Rockwall INDEPENDENT SCHOOL DISTRICT

Request for COMPETITIVE SEALED PROPOSALS

RFCSP 2526.03-002
Cain MS and Williams MS
Site Improvements

Date	Event
March 6, 2026	1st Advertisement / Issue Date
March 10, 2026	Pre-Bid Conference – 2:00 P.M. (CST)
March 13, 2026	Deadline for Questions - 12:00 P.M. (CST)
March 16-20, 2026	RISD Spring Break
March 31, 2026	Deadline for Responses – 2:00 P.M. (CST)
April 20, 2026	Recommendation to RISD Board of Trustees

** The District will make every effort to adhere to this schedule; however, dates are subject to change. Any changes will be posted in the form of an addendum on the RISD website. Additional addendums may be posted at the discretion of RISD. Potential respondents are responsible for watching the website for such publications.*

Deliver Sealed Responses to:
Rockwall ISD Administration Building
Purchasing Department
1050 Williams Street
Rockwall, Texas 75087

Rockwall ISD Purchasing Department:
(Contact during Procurement)
Jana Hunter, MBA, RTSBA
Director of Purchasing
972-771-0605
jana.hunter@rockwallisd.org

Rockwall ISD Operations Department:
(Contact during Project)
Tim Lyssy
Director of Project Planning and Construction
972-771-0605
Tim.lyssy@rockwallisd.org

Pre-Bid Information:
March 10, 2026 – 2:00 P.M.
RISD Administration Bldg.

NOTICE

The Rockwall Independent School District (RISD) is soliciting proposals per the specifications stated elsewhere in this solicitation document. A response to this solicitation is an offer to contract with Rockwall ISD and its members based on the specifications and standard terms and conditions contained in the bid document.

Respondents are cautioned to read this document completely and submit all documents. Each respondent, by submitting a response, represents that he/she has read and understands the proposal. Failure to examine the documents will be at the vendor's risk.

Respondents shall familiarize themselves with existing conditions in the material and labor markets prior to submission of an offer. The fact that an offer is submitted will be construed by the RISD Board of Trustees to indicate that the respondent agrees to carry out the furnishing of products and services in full accordance with the specifications and other contract documents not withstanding existing material and labor market conditions. A signed, submitted proposal constitutes an offer to perform the work and/or deliver the product(s) and/or services specified in the solicitation.

The vendor should propose his/her lowest and best price. All pricing information shall be entered on the proposal in ink or typewritten. Pricing should include packaging and transportation unless otherwise noted by the vendor.

If the vendor is awarded a contract under this solicitation, the prices proposed by the vendor shall remain fixed and firm during the term of the contract, provided, however that the vendor may offer incentive discounts from this fixed price to the District at any time during the contractual term.

Jana Hunter

Jana Hunter, MBA, RTSBA
Director of Purchasing

March 6,2026
Release Date

DISTRICT OVERVIEW

Rockwall ISD, situated in Rockwall County, Texas, comprises approximately two-thirds of the county's area and shares the county's boundary lines on the North, West and South. The eastern boundary of the district is an irregular line running through the town of Fate.

The District currently has 21 campuses comprised of 16 elementary schools, 3 middle schools, 2 high schools, a College and Career Academy and an alternative school. The District currently serves approximately 18,500 students and employs approximately 2300 employees.

Rockwall ISD has grown by more than 3,000 over the last decade and is expected to grow by nearly 6,000 students by 2030.

Rockwall ISD's Call to Action: Rockwall ISD empowers learners to embody independence, value relationships, and achieve excellence as thriving members of a dynamic community.

We believe that:

- Collaborative relationships create a culture where learners thrive.
- An effective learning environment is collaborative, safe, challenging, and responsive to the diverse needs of all students.
- Learning is a partnership that engages all members of our community to empower empathetic and responsible citizens for success among themselves.
- All learners deserve to be challenged in preparation for lifelong learning and future success.

Core Values:

- Relationships
- Innovation
- Excellence

Rockwall INDEPENDENT SCHOOL DISTRICT

Additional information about Rockwall ISD can be obtained on its website: www.rockwallisd.com

CODE OF CONDUCT

Vendors and their suppliers, installers and all others working on Rockwall ISD facilities are required to understand and adhere to the following rules and responsibilities. Failure to comply with the following rules and responsibilities may result in a work's removal from the facilities and/or the termination of all subcontractor's contract. Vendors are responsible for the suppliers and installers adherence to these policies. All personnel working on RISD facilities will indicate their understanding and agreement to comply with these rules and responsibilities by submitting a response to this solicitation.

1. Vendor's employees, installers and suppliers who will be entering the district should check in with the Rockwall ISD designated representative.
2. Vendor's employees, installers and suppliers must wear picture ID badges while on Rockwall ISD property.
3. The use of any tobacco products is prohibited on district property. These prohibited items include but are not limited to cigarettes, cigars, vapes and smokeless tobacco.
4. Drugs and alcoholic beverages are prohibited.
5. The use of vulgar or improper language is prohibited.
6. Unacceptable behavior including physical or verbal intimidation, horseplay, or fighting by any individual on district property will result in immediate remove from property.
7. School requirements may occasionally result in the untimely termination of a subcontractor's daily activities. Vendors are expected to anticipate and understand these circumstances and work with RISD to make-up any scheduling.
8. All contact with student is strictly prohibited.
9. Vendor's employees, installers and suppliers must be properly dressed in work attire which includes the use of proper work shoes and personal protection equipment (as needed).
10. Vendor's employees, installers and suppliers will promptly leave the premises at the end of each work shift or once business purpose has been served.
11. Vendor's employees, installers and suppliers will comply with all state and district rules regarding weapon free zones.
12. Vendor's employees, installers and suppliers shall submit such background information as may be requested by Rockwall ISD to perform criminal background evaluations/investigations.
13. No person who has charges pending or who has been convicted, received probation or deferred adjudication for the following shall be engaged to work on RISD property where students are present: Any offense against a child, any sex offense, any crimes against persons involving weapons or violence, any felony offense against property; or any offense that Rockwall ISD determines to compromise the safety and well-being of staff, students and/or property.

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STANDARD TERMS AND CONDITIONS

The following instructions by the Rockwall Independent School District are intended to afford potential respondents an equal opportunity to participate in the solicitation process. The following Terms and Conditions are standard for the District and apply to all types of purchasing, including this solicitation. In these Terms and Conditions, the terms *respondent, contractor*, *proposer*, *vendor*, and/or *bidder* refer to the person/firm that submits the offer to this solicitation document. The terms *RISD*, *owner*, *district*, and/or *government entity* refer to Rockwall Independent School District.

The documents contained in this solicitation represent the potential agreement between the successful respondent and the school district and supersedes any prior discussions, negotiations, representations, agreements, written or oral.

Any specifications, details, or specific instructions for this solicitation will be found following these Standard Terms and Conditions. Some of the Standard Terms and Conditions may not be applicable to a specific bid or proposal. To the extent each of the terms and conditions is applicable, these shall be deemed to be part of the vendor's bid or proposal documents. If there are specific terms and conditions contained in the bid or proposal documents which are inconsistent with the Standard Terms and Conditions, the specific terms and conditions in the bid and solicitation documents shall control. By submitting a bid or proposal, each vendor or proposer agrees to waive any claims it has or may have against the Owner, the Architect, and their respective officers, trustees, employees, agents, or representatives, arising out of or in connection with the administration, evaluation, recommendation, or selection of any bid or proposal; waiver of any requirements under the bid or proposal documents or contract documents; acceptance or rejection of any bid or proposal; and award of the contract.

The district guarantees no minimum dollar amount in purchase orders against this contract. The scope of this request and requirements of the District as shown in the specifications shall not be considered as binding on the District, and the work actually may be less than or greater than projected.

The RISD can terminate any resulting award for this request with thirty (30) calendar day notice, in the event no funds or insufficient funds are appropriated and budgeted or are otherwise not available in the next fiscal year for obligations herein provided, however, this provision shall not be construed so as to permit RISD to terminate this request in order to enter other contracts or make other arrangements for essentially the same services made the subject of this solicitation.

All bids and proposals from the vendor must remain open for acceptance for sixty (60) days after submittal.

AUTHORITY

The Board of Trustees has delegated to the superintendent the authority to make budgeted purchases for goods and services. Functional area experts, day-to-day contract administrators/managers, teachers, principals, and/or other district employees are not authorized to substantially amend this solicitation document or to substantially modify the subsequent contract. Substantially includes, but is not limited to, changes to delivery dates, place of delivery, and/or specifications that significantly alter the form, fit, and function of a product or the scope of work of a service. Amendments to solicitation documents may be made by the Director of Purchasing. Modifications to contracts/agreements will be made by the Director of Purchasing in accordance with the RISD Board of Trustee guidance, policies, and/or procedures. If a vendor acts on the guidance of a district employee that is not authorized to make changes, the vendor does so at his or her own risk or peril. Also, if a vendor attempts, or gains, a modification/amendment from a district employee that is not authorized to make changes, the vendor does this at his or her own risk or peril and risks the termination of his or her contract/agreement. The functional administrator for this contract is Tim Lyssy, Director of Project Planning and Construction.

CONTACT

Contact between soliciting vendors and user departments during this solicitation process or evaluation process is prohibited. Any attempt by a soliciting firm to contact the department may result in disqualification.

VENDOR QUESTIONS

Any explanation desired or questions by a vendor regarding the meaning or interpretation of these instructions or any other documents included in this solicitation must be requested in writing to RISD, Director of Purchasing, 1050 Williams Street, Rockwall, TX 75087 (jana.hunter@rockwallisd.org) with sufficient time allowed for a reply to reach vendors before the submission of their offers. The email subject line for questions should read: "Questions" followed by the solicitation number and title. The deadline for questions regarding this solicitation is March 13, 2026.

ADDENDA

Written responses to vendor questions shall be presented in the form of an Addendum and posted on the District's website at: https://www.rockwallisd.com/Page/380. Respondents should monitor the Purchasing page on the RISD website for such postings. Oral explanations or instructions will not be binding. Rockwall ISD reserves the right to post addendums up to, and including, the business day prior to the deadline. Vendors who submit a bid or proposal without acknowledging receipt of all addenda issued may be deemed to have submitted a bid or proposal not responsive to the solicitation. Failure to receive such addenda does not relieve the vendor from any obligation under the bid or proposal submitted. All formal written addenda become a part of the vendor bid or proposal documents.

PRE-BID MEETING

Any scheduled pre-bid meeting, will be noted on the cover page of this document. In the event a pre-bid meeting is held, attendance is highly recommended to all potential responders. The purpose of this meeting will be to answer any questions regarding the proposal specifications. Proposers are reminded, however, that verbal responses are not binding – only questions answered by formal written agenda will be binding and will be made part of the proposal documents. Proposers must satisfy themselves, upon examination of these specifications in the pre-bid conference, as to the intent of the specifications. After submission of the proposal, no complaint or claim that there was any misunderstanding in regard to items listed for proposal will be entertained from either party.

SUBMISSION

The responsibility for compliance with this solicitation and the subsequent contract shall be with the bidder/respondent. In submitting a response to this solicitation, respondent understands and agrees to be bound by the terms and conditions, provided in this document, which shall be incorporated into any future contracts, agreements, or purchase orders relating to any resulting agreement between the vendor and Rockwall ISD.

Submissions to this request are due by: March 31, 2026 – 2:00 P.M. (CST)

Responses must be plainly marked on the outside with the vendor's name and address and the solicitation number. A shipping label has been provided in this packet and its use is highly encouraged. Respondents are instructed to submit (1) one original hard copy (marked ORIGINAL) and (1) one additional hard copy.

Responses must be delivered in a sealed envelope or container and submitted to the Purchasing Department at the RISD Administration Building in sufficient time to be received and time-stamped on or before the published date and time shown within this document or on any subsequent addenda. No other published dates will be binding. Late submissions will not be accepted. Unsigned, unsealed, faxed or late responses will not be accepted. Rockwall ISD will not be responsible for mail delivered from the post office. No oral, telegraphic, telephonic, electronic mail or facsimile transmitted responses will be considered. RISD Purchasing personnel will be the official time keeper for all submissions.

Each vendor shall furnish the information required by the solicitation documents. Proposals should provide straightforward, concise information that satisfies the requirements of this solicitation. Emphasis should be placed on conformity to the instructions and requirements of this solicitation and the completeness and clarity of content. Links to web sites for supporting documentation are not acceptable. Expensive bindings, color displays, and advertising materials are not necessary or desired.

Offers submitted on other than authorized forms or with different terms or provisions may be considered to be non-responsive. The vendor must sign the Offer Form and return with the other certifications provided

herein. Failure to manually sign the offer may disqualify it from being considered. The person signing the documents must initial erasures or other changes. Signatures by an agent are to be accompanied with evidence of his authority unless such evidence has been previously furnished to RISD.

EXCEPTIONS/MODIFICATIONS/WITHDRAWAL

Responses deposited with Rockwall ISD may be withdrawn prior to the time set for opening. A response may not be withdrawn after the submittal deadline. By submitting a response, the proposer warrants and guarantees that the document has been carefully reviewed and checked and that it is in all things true and accurate and free of mistakes. If any exceptions are taken to any portion of the bid or proposal, the vendor must clearly indicate the exceptions taken and include a full explanation. Vendor's failure to identify exceptions or proposed changes will constitute acceptance by the vendor of the bid or proposal as proposed by the District. The District reserves the right to reject a bid or proposal containing exceptions, additions, qualifications, or conditions. Any bid or proposal to the District by the vendor, or contract between the District and the vendor, can be modified or withdrawn only by written agreement between Rockwall ISD and the vendor.

BID OPENING

Submittals may be publicly opened immediately after the response deadline on the same day. Responses received by hand delivery or mail after the stated due date and time will remain unopened. Trade secrets and confidential information contained in response shall not generally be open for public inspection, but RISD's records are a matter of public record.

DISQUALIFICATION

Any bid or proposal that does not contain all required contents required by District may be disqualified. Vendor is strongly encouraged to carefully review its bid or proposal documents prior to submitting their response to ensure all requirements are met. Failure to provide the information requested, in its entirety, may be grounds for disqualification of the bid or proposal. Bidders or proposers may also be disqualified and their bids or proposals not considered, among other reasons, for any of the following specific reasons:

a. Reason for believing collusion exists among respondents
b. Reasonable grounds for believing that any respondent is interested in more than one solicitation for the work contemplated
c. Where the respondent, any sub-contractor or supplier, or the surety on any bond given, or to be given, is in litigation with the District or where such litigation is contemplated or imminent, in the sole opinion of the District
d. Respondent being in arrears on any existing contract/purchase order or having defaulted or failed to perform in a satisfactory manner on a previous purchase order
e. Lack of competency as revealed by pertinent facts, including but not necessarily limited to, experience and equipment, financial statement and questionnaires

f. Uncompleted work that, in the judgement of the District, will prevent or hinder the prompt completion of addition work if awarded.
g. Where the bidder or proposer has failed to perform in a satisfactory manner on a previous purchase order or contract.

RISD expressly reserves the right to:

a. Reject any or all proposals
b. Consider a response irregular if it shows any omissions, alterations of form, additions, or conditions not called for; failure to return all forms and copies; or irregularities of any kind.
c. Waive any minor informality or deficiency in a bid or proposal if it is determined to be in the best interest of RISD
d. Award to a single vendor, multiple vendors, each line item separately, or in any combination it determines to be in the best interest of the District. If the Respondent chooses to propose "All or None" or is not agreeable to multiple or split awards, it must be noted as a deviation and included with the response.
e. Reissue a request
f. Consider and accept an alternate proposal as provided herein when most advantageous to RISD, including the utilization of other District contracts, contracts awarded by other governmental agencies, other school boards, or cooperative agreements in lieu of any offer received or award made as a result of this proposal, if it is in the best interest to do so.
g. Cancel the contract with a thirty-day written notice, without prejudice, for factors including, but not limited to, non-availability or non-appropriation of funds
h. Procure any item or services by other means to meet time-sensitive requirements
i. As part of the evaluation process, seek additional information from bidders or proposers, interview bidders or proposers, and negotiate the terms of a proposal as allowed by Texas law.
j. Negotiate price/delivery for service(s)/products(s) identified by this request. The District reserves the right to reject any and all bids that comply with the specifications or to accept a higher bid that complies, when, in judgment of the District, such proposal offers additional value or function, which justifies the difference in price.
k. Make an award without discussion with any proposer.
l. Be the sole judge of acceptable proposal responses.
m. Cancel part or this entire contract at any time during the term without cause. Notification will be submitted in writing no less than thirty (30) days prior to the effective date. Upon receipt of such notice from the District, vendor shall not thereafter incur, and RISD shall have no liability for, any costs under this solicitation that are not necessary for actual performance of the request between the date of the notice of termination for convenience and the effective date of that termination for convenience. In the event of a termination for convenience hereunder, RISD shall have no liability to vendor for lost or anticipated profit resulting there from.

n. Terminate for default all or any part of this contract if vendor breaches any of the terms hereof or if the vendor becomes insolvent or files any petition in bankruptcy. Such right of termination is in addition to and not in lieu of any other remedies which RISD may have in law or equity, specifically including, but not limited to, the right to collect for damages or demand specific performance. RISD may terminate the contract and debar the vendor for future "bidding" for violations of the federal requirements including, but not limited to, "Contract Work Hours and Safety Standards Act", "Equal Employment Opportunity Act", and "Energy Policy and Conservation Act".

Purchases of service or equipment from a business owned in whole or in part by a Rockwall ISD employee shall be permitted only when approved by the Director of Purchasing and when determination has been made that such equipment or service is not an extension of the employee's regular job responsibility at the District. Failure on part of Proposer to disclose ownership by the District employee may be grounds for disqualification.

EVALUATION

Proposals may be evaluated by an Evaluation Committee comprised of key Rockwall ISD personnel in order to fairly evaluate all qualified proposals. Evaluation by committee members will be combined into one score, which will be compared to the other proposals.

To the extent allowed by law, discussions/negotiations may be conducted with vendors who are deemed to be within the competitive range. If discussions/negotiations are conducted, respondents may be required to submit a best and final offer. The best and final offer may be required as early as 24 hours after completion of discussions/negotiations.

In determining to whom to award a contract and per the Texas Government Code 2269.055, the district will consider and apply any existing laws, including any criteria, related to historically underutilized business and any existing laws, rules or applicable municipal charters, including laws applicable to local governments, related to the use of women, minority, small, or disadvantaged business. The district may also consider the following criteria. At the discretion of the district and in evaluation of this solicitation, point values are indicated after each criteria item.

Govt. Code 2269	Criteria	Weight
(1)	The price	60
(2)	The offeror's experience and reputation	15
(3)	The quality of the offeror's goods or services	20
(4)	The offeror's proposed personnel	5
(5)	Any other relevant factor specifically listed in the request for bids, proposals or qualifications	

In determining an award of a contract under Texas Government Code 2269.055, the government entity shall:

a. Consider and apply any existing laws, including any criteria, related to historically underutilized businesses; and
b. Consider and apply any existing laws, rules, or applicable municipal charters, including laws applicable to local governments, related to the use of women, minority, small or disadvantaged business.

As provided by Texas Government Code 2269.054 ("Right to Work"), Rockwall ISD will not consider whether the vendor is a member of, or has any other relationship, with any organization, and the specifications are not intended to, and do not, deny or diminish the right of a person to work because of the person's membership or other relationship status with respect to any organizations.

It is the intent and policy of the District not to discriminate on the basis of sex, disability, race, color, or national origin in its programs and/or activities, nor in its employment practices.

LOBBYING

In order to ensure the integrity of the selection process, the vendor's employees, officers, agents, or other representatives shall not lobby or attempt to influence a vote or recommendation related to the vendor's response, directly or indirectly, through any contact with school board members or other district officials involved in the solicitation from the date it is released until the award.

AWARD

Successful vendor(s) may be notified in writing of District's award. No assignment of a bid, proposal, or resulting contract is permitted without the prior notice to and written consent of Rockwall ISD by means of a Notice to Proceed and/or Authorized Purchase Order or signed contract after a recommendation has been accepted by the RISD Board of Trustees. If respondent requires any other agreement, a draft document must be provided with the proposal. No work shall begin, goods procured or delivered, or costs incurred by vendor until the notice is received. Any cost incurred by the vendor prior to the notice shall not be reimbursed by the District.

Tabulations may be requested by contacting the Director of Purchasing via email upon award of a contract based upon approval by the RISD Board of Trustees, if required. Otherwise, information may be released after award of the contract by the Superintendent or designee.

TERM

If this solicitation is for a set time period only, or a single purchase, the award will last until the goods or services have been delivered, completed and accepted by the District. The District reserves the right to acquire reasonable amounts of additional goods/services, as listed in the bid or proposal, subject to verification of the same or lower prices and conditions of the bid or proposal and consistent with Texas law. After the initial contract term, the District reserves the right to extend the contract as indicated in this request.

PRICING

All prices proposed by the vendor, and accepted by the District, shall remain in effect throughout the term of the bid proposal, award, contract, or purchaser order, and cannot be increased during that term without written agreement between the vendor and the Rockwall ISD Board of Trustees or its designee. Rockwall ISD reserves the right to show a preference to any bid or proposal that provides a standard discount percentage for goods or services, or a discount for early payment of any bill to the vendor for its goods or services.

BILLING AND PAYMENTS

Per CH Local of District Policy - The District limits its purchases through the use of properly drawn and authorized purchase orders. Consequently, the District is not responsible for items not ordered via this method. The purchase order number shall appear on all itemized invoices to ensure payment. District employees shall not be permitted to purchase supplies or equipment for personal use through the District's business office without an authorized purchase order. Completing work or providing product without a purchase order may result in non-payment by the district and/or termination of awarded contract.

The District is a tax-exempt entity under Texas law. Vendor should not include tax on its bid, proposal, quote or invoice to the District. Vendor shall submit itemized invoices on each purchase order in a timely manner following delivery.

Invoices shall indicate the purchase order number and be submitted to RISD Business Office, Attn: Accounts Payable, 1050 Williams Street, Rockwall TX 75087 or emailed to accountspayable@rockwallisd.org.
The vendor shall make no charge or addition to the accepted price for delivering, placing, or invoicing product(s). Payment shall not be due until all items on the purchase order have been received by RISD (unless specified in the specifications) and the above instruments are submitted and the invoice has been accepted by RISD. All prices shall be F.O.B. destination.

District shall make all payments under this Agreement from current revenues available. In the event no funds,

or insufficient funds due to non-appropriation, are available at any time or during any fiscal period when such payment is due, in accordance with Local Government Code Ann. §271.903, District shall notify vendor of such occurrence and this Agreement shall terminate on the last day of the fiscal period for which payment was received without penalty or expense to District of any kind whatsoever. However, District shall be responsible to remit payment for all services provided by the Vendor to the District prior to the termination date.

GOODS

The vendor warrants that it owns and is legally able to transfer ownership of the goods or materials that are the basis of the solicitation to Rockwall ISD. The vendor warrants that it owns a clear title free of any materialman's, suppliers, or other type of liens, mortgage, encumbrance, or other security interest in the goods or materials supplied to Rockwall ISD. Any breach to this warranty of title shall be considered a default by the vendor and good cause for termination of the award, contract, or purchase order.

Strict conformance with the standards, specifications, and requirements of the bid or proposal is required by Rockwall ISD. Unless otherwise stated in the specifications, all supplies and components to be provided shall be new (not used or reconditioned, and not of such age or so deteriorated as to impair their usefulness or safety), of current production, and of the most suitable grade for the purpose intended. If at any time during the term of an awarded agreement the vendor believes the furnishings of supplies or components which are not new is necessary or desirable, it shall notify the District immediately, in writing, including the reasons and proposing any consideration which will flow to the District if authorization to use such supplies or components is granted.

If a brand name or specific model name is shown in the proposed specifications or bid form, such usage is to indicate an acceptable standard which must be considered if bidding better or equivalent products. Any bid or proposal for such better or equivalent products shall provide significant information on the products to allow the District to determine whether or not they are acceptable.

Any proposed substitution of goods or services to be supplied by the vendor shall require prior written acceptance by the District, unless stated otherwise. The vendor shall be bound to provide all proposed goods or services if its bid or proposal is accepted and awarded by Rockwall ISD, and no changes shall be acceptable unless agreed to in writing by the District.

Vendor assumes all liability for delivering non-compliant goods. The District reserves the right to reject any tender of non-compliant goods and shall require the vendor to take possession of such defective goods at no cost to District, and replace them with compliant goods at no cost to District, unless Rockwall ISD elects, in writing, to accept such non-compliant goods. Such non-confirming goods shall constitute good cause for termination of the contract, purchase order, or award, if not accepted by written agreement by Rockwall ISD or cured by the vendor.

Respondent agrees to ascertain whether goods manufactured in accordance with the specifications will give rise to the rightful claim of any third person by way of infringement or the like. If vendor is of the opinion that an infringement or the like will result, he/she will notify RISD to this effect in writing within two weeks after the signing of this a contract. If RISD does not receive notice and is subsequently held liable for the infringement or the like, vendor will indemnify RISD for any damages due to such claim. If vendor, in good faith, ascertains that production of the goods in accordance with the specifications will result in infringement or the like, this document shall be null and void. RISD may pay vendor for the reasonable cost (as determined by RISD) of his/her search as to infringements.

Respondent warrants that the product sold to RISD shall conform to the standards promulgated by the federal government including, but not limited to, the U.S. Department of Labor under the Occupational Safety and Health Act (OSHA) and the Consumer Product Safety Commission (CPSC). In the event the product does not conform to applicable safety standards, RISD may return the product for correction or replacements at the vendor's expense. In the event vendor fails to make the appropriate correction within a reasonable time (i.e., 2 weeks) correction may be made by RISD at vendor's expense.

The terms of the agreement are “no arrival, no sale”. The title and risk of loss of the goods shall not pass to the District until the District actually receives and takes possession of the goods/services at the point or points of delivery. The District shall have the right to inspect the goods at delivery before accepting them.

The vendor shall be responsible for replacing or correcting any defective product or service supplied to the District in response to the Solicitation at no cost to Rockwall ISD.

DELIVERY

Performance of service/delivery of goods shall be made to the location identified on each purchase order or resulting contract. All work performed, as herein shown under the specifications, shall be of the highest quality workmanship and shall in every respect meet or exceed the industry standards for this type of good/service. Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. All delivered equipment, materials or merchandise must be new, unused, free of liens, and in the manufacturer's original packing unless otherwise specified. If a tender is made which does not fully conform, this shall constitute a breach of the contract, purchase order, and award, and the vendor shall not have the right to substitute a conforming tender, provided, where the time for performance has not yet expired, the vendor may reasonably notify the district of his intention to cure and may then make a conforming tender within the contract time but not afterward.

The vendor will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently packed as follows: (a) vendor’s name and address;(b) Consignee's name, address and purchase order or purchase release number and the supply agreement number if applicable; (c) Container number and total number of containers, e.g., box 1 of 4 boxes; and (d) the number of the

container bearing the packing slip. The vendor shall bear the costs of packaging and delivery at reasonable costs unless otherwise provided. Acceptance by the District of any delivery shall not relieve the vendor of any guarantee or warranty, express or implied, nor shall it be considered an acceptance of material not in accordance with the specifications and shall not waive the District's right to request replacement of defective material.

NOTICE OF DELAYS

Whenever the vendor encounters any difficulty which delays or threatens to delay timely performance, the vendor shall immediately give notice, in writing, to the District, including all relevant information. Such notice shall not in any way constitute a basis for an extension of the delivery or performance schedule or be construed as a waiver by Rockwall ISD of any right or remedies to which it is entitled by law or pursuant to provisions herein. Failure to give such notice, however, may be grounds for denial of any request for an extension of the delivery or performance schedule because of such delay.

SAFETY DATA SHEET (SDS)

The vendor shall provide, at no cost to DISTRICT, at least one (1) copy of any Safety Data Sheet (SDS) applicable to any goods or materials to be supplied by the vendor in response to this solicitation.

WARRANTIES

Warranties for goods and services shall be a minimum of one (1) year from completion of the bid or proposal. If goods or services to be provided are of comparable quality, the District may give preference to longer warranties when evaluating the bid or proposal.

The price to be paid by Rockwall ISD shall be that contained in vendor's response, which the vendor warrants to be no higher than the vendor's current prices on orders by others for products of the kind and specification covered by the agreement for similar quantities under similar or like conditions and methods of purchase. In the event the vendor breaches this warranty, the prices of the items shall be reduced to the vendor's current prices on orders by others or, in the alternative, Rockwall ISD may cancel this contract without liability to the vendor for breach or the vendor's actual expense.

The vendor 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 vendor for the purpose of securing business. For breach or violation of this warranty, Rockwall ISD shall have the right in addition to any other right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

The vendor shall not limit or exclude any implied warranties and any attempt to do so shall render this contract

voidable at the option of the District. The vendor warrants that the goods furnished will conform to the specifications, drawings and descriptions listed in the bid invitation and to the sample(s) furnished by the vendor, if any. In the event of a conflict between the specifications, drawings and descriptions, the specifications shall govern. All equipment items awarded as a result of the bid will be covered by an all parts and labor warranty, including any/all transportation charges, for a minimum period of one (1) year.

CONTRACTORS

Persons providing services on a project ("subcontractor" in Texas Labor Code 406.096) include 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 contracted 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 that 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 do not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

The proposer declares that in the event of the award of a contract to the undersigned to this offer will comply with the Immigration Reform & Control Act of 1986.

Respondents will provide their own tools/equipment required/expected of their craft/trade. The contractor is responsible for permits and fees required and compliance with all local, state, and federal rules, regulations, and statutes. The job site shall be in a clean, safe and orderly condition at all times. It shall be the contractor's responsibility to remove all debris, materials, and equipment from the job site upon completion of the work specified.

The contractor shall agree to waive all right of subrogation against the District, its officials, employees and volunteers for losses from work performed by contractor for the District.

The contractor shall hold the District harmless from and indemnify it against all liability, including attorney's fees, which may arise from and accrue directly from the performance of the work or any obligation of Contractor or failure of Contractor to perform any work or obligation provided for in this Agreement.

INSURANCE

The successful respondent, at his/her own expense, shall provide and maintain insurance with fiscally sound firms (at least an AM Best rating of A-) authorized to do business in Texas. Insurance requirements also apply to any sub-contractor(s) in the event that any work is sublet. The contractor is responsible for making

sure the sub-contractor(s) meets the minimum insurance requirement limits as by law.

Insurance must remain in effect for the duration of this contract. Should any policy be canceled before the expiration date, the issuing company will mail thirty (30) days written notice to the certificate holder, RISD. The contractor shall notify the district in writing by certified mail or personal delivery, within ten 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. 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 district showing that coverage has been extended.

Vendor may be required to provide a copy of insurance coverage to RISD. If the district is to be named as an additional insured on the vendor's insurance coverage, the certificate indicating this should be provided within ten (10) calendar days from date of award. The bid/proposal number and title should be noted in the "Description of Operations/Locations/Vehicles/Special Items" block of the certificate and the "Certificate Holder" block of the certificate should read, "RISD, Attn: Director of Purchasing, 1050 Williams Street, Rockwall, TX 75087." Additional insurance requirements may be required for construction and/or services projects and will be identified elsewhere in this document.

The contractor represents to the district that all employees of the contractor who will provide services on the project will be covered by statutory 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 filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011 (44) for all employees of the contractor, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's 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.

The contractor shall post on each project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, 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.

A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the project. Duration of the project includes the time from the beginning of the work on the project until the project has been completed and accepted by the district.

The contractor shall retain all required certificates of coverage for the duration of the project and for one

year thereafter. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor that entitled the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

TERMINATION

Vendor shall be considered in default, and such default shall be grounds for the District to terminate any resulting award for this solicitation and/or pursue any and all relief, at law or in equity, to which it may be entitled by reason of such default, in the presence of a failure to perform any of its obligations under any resulting agreement and fails to correct such non-performance within ten (10) calendar days of written notice from the District to do so. In case of default of the vendor, RISD reserves the right to terminate the purchase order. In case of default of three (3) purchase orders, the district reserves the right to terminate the contract and suspend future business with the vendor.

Rockwall ISD shall have the right to terminate any purchase order to, contract with, or awarded to the vendor, in whole or in part, for cause (including breach of the proposal, warranties, or contract by the vendor**,** or because of loss of federal funding) or for the District's convenience at any time. Any award, contract, or purchase order is subject to termination by the District if any person significantly involved in initiating, negotiating, securing, drafting, or creating the solicitation on behalf of the District, is at any time while the solicitation is in effect, an employee of the vendor in any capacity or as a consultant to the District with respect to the subject matter of the Solicitation.

If deemed necessary, inspections will be made by authorized District personnel on a routine basis. Any deficiencies in the work performance disclosed during such inspections must be corrected following receipt of notification by the Vendor. Continued failure to take such corrective actions could, at the District's discretion, lead to termination of any resulting award.

FORCE MAJEURE

Neither the District nor the vendor shall be responsible or deemed to be in default of its obligations to the other to the extent any failure to perform or delay in performing its obligations under the bid or proposal is caused by events or conditions beyond the reasonable control of that party, and are not due to the negligence or willful misconduct of such party (hereinafter, "Force Majeure events"). For purposes of the bid or proposal, Force Majeure events shall include, but not be limited to, acts of God or public enemy, war, riot or civil commotion, strikes, epidemic, fire, earthquake, tornado, hurricane, flood, explosion, weather-related emergencies, or other catastrophes, or events or conditions due to law, regulations, ordinances, order of a court of competent jurisdiction, or executive decree or order. However, in the event of such delayed non-performance or nonperformance, the party so delayed shall furnish prompt written notice to the other party (including the date of inception of the Force Majeure event and the extent to which it will affect performance) and shall undertake all efforts reasonably possible to cure the delay or nonperformance and mitigate its effects, or to otherwise perform. The District shall not be responsible for payment for any product or service

delayed or foreclosed by any Force Majeure event unless and until such delayed or foreclosed product or service is provided. These provisions shall not preclude the District from canceling or terminating any resulting award (or any order for any goods or services included herein), or from revising the scope of the work, as otherwise permitted under the bid or proposal.

CONFLICTS

Effective January 1, 2006 and pursuant to Texas H.B. No. 914 and in accordance with Chapter 176 of the Texas Local Government Code, Section 176.006, any person or entity who contracts or seeks to contract with RISD for the sale or purchase of property, goods, or services (as well as agents of such persons, hereafter referred to as Vendors) are required to file, on an annual basis, a Conflict of Interest Questionnaire with the District. Each covered person or entity who seeks to or who contracts with RISD is responsible for complying with any applicable disclosure requirements. RISD will post the completed questionnaires on its website. Information regarding H.B. No. 914 may be obtained from the Texas Ethics Commission's website at http://www.ethics.state.tx.us.

Any board member who has any substantial interest, either direct or indirect, in any business entity seeking to contract with the District, shall, before any vote or decision on any matter involving the business entity, file an affidavit stating the nature and extent of interest and shall abstain from any participation in the matter. This is not required if the vote or decision will not have any special effect on the entity other than its effect on the public. However, if a majority of the governing body are also required to file, and do file similar affidavits, then the member is not required to abstain from further participation.
Local Government Code Chapter 171

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The laws 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 (Form 1295) 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 business entity is responsible for first electronically filing Form 1295 with the Ethics Commission. This filing process creates a certification of filing and a completed Form 1295 must be printed, signed by an authorized agent of the business entity and submitted to the school district.

GRATUITIES

Please note that a "gift to a public servant" is a Class A misdemeanor offense if the recipient is a government employee who exercise some influences in the purchasing process of the governmental body. This would certainly apply to anyone who helps establish specifications or is involved in product selection or directs a purchase.

The District may, by written notice to the vendor, cancel this solicitation, its contract, purchase order, or award

without liability to the vendor if it is determined by the District that gratuities, in the form of entertainment, compensation, gifts, or otherwise were offered or given by the vendor, or any agent or representative of the vendor, to any Board of Trustee member, officer, or employee of the Rockwall Independent School District with an intent to secure favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such an agreement. In the event this contract is canceled by the District pursuant to this provision, Rockwall ISD shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount used by the vendor to provide such gratuities.

FACILITIES

Rockwall ISD is a tobacco-free, drug-free, weapon-free and alcohol-free environment. No one may use, consume, carry, transport or exchange alcohol beverages, tobacco, cigarettes, electronic cigarettes, controlled substances and/ or illegal drugs while in a school district building or while on school district property. It is the responsibility of the vendor to ensure that its employees, agents, and subcontractors are not under the influence of drugs or alcohol and/or in possession of drugs, tobacco, alcohol, or weapons. If an employee, agent, or subcontractor of vendor is found to be under the influence and/or in possession of drugs/tobacco, alcohol, or weapons at the time of service, the vendor will be notified at once by District that the individual(s) must be immediately restricted from all Rockwall ISD campuses/departments. Repeated offenses by vendor could result in contract termination for default.

For the safety of students, all vendor personnel will sign visitor log in the office at the campus. An identification badge will be worn as required by the campus administrator. Vendor personnel are expected to maintain proper dress and exhibit a vendor badge or wear vendor issued shirts displaying the vendor logo. All contractors must also be in a uniform that identifies them at all times.

All vendor personnel are required to stay within the designated installation areas and may only enter a teacher's classroom when accompanied by District personnel.

At the time of offer submission, the person or entity submitting an offer must give 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 this conviction of a felony. The District may terminate a contract with a person or business if the District determines that the person or business failed to give such notice or misrepresented the conduct resulting in the conviction. This requirement does not apply to a publicly held corporation.

Texas Education Code Chapter 22 requires service contractors to obtain criminal history record information regarding covered employees and to certify to the District that they have done so. Covered employees with disqualifying convictions are prohibited from serving at a school district. Covered employees are all employees of a contractor who have or will have continuing duties related to the service to be performed at the District and have or will have direct contact with students. The District will be the final arbiter of what

constitutes direct contact with students.

Vendors (owners, officers, employees, volunteers, etc.) may not work on District property where students may or may not be present when they have charges pending, have been convicted, received probation or deferred adjudication for the following:

- Any offense against a child
- Any sex offense
- Any crimes against persons involving weapons or violence
- Any felony offense involving controlled substances
- Any felony offense against property
- Any other offense the District believes might compromise the safety of students, staff, or property.

ASBESTOS

Vendors who perform work inside the RISD facilities are hereby notified that buildings may contain asbestos containing materials. This notification is required by both the State of Texas Department of State Health Services and the Federal EPA Asbestos regulations. These guidelines cover both RISD's responsibilities and the Employer's responsibility to their employees. As a Vendor it is your responsibility to check each building prior to performing any work in that facility. These building materials may include but are not limited to: ceiling tile, floor tile and mastic, sheetrock, tape and bed compound, thermal pipe insulation, spray-on ceiling material, calks, and roofing products. As there have been numerous asbestos containing products manufactured over the years, you must check each building's Asbestos Management Plan. This plan is normally kept in the main office. Check with the school secretary and she will allow you to look at it. It is the vendor's responsibility to notify all employees working for them that RISD facilities may contain asbestos and where their employees may find the facility's Asbestos Management Plan.

Products and/or services procured under this agreement may be of a construction nature and will require certification that materials utilized and installed in conjunction with any project involving construction, be it new, renovation or contracted trade services, are free of asbestos and lead.

PUBLIC INFORMATION ACT (PIA) / FREEDOM OF INFORMATION ACT (FOIA)

By entering into a contract, pursuant to Texas Government Code Ann. Chapter 552, Subchapter J, the vendor agrees to be bound by the following terms if the contract has a stated expenditure of at least $1,000,000 for the purchase of goods or services by the District or if the contract results in the expenditure of at least $1,000,000 in public funds for the purchase of goods or services by the District in a fiscal year of the Rockwall ISD. If the district receives a written request for public information related to this Contract that is in the possession or custody of the vendor and not in the possession or custody of the District, Rockwall ISD shall send, not later than the third business day after the date the District receives the written request, a written request to the vendor that vendor provide that information to the District.

The vendor must:

- Preserve all contracting information related to the contract as provided by the records retention requirements applicable to the District for the duration of the contract;

- Promptly, within four business days, provide to the District any requested contracting information that is in the custody or possession of the vendor upon request of the Rockwall ISD; and,

On completion of the contract, either:

- Provide to the District at no cost all contracting information related to the contract that is in the custody or possession of the vendor; or

- Preserve the contracting information related to the contract as provided by the records retention requirements applicable to the District.

If the requirements of Subchapter J, Chapter 552, Texas Government Code Ann. apply to this Solicitation or Contract, the vendor agrees that the contract can be terminated if the vendor knowingly or intentionally fails to comply with the requirements of that subchapter. Texas Government Code Ann. Chapter 552.374.

Further, under Texas Government Code Ann. Chapter 552.372(c), Rockwall ISD may not accept a bid from or award a contract to an entity that the District has determined has knowingly or intentionally failed in a previous bid or contract to comply with Subchapter J, unless the District determines and documents that the entity has taken adequate steps to ensure future compliance.
If a vendor fails to provide the requested information to the District, Texas Government Code Ann. §552.373 requires the District to notify the vendor in writing of the failure and allow 10 business days to cure the violation. Rockwall ISD may terminate the contract if vendor fails to remedy the failure, the District determines the failure was knowing and intentional, and steps have not been taken to ensure future compliance.

INDEMNITY

Except as otherwise expressly provided or prohibited by law, respondent shall defend, indemnify, and hold RISD harmless from and against all claims, liability, loss and expenses, including reasonable costs, collection expenses, and attorneys' fees incurred, which arise by reason of the acts or omissions of respondent, its agents or employees in the performance of its obligations under this contract. This clause shall survive termination of this contract.

ANTI-TRUST

Successful respondent shall assign to RISD any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 USCA, Section 1 et seq., and which arise under

the antitrust laws of the State of Texas, Tex. Bus. & Com. Code, Section 15.01, et seq.

MEDIATION

In the event of any dispute arising out of, related to, or regarding vendor's bid or proposal, or charges for goods or services provided by the vendor, those disputes will be resolved under the terms of Texas Government Code Ann. Chapter 2251. The vendor further agrees that any dispute regarding the sufficiency of the goods or services supplied by the vendor that is not resolved by discussion with the District, will be submitted to mediation in Rockwall County, Texas, with a mutually-agreed mediator, before either party may file suit. The costs of the mediator will be divided equally between the parties. In the event of any litigation between the parties, the prevailing party shall be entitled to recover reasonable and necessary attorneys' fees from the other party.

LITIGATION

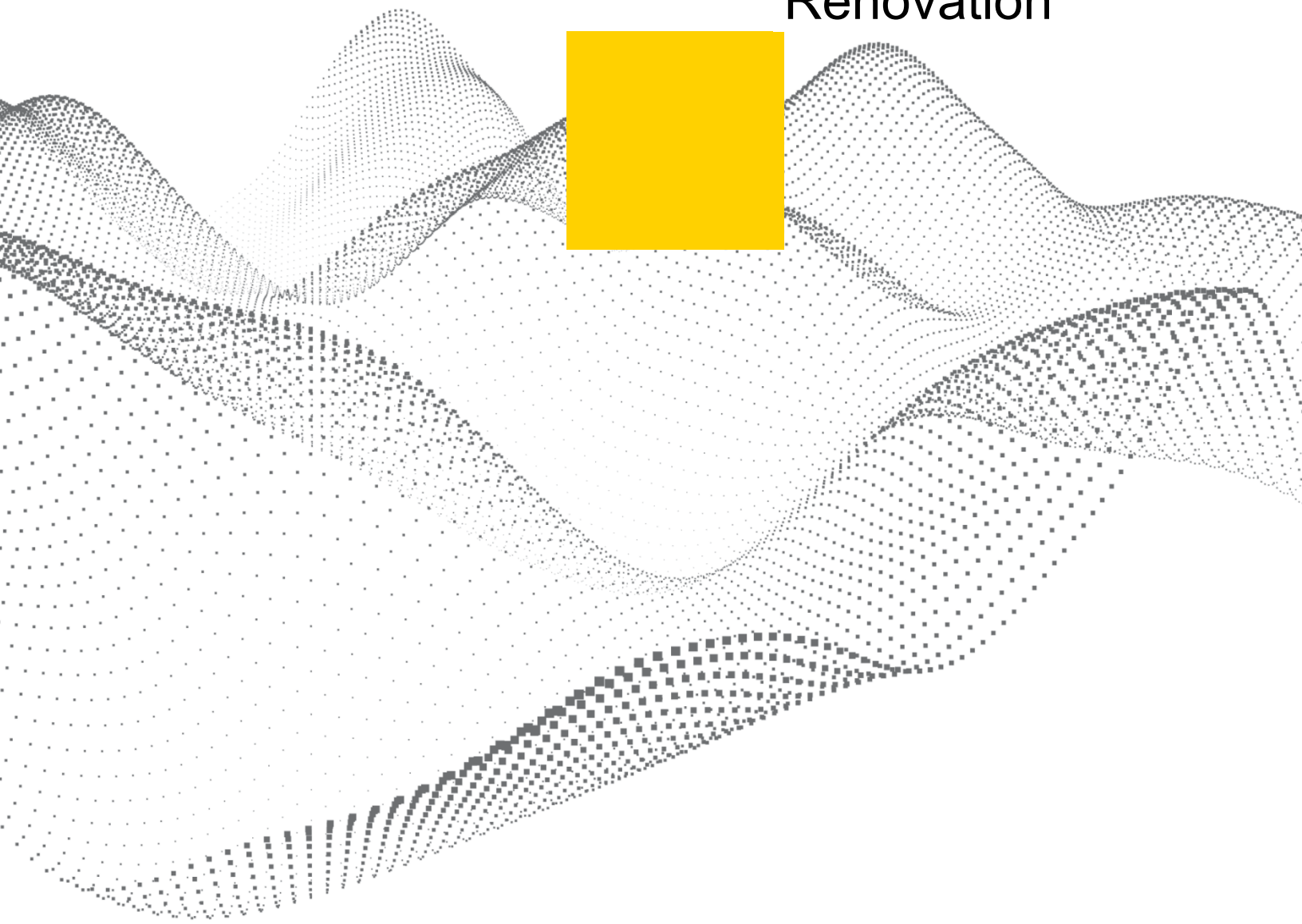
This procurement, and any resulting award, contract, purchase order, or other agreement arising out of or related to it, shall be governed and interpreted by the laws of the State of Texas, and any litigation shall be conducted in state district court. Mandatory and exclusive venue shall be in Rockwall County, Texas, or, if no county is specified, then in the county in which the Owner's main administrative office is located.

SPECIFICATIONS

CORGAN

PROJECT MANUAL

Cain and Williams MS Athletic, Site, and Interior Renovation



Issue for Construction
26 February 2026
26028.0000

Corgan Associates, Inc.
401 North Houston Street
Dallas, Texas 75202
214 748 2000

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DOCUMENT 00 01 07

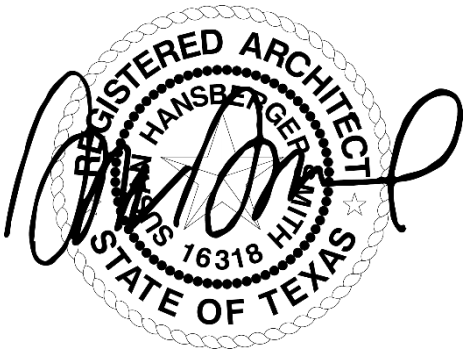
SEALS PAGE

Project Manual

Issue for Construction
26 February 2026
26028.0000

Cain and Williams MS Athletic, Site, and Interior Renovation

ARCHITECT OF RECORD
Corgan Associates, Inc.
401 North Houston Street
Dallas, Texas 75202
214 748 2000
Responsible for Sections marked with (CAI) in Document 00 01 10 "Table of Contents."



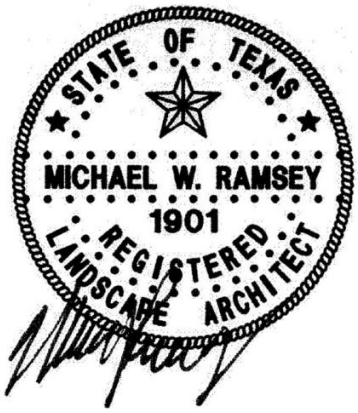
Architect of Record — 02/26/26 Date

CIVIL ENGINEER OF RECORD
Glenn Engineering Corporation
4500 Fuller Drive, Suite 220
Irving, Texas 75038
972 717 5151
Firm License #: F-303
Responsible for Sections marked with (GEC) in Document 00 01 10 "Table of Contents."



Civil Engineer of Record — 02/26/26 Date

LANDSCAPE ARCHITECT OF RECORD
Ramsey Landscape Architects, LLC
11914 Wishing Well Ct.
Frisco, Texas 75035
972 335 0889
Responsible for Sections marked with (RLA) in Document 00 01 10 "Table of Contents."



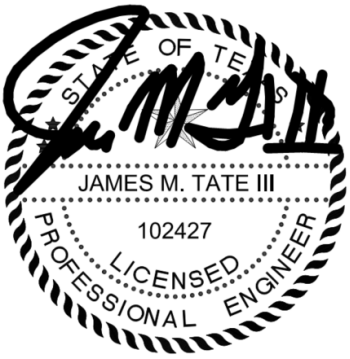
Landscape Architect of Record — 02/26/26 Date

MECHANICAL ENGINEER OF RECORD
EMA Engineering & Consulting, Inc.
328 S. Broadway Ave.
Tyler, Texas 75702
903 581 2677
Firm License #: F-893
Responsible for Sections marked with (EMA-M) in Document 00 01 10 "Table of Contents."



Mechanical Engineer of Record — Date: 02/26/26

ELECTRICAL ENGINEER OF RECORD
EMA Engineering & Consulting, Inc.
328 S. Broadway Ave.
Tyler, Texas 75702
903 581 2677
Firm License #: F-893
Responsible for Sections marked with (EMA-E) in Document 00 01 10 "Table of Contents."



Electrical Engineer of Record — Date: 02/26/26

END OF DOCUMENT

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DOCUMENT 00 01 10

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Division	Section Title	DR Code	Date
DIVISION 32 — EXTERIOR IMPROVEMENTS			
32 01 90	Landscape Grounds Maintenance	RLA	02/26/26
32 13 13	Portland Cement Concrete Paving	GEC	02/26/26
32 13 14	Wheelchair Ramp	GEC	02/26/26
32 13 15	Concrete Curb and Gutter	GEC	02/26/26
32 14 05	Track Construction	GEC	02/26/26
32 14 08	Poly Track General	GEC	02/26/26
32 17 23	Pavement Markings	GEC	02/26/26
32 17 24	Track Marking	GEC	02/26/26
32 17 33	Joint Sealer	GEC	02/26/26
32 31 14	Steel Fencing	GEC	02/26/26
32 31 15	Chain Link Fence- PVC Color Coated Fabric	GEC	02/26/26
32 31 19	Decorative Metal Fences and Gates	CAI	02/26/26
32 80 00	Irrigation	RLA	02/26/26
32 80 01	Tree Protection and Trimming	GEC	02/26/26
32 92 00	Lawns and Grasses	RLA	02/26/26
DIVISION 33 — UTILITIES			
33 42 16	Reinforced Concrete Pipe Culverts	GEC	02/26/26
33 42 17	Drainage Structures	GEC	02/26/26
33 42 18	Polypropylene Storm Drainage Pipe	GEC	02/26/26
33 42 19	N12 Pipe	GEC	02/26/26

END OF DOCUMENT

DOCUMENT 00 73 43

WAGE RATE REQUIREMENTS

1.1 FEDERAL PARTICIPATION DISCLOSURE

A. This project will be partially funded with Federal funds from the United States Department of Commerce, Economic Development Administration and therefore is subject to the Federal laws and regulations associated with that program.

1.2 DUTY TO PAY PREVAILING WAGE RATES

A. In compliance with Section 2258, Subchapter B of the Texas Government Code, Contractor shall pay not less than wage scale of various classes of labor as shown in the Attachment to this Document. The wage rates set forth are minimum rates only. Owner will not consider any claims for additional compensation made by any Contractor because the Contractor pays wages in excess of the applicable minimum rate stipulated in the Contract. The Attachment is not a representation that quantities of qualified labor adequate to perform the Work may be found locally at specified wage rates.

1.3 ATTACHMENT

A. The attached Document is part of the Procurement and Contracting Requirements for Project. They provide Owner's information and are made available for Bidders' convenience and information.

B. Attachment: Document 00 73 43.10 "General Decision" dated 01/02/2026.

END OF DOCUMENT

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GENERAL DECISION

General Decision Number: TX20260281 01/02/2026

Superseded General Decision Number: TX20250281

State: Texas

Construction Type: Building

Counties: Hunt, Kaufman and Rockwall Counties in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Modification Number	Publication Date
0	01/02/2026

ASBE0021-011 06/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 33.23	7.52

BOIL0074-003 01/01/2025

	Rates	Fringes
BOILERMAKER	$ 33.17	24.92

CARP1421-002 10/01/2023

	Rates	Fringes
MILLWRIGHT	$ 32.02	11.27

ELEV0021-006 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC	$ 51.93	38.435+a+b

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day,

Christmas Day, and Veterans Day.

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

IRON0263-005 06/01/2025

	Rates	Fringes
IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 29.64	8.43

PLUM0100-005 11/01/2024

	Rates	Fringes
HVAC MECHANIC (HVAC Unit Installation Only)	$ 39.76	14.04
PIPEFITTER (Excludes HVAC Pipe Installation)	$ 39.76	14.04

SUTX2014-061 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 19.89	0.00
CARPENTER, Excludes Drywall Hanging, Form Work, and Metal Stud Installation	$ 16.62	0.00
CAULKER	$ 15.16	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.21	0.00
DRYWALL HANGER AND METAL STUD INSTALLER	$ 15.42	0.00
ELECTRICIAN (Alarm Installation Only)	$ 20.93	3.86

ELECTRICIAN (Communication Technician Only)	$ 17.62	2.92
ELECTRICIAN (Low Voltage Wiring Only)	$ 17.97	2.63
ELECTRICIAN, Excludes Low Voltage Wiring and Installation of Alarms/Sound and Communication Systems	$ 20.65	3.05
FORM WORKER	$ 12.13	0.00
GLAZIER	$ 16.55	3.13
HIGHWAY/PARKING LOT STRIPING: Operator (Striping Machine)	$ 10.04	2.31
INSTALLER - SIDING (METAL/ALUMINUM/VINYL)	$ 14.74	0.00
INSTALLER - SIGN	$ 15.61	0.00
INSULATOR - BATT	$ 13.00	0.00
IRONWORKER, REINFORCING	$ 12.37	0.00
LABORER: Common or General	$ 11.25	0.00
LABORER: Mason Tender - Brick	$ 10.54	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.75	0.00
LABORER: Pipelayer	$ 13.00	0.35
LABORER: Plaster Tender	$ 12.22	0.00
LABORER: Roof Tearoff	$ 11.28	0.00
LABORER: Landscape and Irrigation	$ 11.09	0.00
LATHER	$ 16.00	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 12.83	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31

OPERATOR: Drill	$ 15.69	0.50
OPERATOR: Forklift	$ 13.21	0.81
OPERATOR: Grader/Blade	$ 12.96	0.00
OPERATOR: Loader	$ 13.46	0.85
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 18.44	0.00
OPERATOR: Roller	$ 15.04	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 13.21	2.33
PAINTER: Drywall Finishing/Taping Only	$ 13.76	2.84
PLASTERER	$ 15.75	0.00
PLUMBER (HVAC Pipe Installation Only)	$ 22.16	5.46
PLUMBER, Excludes HVAC Pipe Installation	$ 22.31	5.18
ROOFER	$ 17.19	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 20.88	5.19
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 24.88	5.97
SPRINKLER FITTER (Fire Sprinklers)	$ 22.94	0.00
TILE FINISHER	$ 11.22	0.00
TILE SETTER	$ 14.25	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 16.40	0.81
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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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.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, 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 the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

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 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

END OF ATTACHMENT

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project Information
2. Work covered by Contract Documents
3. Owner furnished products.
4. Contractor's use of premises and site.
5. Owner occupancy.
6. Work sequence.
7. Work restrictions.
8. Specification and drawing conventions.
9. Hazardous materials.

1.2 PROJECT INFORMATION

A. Project Information:

1. Project Identification: Cain and Williams MS Athletic, Site, and Interior Renovation for Rockwall ISD.
2. Code Requirements: This project is governed by the Codes as indicated on the Drawings, with local amendments applicable to Rockwall, Texas. The Contractor shall comply with all requirements of the Codes and the Local Authority Having Jurisdiction.

B. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage as specified in Section 01 31 00 "Project Management and Coordination."

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Cane Middle School Athletic, Site, and Interior Renovation.
2. Williams Middle School Athletic, Site, and Interior Renovation.

B. Type of Contract:

1. Single Prime: Project will be constructed under a single prime (lump sum) contract.

2. Project is tax exempt. The Contract will be executed with separate contract sums for materials and services to comply with requirements of 1991 Texas House Bill 11.
3. Contract: Contract form provided by Owner.

C. Items noted "NIC" (Not in Contract) are provided by Owner.

1.4 OWNER FURNISHED PRODUCTS

A. Owner furnished items shall be as indicated on the Drawings as Owner Furnished Contractor Installed (OFCI) items.

B. Owner Responsibilities: Owner reserves the right to furnish certain products. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner furnished products and making building services connections.

1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
2. Owner will arrange and pay for delivery of Owner furnished items according to Contractor's Construction Schedule.
3. Upon delivery, Owner and Contractor will inspect delivered items for damage. Assist Owner with inspection.

    a. If Owner furnished items are damaged, defective, or missing, Owner will arrange for replacement.

4. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
5. Owner will furnish Contractor a potential delivery date for Owner furnished products.

C. Contractor Responsibilities: Using Owner furnished delivery dates, incorporate delivery dates of Owner furnished items in Contractor's Construction Schedule.

1. Review Shop Drawings, Product Data, and Samples and return to Architect noting discrepancies or anticipated problems in use of product.
2. Receive, unload, and store Owner furnished items at site.
3. Upon delivery, inspect delivered items with owner for damage.
4. Protect Owner furnished items from damage during storage and handling, including damage from exposure to the elements.
5. If Owner furnished items are damaged as a result of Contractor's operations, repair or replace items.
6. Install and incorporate Owner furnished items into the Work.

1.5 CONTRACTOR'S USE OF PREMISES AND SITE

A. Unrestricted Use: Contractor shall have complete and exclusive use of immediate premises and site, with all exceptions as agreed to with the Owner. To the extent possible, limit use of site to areas within the Contract limits if so indicated. Do not

disturb portions of site beyond areas in which the Work is indicated and protect all items to remain from damage.

1. Driveways, Walkways and Entrances: Keep driveways, loading areas, entrances, fire exits or lanes, or delivery routes serving premises clear and available to Owner, Owner's employees, the public, and emergency vehicles. Do not use these areas for parking or for storage of materials.

    a. The Contractor shall protect all driveways, walkways and paving from damage during construction. Any damaged driveways, walkways and entrances shall be repaired by the Contractor at no additional cost to the Owner.

2. Coordinate use of premises under direction of Architect and Owner. Contractor shall be responsible for monitoring use of premises by employees and subcontractors.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities unless permitted under the following conditions and after providing temporary utility services according to requirements indicated:

1. Notify Architect and Owner not less than two days in advance of proposed utility interruptions. Include length of service outages and intended scope of Work in all such notifications.
2. Obtain Owner's written permission before proceeding with utility interruptions.

C. Access routes for delivery of materials and equipment shall be as indicated on drawings by Contractor. Do not use access routes other than those indicated without permission of Owner and Architect.

D. Assume full responsibility for protection and safekeeping of products stored on project site, including but not limited to all salvaged items. Store materials and products in areas indicated for staging and protect from damage.

E. Move stored products, under Contractor's control, which interfere with operations of Owner or as required by Architect. Do not unnecessarily encumber project site with materials and equipment.

F. Store all salvaged items and protect from damage and weather conditions.

G. Staging and material storage shall be limited to areas indicated. Obtain specific permission from Owner for use of other areas for storage and staging.

H. Do not overload existing or new structures with weight that would compromise safety. Verify design loads for structure if necessary prior to loading structure.

I. Obtain and pay for use of additional secured storage or Work areas needed for operations, material storage for new and salvaged items.

J. Protect existing lawns, landscaping, sidewalks, pavements, curbs, and utilities subject to damage by Work under this Contract. Repair or replace existing Work damaged by

Contractor. Replace existing lawns damaged by Contractor's activities with hydromulched lawn seed to provide full stand of replacement grass.

K. Parking areas for Contractor's personnel shall be as indicated by Owner.

1.6 OWNER OCCUPANCY

A. Schedule construction operations for completion of portions of Work for any Owner's occupancy prior to Substantial Completion of entire Work.

B. Contractor agrees to the use and occupancy of portion of Project by Owner prior to Substantial Completion of entire Project, provided Owner:

1. Secures written consent of Contractor except when, in opinion of Architect, Contractor is chargeable with unwarranted delay in final completion of uncompleted items or other Contract requirements.
2. Secures endorsement from insurance carrier and consent of surety permitting partial occupancy of Project or use of Project during remaining period of construction.

C. Use and occupancy prior to Substantial Completion of entire Project does not relieve Contractor of responsibility to maintain specified insurance coverage on 100 percent basis for benefit of Owner, Contractor and subcontractors until Project is complete and accepted by Owner.

D. After Owner occupancy, allow following:

1. Access for Owner's personnel.
2. Operation of heating, ventilating, air-conditioning, and electrical systems.

E. During partial occupancy, mutually acceptable arrangements shall be negotiated between Owner and Contractor regarding warranties and insurance requirements respecting portion of Work affected by partial occupancy and regarding operation and cost of building services so that costs attributable to partial occupancy shall be borne by Owner and costs attributable to performance of Work shall be borne by Contractor.

F. Prior to occupancy, execute Certificate of Substantial Completion, designating areas to be occupied by Owner.

1.7 WORK SEQUENCE

A. Construct Work in phases to accommodate Work to be completed on schedule and as agree with Owner; coordinate construction schedule and operations with Owner's representative.

B. Construct Work to minimize public inconvenience. Do not close off public use travel paths until completion of one stage of construction will provide alternative usage.

C. Owner may require certain Work to be performed after normal Working hours or on holidays or weekends. Negotiate all such Work with Owner prior to final Agreement.

1.8 WORK RESTRICTIONS

A. Work Restrictions: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated or required by the Authority Having Jurisdiction.

1. Weekend Hours: As permitted by Owner written authorization and in compliance with Local Ordinances.
2. Early Morning Hours: Comply with time restrictions set forth by the Local Authority Having Jurisdiction for restrictions.
3. Hours for Utility Shutdowns: Only during hours agreed to in writing by the Owner 2 weeks in advance.
4. Hours for Core Drilling or other noisy activity: During times unrestricted by the Owner and in accordance with Local Ordinances.

C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.

D. Restricted Substances and Firearms: Use of tobacco products and other controlled substances and firearms on Project site is not permitted.

E. Employee Identification: Owner may require identification tags for Contractor personnel Working on site. If so required, insure all personnel onsite use identification tags at all times.

F. Comply with all Work Restrictions imposed by the Local Authority.

G. Abide by all road cleaning and other requirements imposed by the Local Authority.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of the specification sections.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations and scheduled on Drawings.

PART 2 - PRODUCTS

2.1 HAZARDOUS MATERIALS - ASBESTOS

A. Owner requires that products and materials used meet the following requirements:

1. Contain not more than 1.0% of any kind or combination of asbestos, as determined by the Environmental Protection Agency (EPA) recommended test methods as listed in EPA/600R-93/116 July 1993 "Method for the Determination of Asbestos in Bulk Building Materials." This means one material component or a structure or layer of a material sample. Composite sample analysis is not allowed.

B. Contractor, by executing this Contract, accepts responsibility for prohibiting materials or products containing asbestos from being used on this Project.

C. Should Contractor furnish, use, or install products or materials containing asbestos, knowingly or otherwise, he has not met the requirements of this Contract.

2.2 HAZARDOUS MATERIALS – MOLD

A. If mold is present on the inside of the building; determine source of moisture and correct prior to performing the following:

1. Nonporous Surfaces: Mold growing on steel, aluminum or other nonporous materials may be cleaned using methods recommended by an Environmental Inspector licensed by the State of Texas.
2. Porous Surfaces: Entire mold contaminated surface must be removed and disposed of using methods recommended by an Environmental Inspector licensed by the State of Texas.
3. Following elimination of mold provide a report prepared by an Environmental Inspector licensed by the State of Texas that the building is free from mold contamination.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Include in contract sum allowances stated in Contract Documents.
2. Designate in construction progress schedule delivery dates for Products specified under each allowance.
3. Designate in Schedule of Values quantities of materials required under each unit cost allowance.

1.2 ALLOWANCES FOR PRODUCTS

A. Amount of Each Allowance Includes:

1. Cost of Product to Contractor or subcontractor, less applicable trade discounts.
2. Delivery to site.
3. Labor required under allowance, except when labor is specified not to be included in allowance.

B. In addition to amount of each allowance, include in contract sum Contractor's costs for:

1. Handling at site, including unloading, uncrating, and storage.
2. Protection from elements and from damage.
3. Labor for installation and finishing where labor is specified not to be a part of allowance.
4. Other expenses required to complete installation.
5. Contractor’s and Subcontractor's overhead and profit.

1.3 SELECTION OF PRODUCTS UNDER ALLOWANCES

A. Architect's Duties:

1. Consult with Contractor in consideration of Products and suppliers or installers.
2. Make selection in consultation with Owner. Obtain Owner's written decision, designating:

a. Product, model, and finish.
b. Accessories and attachments.
c. Supplier and installer as applicable.
d. Cost to Contractor, delivered to site or installed, as applicable.
e. Manufacturer's Warranties.

3. Transmit Owner's decision to Contractor.
4. Prepare Change Orders.

B. Contractor's Duties:

1. Assist Architect and Owner in determining qualified suppliers or installers.
2. Obtain proposals from suppliers and installers when requested by Architect.
3. Make appropriate recommendations for consideration of Architect.
4. Notify Architect promptly of:

a. Reasonable objections Contractor may have against supplier, or party under consideration for installation.
b. Effect on Construction Schedule anticipated by selections under consideration.

1.4 CONTRACTOR RESPONSIBILITY FOR PURCHASE, DELIVERY, AND INSTALLATION

A. On notification of selection, execute purchase agreement with designated supplier.

B. Arrange for and process Shop Drawings, Product Data and Samples, as required.

C. Make arrangements for delivery.

D. Upon delivery, promptly inspect products for damage or defects.

E. Submit claims for transportation damage.

F. Install and finish products in compliance with requirements of referenced specification sections.

1.5 ADJUSTMENT OF COSTS

A. Should net cost be more or less than specified amount of allowance, contract sum will be adjusted accordingly by Change Order.

1. Amount of Change Order will recognize changes in handling costs at site, labor, installation costs, overhead, profit, and other expenses caused by selection under allowance.
2. For products specified under unit cost allowance, unit cost shall apply to quantity listed in Schedule of Values.
3. For products specified under unit allowance, unit cost allowance shall apply to quantities actually used with nominal amount for waste, as determined by receipts, invoices or by field measurement.

B. Submit claims for anticipated additional costs at site, or other expenses caused by selection under allowance, prior to execution of work.

C. Submit documentation for actual additional costs at site, or other expenses caused by selection under allowance within 60 days after completion of execution of Work.

D. Failure to submit claims within designated time will constitute waiver of claims for additional costs.

E. At contract closeout, reflect approved changes in contract amounts in final statement of accounting.

1.6 CONSTRUCTION CONTINGENCY

A. Following shall apply to construction contingency allowance:

1. It shall be used only to cover cost of hidden, concealed or otherwise unforeseen conditions that develop during project.
2. Work which is clearly change in scope shall be authorized and paid for only by means of change order executed in accordance with established Owner procedures.
3. Bidder shall include in his base bid on project his profit and overhead to cover amount of contingency; as each contingency authorization is processed, it will not include profit or overhead for Contractor.
4. Contractor shall proceed with accomplishing work only after receiving properly executed contingency authorization executed by Owner.
5. Contractor shall not bill Owner for work authorized by this procedure until work has been accomplished.
6. Balance of contingency allowance which is not used during construction of project shall be returned to Owner.
7. At completion of project, Architect will reconcile work accomplished through properly executed contingency allowance authorizations, and provide for refund of unused portion of contingency to Owner through properly executed change order.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

A. Section 12 11 13 "Photo Murals": Allow sum of $15,000 for graphics.

END OF SECTION

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SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to the individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work in place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Decorative Metal Fencing:

1. Description: Additional 6-foot tall decorative fencing in addition to fencing shown on Drawings as specified in Section 32 31 19 "Decorative Metal Fences and Gates."
2. Unit of Measurement: Linear feet of fencing.

B. Unit Price No. 2: Mow Strip:

1. Description: Additional 12-inch wide 4-inch deep mow strips in addition to mow strips shown on Drawings.
2. Unit of Measurement: Linear feet of mow strip.

C. Unit Price No. 3: Sidewalk Repair:

1. Description: Repair 5-foot wide sidewalk.
2. Unit of Measurement: Linear feet of sidewalk.

D. Unit Price No. 4: Fire Lane Paving:

1. Description: Additional fire lane paving in addition to mow strips shown on Drawings.
2. Unit of Measurement: Cubic yard of concrete.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described are part of the work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No.1: Time Clocks and Scoreboard Cabinet Replacement

1. Base Bid: No work for scoreboards.
2. Alternate: Demolish existing exterior scoreboard where shown on Drawings and specified in Section 02 41 19 "Selective Demolition." Replace as shown on Drawings and specified in Section 11 68 43 "Exterior Scoreboard."

B. Alternate No.2: Tennis Court Light Fixture Replacement with LED

1. Base Bid: No work for tennis court lighting.
2. Alternate: Replace tennis court light fixtures as shown on electrical Drawings and specified in Division 26.

C. Alternate No.3: Kyle Field and Heath Stadium Light Fixture Replacement with LED

1. Base Bid: No work for Kyle Field and Heath Stadium light fixtures.
2. Alternate: Replace Kyle Field and Heath Stadium light fixtures as shown on electrical Drawings and specified in Division 26

D. Alternate No.4: Triple/Long Jump Relocation

1. Base Bid: No work for triple/long jump equipment.
2. Alternate: Relocate triple/long jump equipment as shown on Drawings.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. 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.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet Project requirements but may offer advantage to Contractor or Owner.

B. Comparable Products: Products demonstrated and approved through the product substitution process to have similar qualities related to type, function, dimension, in service performance, physical properties, appearance, and characteristics equivalent to or exceeding those of the specified product and incorporated into the Contract Documents.

C. Substitutions submitted and accepted prior to the award of the Contract for Construction are deemed part of the Contract Documents and are not subject to substitution requirements.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Identify the Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use facsimile of form provided in Form 01 25 00.10 "Substitution Request Form."
2. Documentation: Demonstrate compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating the reason the specified product, fabrication, or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the work and to construction performed by Owner and

separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitutions with those of the work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, physical characteristics, weight, size, durability, visual effect, noise levels, color and texture, vibration generation, interchangeability of parts or components, maintenance, compatibility with other materials, products, assemblies and components, equipment capacities and performance characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures. Mark cut sheet to indicate specific model or product.
e. Samples, where applicable or requested.
f. Certificates and manufacturer/installer/fabricator qualification data, where applicable.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES and local regulations.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions 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.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. 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.
m. 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.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance During Bidding: Addenda.
b. Form of Rejection During Bid Period: No response.
c. Forms of Acceptance During Construction: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the work.

d. Form of Rejection During Construction: Written rejection on Substitution Request Form.

4. No response will be given for substitutions submitted by individual subcontractors or material suppliers.
5. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

B. Substitution requests are not allowed when disguised as a submittal. Request substitutions in accordance with substitution procedures. Substitutions submitted as a Submittal will be returned without review or comment.

1. Contractor assumes full and complete responsibility for installing substitutions that have not been formally submitted and approved by the Architect.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 COORDINATION

A. Revise or adjust affected work necessary to integrate work of the approved substitutions.

1.6 PRODUCT SUBSTITUTIONS

A. Conditions for Consideration: Substitution requests will be considered when the request is submitted in writing on the Request for Substitution form by the Contractor.

B. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. 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.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has the 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.

1) A warranty based on the same warranty period only is not considered equivalent to the 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 each contractor involved.

C. Substitutions for Convenience: Architect will consider requests for substitution if received within 60days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. 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 offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume.

1) Additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has the necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the work.
h. Requested substitution has been coordinated with other portions of the work.
i. Requested substitution provides specified or better warranty.
j. 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.

D. Requests for substitutions will not be considered when:

1. Products are indicated or implied on Shop Drawings, Product Data Submittals, or Requests for Information (RFIs).

2. Requested directly by subcontractor or supplier.
3. Acceptance requires substantial revisions to Contract Documents or Contract time.
4. Additional cost to Owner is involved.
5. Substitute products shall not be ordered or installed without written acceptance of Architect. If proposed substitution is not accepted, provide specified product or materials.
6. Burden of proof for merits of proposed substitute is upon proposer. Architect's decision of acceptance or rejection of proposed substitution is final.
7. Review of Architect, acceptance, or failure to take exceptions to substitutions or other review documents, shall not relieve Contractor of its responsibility for compliance with performance or requirements of Contract Documents.
8. Contractor shall be responsible for and pay for all expenses incurred by Owner or Architect for changes to Contract Documents ultimately required by accepted Contractor requests for substitutions.

1.7 SUBMISSION PROCEDURES

A. Submit each product substitution as a separate request.

B. The burden of proof of compliance to requirements lies with the proposer.

C. Documentation: Submit supporting documentation indicating compliance with requirements for substitutions and the following:

1. Identify product by specification section and article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
2. Include a statement indicating the reason specified product is unavailable.

    a. Contractor’s failure to order specified product in sufficient time for delivery to site is not a valid reason for a substitution.

3. Coordination information, including list of modifications necessary for related work, existing conditions, and to construction performed by Owner and separate contractors necessary to accommodate proposed substitution.
4. Detailed comparison of significant properties of proposed substitution with quality of work specified. Significant properties may include but are not limited to attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated. Identify variations from contract requirements.
5. Detailed comparison of warranties of proposed substitution and specified product note variations.
6. Shop drawings and product data, including drawings and descriptions of products, fabrication and installation procedures, certified test results, and similar data.
7. Samples, where applicable or requested.
8. Indicate availability of product in quantities required and availability of approved/certified, trained, and skilled installers.

9. Indicate availability of maintenance services and replacement materials as applicable.
10. Material test reports from qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
11. ICC-ES Evaluation Reports evidencing compliance with building code.
12. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for work, including effect on overall Contract Time. If specified product or method of construction cannot be provided within Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
13. Cost information, including proposal of change, if any, in Contract Sum.
14. Contractor's certification that proposed substitution complies with requirements of Contract Documents and is appropriate for applications indicated.
15. 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.
16. Contractor agreement to assume full responsibility for additional costs and time associated with substitution that may become necessary during the work.
17. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

D. Unsigned submittals are considered incomplete and will not be reviewed.

E. For accepted products, submit formal shop drawings, product data, and samples under provisions of Section 01 33 00 and the individual specification section.

1.8 ARCHITECT DUTIES

A. Architect will determine acceptability of proposed substitutions.

B. Review Contractor's requests for substitutions with reasonable promptness.

C. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

A. Product Properties: Properties of substituted products considered include but are not limited to:

1. Physical dimension requirements to satisfy space limitations.
2. Static and dynamic weight limitations, structural properties.
3. Audible noise levels.
4. Vibration generation.
5. Interchangeability of parts or components.
6. Accessibility for maintenance, possible removal, or replacement.

7. Colors, textures and compatibility with other materials, products, assemblies, and components.
8. Equipment capacities and performance characteristics.
9. Warranty conditions.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REPRESENTATION

A. In making a formal request for substitution Contractor represents that:

1. It has thoroughly investigated proposed product and has determined it is equivalent to or superior in respects to that specified.
2. It will provide same warranties or bonds for substitution as for product specified.
3. It will coordinate installation of accepted substitution into the work and will make necessary changes for the work to be complete.
4. It waives claims for additional costs caused by the requested substitution which may subsequently become apparent.
5. Cost data is complete and includes related costs under the Contract, but not costs under separate contracts.

END OF SECTION

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SUBSTITUTION REQUEST FORM

To Architect: Corgan Associates, Inc.
Project Name: Cain and Williams MS Athletic, Site, and Interior Renovation

Specified Item: _____

Section	Page	Paragraph	Description

The undersigned Contractor requests consideration of the following:

Proposed Substitution: _____

1. Attached data includes product description, specifications, drawings, photographs, performance, and test data adequate for evaluation of the request; applicable portions of the data are clearly identified, both on the proposed substitution and the original specified product.
2. Attached data includes description of changes to Contract Documents, which proposed Substitution will require for its proper installation.

The undersigned Contractor states that the following paragraphs, unless modified on attachments, are correct.

1. The proposed substitution does not affect dimensions on Drawings.
2. The undersigned Contractor agrees to pay for changes to the building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution has no adverse effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts are locally available for the proposed substitution.

The Contractor further states that the function, appearance, and quality of the Proposed Substitution are equivalent or superior to the Specified Item. The Contractor further warrants that the intent of specification Section 01 25 00, Article Contractor's Representation has been met.

1. Cost Reduction to the Owner: $ _____

ACCEPTANCES:

1. Contractor Acceptance: _____ Date: _____ Representing: _____
2. Owner Acceptance: _____ Date: _____ Representing: Rockwall ISD
3. Architect Acceptance: _____ Date: _____ Representing: Corgan Associates, Inc.

_____ Accepted as Noted _____ Received too late

_____ Not Accepted _____ Resubmit with complete documentation

END OF FORM

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SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.3 PROPOSAL REQUESTS

A. Owner Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the work that require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    e. Quotation Form: Use forms acceptable to Architect.

B. Contractor Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.4 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 .

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 . Construction Change Directive instructs Contractor to proceed with a change in the work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

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SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction progress schedule.

1. Coordinate line items in the schedule of values with required administrative schedules and forms including:

    a. Construction Progress Schedule, in CPM or bar chart format.
    b. Application for Payment form.
    c. List of subcontractors.
    d. Schedule of alternates.
    e. List of products.
    f. List of principal suppliers and fabricators.
    g. Schedule of submittals.

2. Submit initial Schedule of Values to Architect within 14 days of Notice to Proceed.
3. Submit revised Schedule of Values at earliest possible date, but no later than minimum of 20 days before scheduled date of Initial Application for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Arrange Schedule of Values on 8-1/2 inches by 11 inches (213 mm by 283 mm) tabular form on white paper in format acceptable to Architect.
2. Use bar chart or CPM chart as guide to establish format; compile information based on completed tasks.

3. Project Identification:

    a. Project name and location.
    b. Name of Architect.
    c. Project number.
    d. Contractor's name and address.
    e. Date of submittal.
    f. Owner's contract designation.

4. Provide columns to indicate following for each item listed:

    a. Generic name.
    b. Specific task description.
    c. Change Orders numbers that have affected value.
    d. Dollar value.
    e. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

5. Follow table of contents of Project Manual as format for listing component items; identify each line item with number and title of respective specification section.
6. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports.
7. Break principal subcontract amounts down into multiple line items by completed task in various locations.
8. For each major line item, list subvalues of major products or operations under item.
9. Round amounts off to nearest whole dollar, total of listed values shall equal total Contract Sum.
10. For each part of work where Application for Payment includes materials or equipment purchased, fabricated, and stored, but not yet installed, include separate line items on Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of work.

C. Margins of Cost:

1. Indicate line items for indirect costs, and margins on actual costs, to the extent that each item is listed individually in Applications for Payment.
2. Each item in Schedule of Values and Application for Payment shall be complete, including its total cost and proportionate share of general overhead and profit margin.
3. At Contractor's option, temporary facilities and other major cost items that are not direct costs of actual work in place may be shown as separate line items in Schedule of Values.
4. Furnish line item cost for each of following general cost items:

    a. Bonds.
    b. Insurance.
    c. Field supervision and layout.
    d. Temporary facilities and controls.
    e. Testing.

D. Resubmittal:

1. After review by Architect, revise and resubmit schedule as necessary.
2. Resubmit revised schedule monthly in same manner.

E. Subschedule of Unit Material Values:

1. Submit subschedule of unit costs and quantities for following:

a. Submit subschedule for each separate stage of work specified in Section 01 10 00 "Summary."
b. Products specified under unit cost allowance specified in Section 01 21 00 "Allowances."
c. Products on which progress payments will be requested for stored products.

2. Form and Content:

a. Form of submittal shall parallel that of Schedule of Values, with each item identified same as line item in Schedule of Values.
b. Unit quantity for bulk materials shall include an allowance for normal waste.

3. Unit values for materials shall be broken down as follows:

a. Cost of material, delivered and unloaded at Project Site, with taxes paid.
b. Installation costs, including overhead and profit.

4. Installed unit value multiplied by quantity listed shall equal cost of that item in Schedule of Values.
5. After review by Architect, revise and resubmit subschedules as necessary.
6. Resubmit revised subschedules monthly in same manner.

F. Upon request of Architect, provide support values with data which substantiate correctness.

1.4 APPLICATIONS FOR PAYMENT

A. Progress payments shall be made as work proceeds at intervals stated in the Agreement.

B. Work covered by Progress Payments shall, at time of payment, become property of Owner.

C. Form of Application for Payment will be notarized AIA Document G702 Application and Certification for Payment, supported by AIA Document G703 Continuation Sheet, submitted in quadruplicate.

D. Within 15 days of execution of Owner -Contractor Agreement, submit proposed sample of Lien Waiver and Bills Paid Affidavit forms for review and acceptance by Architect.

E. Conditions governing regular schedule for applications, payment, and retainage are stated in Contract.

F. Monthly Applications for Payment include Waivers of Liens for work included in previous months' Application for Payment. Waiver of Liens for subcontractors and materialmen shall be total amount paid prior to previous month's Application for Payment.

G. With each Application for Payment, certify that Application for Payment represents just estimate of cost reimbursable to Contractor under terms of Contract, and shall certify that there are no Mechanics' or Materialmens' Liens outstanding at date of Application for Payment, that due and payable bills with respect to work have been paid to date or shall be paid from proceeds of Application for Payment, and that there is no known basis for filing of Mechanics' or Materialmens' Liens against surety in connection with work, and that Waivers and Bills Paid Affidavit forms from subcontractors and materialmen have been, or will be, obtained in form specified in Contract.

H. Transmittal: Submit signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

I. Preparation of Application:

1. Format and Data Required:

a. Submit itemized applications on AIA Document G702 - Application and Certification for Payment Form, with AIA Document G703 Continuation Forms.
b. Provide itemized data on continuation sheets with format, schedules, line items, and values stipulated in Schedule of Values and acceptable to Architect.

2. Application Form:

a. Fill in required information, including Change Orders executed prior to date of submittal of applications.
b. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
c. Execute certification with signature of responsible officer of Contract firm.

3. Continuation Sheets:

a. Fill in total list of scheduled component items of work with item number and scheduled dollar value for each item.
b. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
c. Round off values to nearest dollar or as specified for Schedule of Values.

d. List each Change Order executed prior to date of submission at end of continuation sheets.
e. List by Change Order number and description as for original component item of work.

4. Initial (First) Application for Payment:

a. Within 15 days of execution of Owner-Contractor Agreement. submit proposed sample of Lien Waiver and Bills Paid Affidavit forms for review and acceptance by Owner for use.
b. Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include, but are not limited to, the following:

1) List of subcontractors, with indications of MBE or WBE Owner firms.
2) List of principal suppliers and fabricators.
3) Schedule of Values.
4) Contractor's Construction Schedule (preliminary if not final).
5) Submittal Schedule (preliminary if not final).
6) Copies of building permits.
7) Copies of authorizations and licenses from governing authorities for performance of Work.
8) Initial progress report.
9) Report of Preconstruction meeting.
10) Certificates of Insurance and insurance policies.
11) Additional items as required in General Conditions.

J. Typical Monthly Application for Payment:

1. Each Application for Payment shall be consistent with previous Applications for Payments reviewed by Architect and paid by Owner.
2. Review pencil copy of Application for Payment with Architect at last scheduled job meeting each month, or at other agreeable time as can be scheduled.
3. Submit monthly Application for Payment on 15th day of each month.
4. Period of construction work covered by each Application for Payment is period ending 15 days prior to date for each progress payment and starting day following end of proceeding period.
5. Work covered by Progress Payments shall, at time of payment, become property of Owner.
6. Form of Application for Payment will be on specified forms, submitted in quadruplicate.
7. Complete each entry on forms, including notarization and execution by person authorized to sign legal documents on behalf of Contractor.
8. Incomplete Applications for Payment will be returned without action.
9. Entries shall match data of Schedule of Values and Contractor's Construction Schedule.
10. Use updated schedules if revisions have been made.
11. Include amounts of Change Orders and Construction Change Directives issued prior to last day of construction period covered by application.
12. Transmit executed copies of each Application for Payment to Architect by means ensuring receipt within 24 hours.

13. Transmit each copy with complete transmittal form listing attachments, and recording appropriate information related to Application in acceptable manner.
14. Stored Materials: Include amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

    a. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
    b. Provide supporting documentation that verifies amount requested, including paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
    c. Provide summary documentation for stored materials indicating the following:

        1) Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
        2) Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
        3) Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

15. Waiver of Liens:

    a. With each Application for Payment, submit waivers of mechanics liens from each contractor, subcontractor and materialman who may be lawfully entitled to file mechanics lien arising out of Contract, and related to Work covered by payment application.
    b. Submit waivers of lien on forms acceptable to Architect.
    c. Waiver of liens shall be total paid prior to previous month's Application for Payment.

16. With each Application for Payment, Contractor certifies the following:

    a. Application for Payment represents just estimate of cost reimbursable to Contractor under terms of Contract.
    b. That there are no Mechanics' or Materialmens' Liens outstanding at date of this Application for Payment.
    c. That due and payable bills with respect to the Work have been paid to date or shall be paid from proceeds of that Application for Payment.
    d. That there is no known basis for filing of Mechanics' or Materialmens' Liens against surety in connection with Work, and that Waivers and Bills Paid Affidavit forms from subcontractors and materialmen have been, or will be, obtained in form specified in Contract.

17. Progress payments will be made in accordance with General Conditions.

K. Application for Payment at Substantial Completion:

1. Following issuance of Certificate of Substantial Completion, submit Application for Payment with following administrative actions and submittals that must precede or coincide with application:
2. Training of Owner's personnel.
3. Occupancy permits and similar required approvals.
4. Warranties and maintenance agreements.
5. Test, adjust, and balance records.
6. Maintenance instructions.
7. Start-up performance reports.
8. Change-over information related to Owner's occupancy, use, operation, and maintenance.
9. Final cleaning.
10. Application for reduction of retainage, and Consent of Surety.
11. Advise on shifting insurance coverage.
12. Final progress photographs.
13. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
14. Transmittal of required Project construction records to Owner.
15. Removal of temporary facilities and services.
16. Removal of surplus materials, rubbish, and similar elements.
17. Additional items as required by General Conditions.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

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SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. Request for Information (RFI).
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.2 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1. Typically, a Contractor initiated written instrument relating to the execute of the work for additional information or clarification of the contract documents.

1.3 INFORMATIONAL SUBMITTALS

A. 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, telephone number, and email address of entity 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.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web based Project software directory, and in prominent location in built facility. Keep list current.

1.4 COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on Drawings. Specifically note dimensions that conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire alarm, and electrical Work. Show locations of visible ceiling mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling, wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, including dampers, valves, diffusers, access doors, cleanouts, and electrical distribution equipment.

c. Fire rated enclosures around ductwork.

7. Electrical Work: Show the following:

a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire Protection System: Show locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not prepared in sufficient scope or detail, or are deficient, Architect will inform Contractor, who shall make suitable modifications and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

1.6 REQUEST FOR INFORMATION (RFI)

A. Upon discovery of the need for additional information, clarification, or interpretation of the Contract Documents, prepare and submit an RFI using the attached form.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs promptly to avoid delays in Contractor's work or work of subcontractors.
3. Submission of an RFI constitutes representation that the Contractor requires additional information regarding the Contract Documents after having made careful study and comparison of the Contract Documents, field conditions, Owner provided information, Contractor prepared coordination drawings, and prior project correspondence or documentation.

a. No response will be made to requests where the information is conveyed or contained in the Contract Documents or the Contractor’s own documents.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 .

1. Attachments shall be electronic files in PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven workdays for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following workday.

1. The following Contractor generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web based Project software. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model will be provided by Architect for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in Autodesk Revit.
4. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement.

a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of AIA Document C106.

5. The following digital data files will be furnished for each appropriate discipline:

a. Floor plans.
b. Reflected ceiling plans.

B. Web Based Project Software: Use Architect's web based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

A. Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and parties involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 workdays prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Use of web based Project software.
    h. Procedures for processing field decisions and Change Orders.
    i. Procedures for RFIs.
    j. Procedures for testing and inspecting.
    k. Procedures for processing Applications for Payment.
    l. Distribution of the Contract Documents.
    m. Submittal procedures.

n. Preparation of Record Documents.
o. Use of the premises and existing building.
p. Work restrictions.
q. Working hours.
r. Owner's occupancy requirements.
s. Responsibility for temporary facilities and controls.
t. Procedures for moisture and mold control.
u. Procedures for disruptions and shutdowns.
v. Construction waste management and recycling.
w. Parking availability.
x. Office, work, and storage areas.
y. Equipment deliveries and priorities.
z. First aid.
aa. Security.
bb. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: 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 Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.

v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of Record Documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Procedures for completing and archiving web based Project software site data files.
d. Submittal of written warranties.
e. Requirements for preparing operations and maintenance data.
f. Requirements for delivery of material samples, attic stock, and spare parts.
g. Requirements for demonstration and training.
h. Preparation of Contractor's punch list.
i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
j. Submittal procedures.
k. Coordination of separate contracts.
l. Owner's partial occupancy requirements.
m. Installation of Owner's furniture, fixtures, and equipment.
n. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, contractor, subcontractor, supplier, and 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 meeting shall be familiar with Project and authorized to conclude matters relating to the work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.
        8) Temporary facilities and controls.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of Proposal Requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and 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 meetings shall be familiar with Project and authorized to conclude matters relating to the work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    c. Review present and future needs of each contractor present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.
        8) Temporary facilities and controls.
        9) Work hours.
        10) Hazards and risks.
        11) Progress cleaning.
        12) Quality and work standards.
        13) Status of RFIs.
        14) Proposal Requests.
        15) Change Orders.
        16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

G. Preapplication Roofing Conference: Not less than seven days or more than 21 days prior to scheduled commencement of roofing application, convene a preapplication roofing conference at project site.

1. Attendance is required by Architect, Contractor, roofing installer, and each entity required to coordinate with or to protect work.

2. Minimum Agenda:

    a. Review accepted Submittals.
    b. Review outstanding material problems.
    c. Review minutes of Preliminary Roofing Conference.
    d. Discuss installation schedules and sequence, and revisions that have occurred.
    e. Review equipment set up and on site storage.
    f. Review readiness of deck for application:

        1) Certification in place.
        2) Examination of substrate by those in attendance.
        3) Drains installed.
        4) Curbs, nailers, penetrations, perimeter, equipment.

    g. Review the installation of the roofing system; review requirements.
    h. Review weather and working conditions, and procedures for daily or inclement weather cut-offs.
    i. Review protection requirements after installation.
    j. Review testing requirements and procedures involved.
    k. Discuss requirements for warranties and bonds.
    l. Conduct tour of roof deck to review potential issues and to verify readiness.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for schedules and reports required for proper performance of the work.

1.2 REFERENCES

A. The Associated General Contractors of America (AGC): The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry.

1.3 QUALITY ASSURANCE

A. Scheduler: Submit documentation of Contractor's personnel specializing in CPM scheduling with five years minimum experience in scheduling construction work of complexity comparable to Project and having use of computer facilities capable of delivering readout within 24 hours.

B. Contractor's Administrative Personnel: Submit documentation of five years minimum experience in using and monitoring CPM schedules on comparable projects.

1.4 DESCRIPTION

A. Provide information and input required for development of Project Schedule in accordance with requirements of this Section. Purpose of schedule is:

1. Assure adequate planning, scheduling, and reporting during execution of work by Contractor.
2. Assure coordination of work of Contractor and various subcontractors and subsubcontractors.
3. Assist Contractor and Owner in monitoring progress of work and evaluating proposed changes to Contract and Project Schedule.
4. Assist Owner and Contractor in preparation and evaluation of Contractor's monthly progress payments.

B. Use Critical Path Method (CPM) for planning, scheduling, and reporting work performed under Contract. Display graphic portions of Project Schedule by Activity-on-Arrow Diagramming Method (ADM).

1. Include Preliminary Network, Detailed Network, and computer produced Schedule and Cost Reports.

C. Provide Preliminary Network to monitor progress of work during development and acceptance of Detailed Network.

D. Contractor and major subcontractors shall meet with Owner within seven calendar days after date of Notice-to-Proceed to conduct joint review of Project Schedule requirements to assure mutual understanding by parties involved.

1.5 INITIAL SCHEDULE DEVELOPMENT (FORMAT)

A. Propose Critical Path Method arrow diagram format consisting of project activities, sequences and duration, submittals, procurement, and completion of work.

B. Submit to Architect from each major subcontractor letter confirming work schedule for their individual trade.

C. Submit initial network analysis schedule development within seven days of Notice to Proceed, or at Preconstruction Scheduling Meeting, to Architect for review.

D. Incorporate revisions deemed necessary by Architect and resubmit within additional 7 days.

E. Upon acceptance of network analysis format, begin data input and development of Preliminary Network.

1.6 PRELIMINARY NETWORK DEVELOPMENT

A. After acceptance of initial schedule format by Architect, Contractor to submit to Architect Preliminary Network within 14 calendar days of acceptance of schedule format, but not more than 21 days after Notice-to-Proceed. Submit four copies of Preliminary Network neatly organized and drawn non-time scaled from left to right on either 24 inches by 36 inches (610 mm by 915 mm) or 30 inches by 42 inches (563 mm by 1065 mm) standard size sheets with suitable notation relating interface points among sheets. Cover following project phases and activities:

1. Proposed procurement activities, including shop drawings, product data and sample submittals, and fabrication and delivery of critical and long lead time procurements.

    a. Indicate intended submittal dates and realistic delivery dates for fabrication and delivery items.
    b. Incorporated into Detailed Network (described below), including requested revisions.

2. Proposed construction activities to be accomplished during first 90 calendar days of Contract.

    a. Activity durations shall be in units of whole workdays and shall be limited to maximum 15 workdays for each activity.

b. Incorporate proposed 90 calendar day construction activities into Detailed Network, including requested revisions.

3. Include in proposed procurement and construction activities same information required for Detailed Network described below.
4. Summary activities not included above which are necessary to properly indicate following:

a. Approach to scheduling remaining work areas or phases of work. Represent work for each phase or area by at least one summary activity such that they cumulatively indicate entire Project Schedule.
b. Show approximate cost and duration for each summary activity on Preliminary Network and include best estimate of work.

B. Show sequence and interdependence of activities subject to requirements of other provisions of this Section.

C. Preliminary Network shall be basis for progress payments during first 90 calendar days of Contract while Detailed Network (described below) is being developed and accepted.

D. Updated on monthly basis while Detailed Network is being developed. Monthly updating of Preliminary Network shall be consistent with procedures and requirements for Schedule Updating, except computer produced Schedule and Cost Reports shall not become part of Project Schedule until after acceptance of Detailed Network.

E. Use as follows for time extension analysis during first 90 calendar days of Contract:

1. When Change Orders (and Proposed Changes) are initiated, delays are experienced, or Contractor desires to revise Preliminary Network, submit to Architect written Time Impact Analysis as required below, except included activities and event times in Analysis from current Preliminary Network update.
2. Determine final determination with regard to extent of time extension allowed in accordance with requirements for Time Impact Analysis, subsequent to development, review and acceptance of Detailed Network.

F. Within seven calendar days of Architect's receipt of Preliminary Network, Architect shall notify Contractor of concerns in regard to Preliminary Network. Furnish written response to Architect's comments prior to or concurrent with submittal of Detailed Network. Resolve comments and concerns before consideration of Detailed Network can commence.

1.7 DETAILED NETWORK DEVELOPMENT

A. Schedule development by Contractor: Within 28 days after Notice-to-Proceed, submit proposed Detailed Network to Architect. Cover entire Contract Time period and incorporate in detail first 90 calendar days of Preliminary Network, including requested revisions. Organize and drawn non-time scaled from left to right on either 24 inches by 36 inches (610 mm by 915 mm) or 30 inches by 42 inches (563 mm by 1065 mm)

standard size sheets with suitable notation relating interface points among sheets. Detailed Network shall include, but not be limited by, following as minimum:

1. Proposed procurement activities, including activities and information used in Preliminary Network. Recommended sequence would be as follows:

Duration	Description
---- --00	0 (restraint from NTP)
--00	--02-SUB
--02	--04-APP
--04	--06-F/D
--06	--081ARR
--08	----0 (restraint to installation)

   a. In above sequence, activity --00 --02 is submittal activity which precedes --02 --04, "approval." Activity --04 --06 is fabrication and delivery time which precedes --06 --08, "arrival." Begin each activity description with three character verb abbreviation standard in procurement item scheduling for purposes of computer report selection. Arrival activity, "ARR," is included for purpose of pinpointing cashflow. Load arrival activity with amount due contractor upon delivery of line item in question. Each activity of this type shall have "duration" of one day.

2. Proposed construction activities, including activities and information used in Preliminary Network. Develop construction sequencing separately from procurement. Construction activity sequence shall appear as though it were developed under assumption that materials are immediately available to Project. Link procurement activities grouped together on network diagram (preferably above construction logic), to various installation activities by restraints (dummies) from "J" nodes of "arrival" activities.
3. Proposed durations for construction activities.
4. Proposed sequencing of construction activities.
5. Proposed activity manpower, cost and equipment loading.

B. Depict following for each activity:

1. "I" and "J" (beginning and ending) event nodes and numbers, respectively. Utilize numerical designations to identify each and every event node. Do not utilize alpha-numeric event node numbering. Each "J" node number shall be larger than preceding "I" node numbers.
2. Concise description of Work represented by activity. As requested by Architect, either prior or subsequent to acceptance of Detailed Network, provide graphic explanation of relationship of activities in comparison with work areas identified on prints of Contract Documents, at no additional cost to Owner.
3. Activity duration in whole workdays, with maximum 15 workdays each, unless otherwise directed by Architect, except for nonconstruction activities such as procurement and fabrication of materials, delivery of materials, and curing of concrete. When single activity requires more than 15 days, subdivided into identifiable elements of less than 15 workdays each.

4. Performance responsibility by discipline code: MECH, ELEC, or acceptable abbreviations accepted by Architect.
5. Assigned dollar value (cost loading) of each activity of Detailed Network, which cumulatively equal total Contract Sum. Mobilization, bond and insurance costs may be shown separately. Prorate other General Requirement costs, overhead, and profit throughout activities. For this purpose, assume rate of activity value installation into work as linear with time.
6. Manpower loading of each activity. Prepare and submit (separate) manpower summary analysis in graphic format depicting manpower by principle trades and aggregate. Graph(s) shall show number of man days of effort, by month, over duration of Project Schedule.
7. Assignment to applicable activities of Detailed Network of major construction equipment to be utilized by Contractor, subcontractors, and sub-subcontractors in executing work.

C. Computer Printout:

1. Early Start and Early Finish dates.
2. Late Start and Late Finish dates.
3. Activity Float Time.
4. Actual Start and Finish dates.

D. Clearly identify activities illustrating accomplishment of time(s) for completion of project set forth in Contract. If schedule indicated earlier completion time(s) than that set forth in Contract, show float (or slack) between schedule and Contract dates on computer printout shall be part of total float available.

E. Produce computer printouts sorts and summaries, providing sorts and breakdowns as follows:

1. I-J.
2. Total float.
3. Performing organization.
4. Early start date.
5. Schedule of Values.
6. Monthly cash flow.

F. Develop network diagram logic so that no activity having duration greater than zero shall share I-node or J-node designation with other activities having duration greater than zero. There shall be no converging or diverging logic patterns involving more than one activity of duration greater than zero.

1. Include contractor and subcontractor work at tiers.

G. Show sequence and interdependence of activities required for complete performance of Work in logical sequence and coordinated plan of work.

H. Estimate proposed durations assigned to each activity of time required to complete activity considering scope and resources planned for activity. Upon request by

Architect, furnish written description of determination of each duration of critical activities. Include in request:

1. Explain number of crews, crew composition, number of shifts per day, number of hours in shift, and number of workdays per week.
2. Provide major item list of construction equipment for activity, including types, number of units, unit capacities, and proposed time each piece of equipment will be on job keyed to activities on which equipment will be used.
3. Other pertinent data affecting specific activity duration.

I. Failure by Contractor to include elements of work required for performance of Contract shall not excuse Contractor form completing work within Contract Time, regardless of acceptance of Detailed Network.

J. Unless noted otherwise in the Supplementary General Conditions, account for the following seasonal precipitation days for exterior Work.

1. DFW Region:

Month	Workdays
January	4
February	5
March	5
April	5
May	8
June	5
July	3
August	4
September	4
October	5
November	4
December	4
Total.	55

2. Show that critical activity path has been delayed by loss of days in excess of number indicated above before consideration of extension will be given.
3. In execution of interior work, show to satisfaction of Architect that interior work has been delayed by adverse weather in excess of number of allowable days above.

K. Indicate holidays, vacations and non-workdays applicable to schedule.

L. If Architect questions Contractor's proposed logic, durations, manpower, cost or equipment loading, within seven calendar days of receipt of written request, furnish satisfactory revision or adequate justification.

M. Joint Review, Revision, and Approval of Detailed Network:

1. Within 14 calendar days of receipt of Contractor's proposed Detailed Network, and within seven calendar days of receipt by Architect of Contractor's response, Architect, Contractor, and Owner shall meet for joint review, correction or

adjustment of proposed Detailed Network. Areas which, in opinion of Architect, conflict with timely completion of Project shall be subject to revision by Contractor.

2. If Contractor fails to define element of work, activity or logic, and Architects review does not detect this error or omission, update error or omission, current at next monthly update without change to Contract Time.
3. Within 7 calendar days after joint review, revise Network in accordance with agreements reached during review and submit one reproducible mylar sepia and three prints of revised Network.
4. Within 7 calendar days of receipt by Architect of revised Detailed Network, three copies of each revised Network and computer produced Schedule and furnish Cost Reports to Architect by Contractor. Include computer produced cashflow analysis generated by both early start and late start activity dates.
5. Upon establishment of agreed upon Project Schedule, sign on face of documents (Detailed Network and Schedule and Cost Report), indicating acceptance of Schedule.
6. Upon acceptance of Detailed Network by Owner, cost-loaded values of Network shall become basis for determining progress payments.
7. Acceptance of Project Schedule by Owner does not relieve Contractor of responsibilities for accuracy or feasibility of schedule, or Contractor's ability to meet Contract Completion date, nor does acceptance warrant, acknowledge or admit reasonableness of logic, durations, manpower or equipment loading of Project Schedule.

1.8 PROJECT SCHEDULE UPDATING

A. Updated on monthly basis throughout Contract Time and until Substantial Completion. Meet with Owner and Architect each month at Schedule Update meeting to review actual progress made through date of schedule update, including following:

1. Progress made to date, activities started and completed to date, and percentage of Work complete to date on each activity started but not complete.
2. Evaluate percentage of completed work with Contractor prepared estimates and supporting data.
3. Submit contractor prepared estimates of percentage completion of each activity and supporting data on or before 14th day preceding progress payment submittal deadline, including following information:

    a. One marked up copy of previous months Schedule Update Network indicating progress on schedule activities and revised (current) remaining durations. Legibly markup copy with felt-tip markers and red ink.
    b. One original and three reproduced marked up copies of previous months Schedule Update reports coordinated with other requirements above and indicating actual activity start or completion dates, revised current) remaining durations, and percent complete regarding activity cost.
    c. Indicate in writing those activities Contractor plans to work on during following update month and current or anticipated conditions which may delay work.

B. In case of disagreements at Schedule Update meeting concerning actual progress to date, Architect's determination shall govern.

C. Upon completion of Schedule Update meeting, which occurs on or before 7th day preceding progress payment submittal deadline, use input from meeting to revise Network to reflect progress as of date of Schedule Update and agreed revisions. Execute computer produced calculation to determine status of Project Schedule. Use percentage completions as required for preparation of monthly request for progress payment.

D. Forward two copies of each updated Project Schedule to Architect including:

1. Description of activities completed during preceding month.
2. Description of progress made on activities listed as started but not completed.
3. Description of revisions to schedule logic, initial activity durations, or activity costs.
4. Prints of updated Network indicating progress made up to date of Schedule Update and indicating revisions to Network.
5. Following computer produced reports:

    a. I-J.
    b. Total float.
    c. 60-day Early Start by I-J.
    d. 60-day Early Start by Responsibility Code.
    e. Cost report.

6. Include I-J, Total Float, and 60-day Early Start Schedule Reports listed for reach activity listed on Network:

    a. I-J Event Node Number(s).
    b. Activity Description.
    c. Original Destination.
    d. Remaining Duration.
    e. Activity Responsibility Code.
    f. Activity Early Start Date.
    g. Activity Early Finish Date.
    h. Activity Late Start Date.
    i. Activity Late Finish Date.
    j. Total Float.

E. If Contractor does not record exceptions to published Project Schedule Update within 14 calendar days after its issuance, Contract shall be deemed to have accepted revisions.

F. Monthly updating of Project Schedule shall be integral part and basic element of estimate upon which progress payments will be made. If, in opinion of Architect, Contractor fails or refuses to provide information required to accomplish complete Update, Contractor shall be deemed to have not provided required estimate upon which progress payments are based and shall not be entitled to progress payment until completed Update has been provided in accordance with requirements of this Section to satisfaction of Architect.

1.9 PROJECT SCHEDULE REVISIONS

A. Updating Project Schedule to reflect actual progress made up to date of Update shall not be considered revisions to Project Schedule.

B. If Project Schedule no longer represents actual progress of work, submit revision to Schedule.

C. If Contractor desires to make changes in Project Schedule to reflect revisions in method of operating and scheduling of work, notify Architect in writing, stating reason for proposed revision.

D. If revision to Schedule is contemplated, Contractor or Owner shall so advise other in writing at least 14 calendar days in advance of next Schedule Update meeting, describing revision and describing reasons for revision.

E. Reasonable requests by Contractor for revisions will be implemented by Owner.

F. Owner directed revisions to Project Schedule will not be incorporated into Schedule without written response from Contractor within 14 calendar days. Contractor's failure to respond within 14 days will be considered acceptance of Owner requested revisions, and such revisions will be incorporated into Schedule.

G. Make requests for revisions of activity manpower, activity costs, or redistribution of activity costs in accordance with requirements.

1.10 ADJUSTMENT OF TIME FOR COMPLETION

A. Time for Completion will be adjusted in accordance with requirements.

B. Accompany request for adjustment of time for completion because of changes or alleged delays with complete Time Impact Analysis submitted for within 30 calendar days after initial notice of delay.

C. Furnish information justifying request and stating extent of adjustment requested for each specific change or alleged delay. Each Analysis shall be on form and content acceptable to Architect. Include but do not limit to, general information set forth in this Clause appropriate to type of request (change or alleged delay) plus following:

1. Fragmentary CPM network illustrating how Contractor proposes to have change or alleged delay incorporated into current Update Schedule.
2. Identification of activities in current updated Project Schedule which are proposed to be amended due to change or alleged delay, together with engineering estimates and other appropriate data justifying proposal.
3. Take into account total allowable time of activity float time available for work involved in request.

1.11 TIME IMPACT ANALYSIS

A. When change Orders (including Proposed Change Orders) are initiated, delays are experienced, or Contractor desires to revise Project Schedule, submit to Architect written Time Impact Analysis illustrating influence of each Change Order, delay, or Contractor request on current Contract Completion date.

B. Base Time Impact Analysis on dates when change or changes were issued, or dates when alleged delay or delays began, status of work at that time, and include time computations for affected activities.

C. Activity delays shall not automatically mean that extension of Contract Time is warranted or due Contractor.

D. Float is not for exclusive use or benefit of either Owner or Contractor. Contract Time extensions will be granted only to extent equitable time adjustments to activity or activities affected by Change Order or delay exceeds total (positive or zero) float of critical activity (or path) and extends Contract Date.

E. Submit three copies of each Time Impact Analysis within 14 calendar days after commencement of delay or notice of direction for Change Order is given to Contractor.

F. Upon Architects review of Time Impact Analysis, to extension of time for completion of immediate contract milestone, time(s) for completion of milestone(s) will be adjusted by Architect, whether or not time for completion of overall Project Schedule is changed accordingly.

G. If Architect finds, after review of Time Impact Analysis that Contractor is entitled to extension of time for completion, time for completion will be adjusted by Architect and Owner will allow revision to Project Schedule.

H. Upon failure to submit Time Impact Analysis for change or alleged delay within 14 calendar days, or provide additional information as Architect may require, Architect will determine time impact of change or alleged delay. If this results in determination that adjustments should be made, Architect will issue direction at next Update meeting.

I. Incorporate Time Impact Analysis related to Change Order work or Contract Time extensions, into and attached to applicable Change Order.

1.12 RESPONSIBILITY FOR COMPLETION

A. Furnish sufficient forces. Include offices, facilities and equipment works hours, night shifts and overtime operations, as necessary to ensure execution of Work in accordance with monthly Project Schedule Update.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

1.2 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos on Project Web site. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.
b. Name and contact information for photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date photograph was taken.
f. Description of location, vantage point, and direction.
g. Unique sequential identifier keyed to accompanying key plan.

1.3 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

B. Aerial Documentation Qualifications: Firm specializing in aerial documentation, having minimum 10 years documented experience in professional unmanned aerial systems (drone) and having the necessary equipment (remote control quadcopters and hexacopters with gimbal mounted HD cameras, insurance, and FAA approvals for unmanned aerial documentation.

C. Drone Operator Qualifications: FAA Part 107 licensed drone operator, certified as an unmanned aircraft operator with a UAS rating for the operation of a commercial drone (unmanned aerial vehicle) pilot, having minimum 7 years as a drone operator with current certifications and is TSA vetted.

1.4 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration reduction technology. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image editing software.

C. Metadata: Record accurate date and time and GPS location data from camera.

D. File Names: Name media files with date and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.

B. Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
2. Take 100 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 20 photographs coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Final Completion Construction Photographs: Take 100 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

    a. Special events planned at Project site.
    b. Immediate follow up when on site events result in construction damage or losses.
    c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    d. Substantial Completion of a major phase or component of the Work.
    e. Extra record photographs at time of final acceptance.
    f. Owner's request for special publicity photographs.

1.6 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements including:

1. Submittal schedule.
2. Shop drawings, coordination drawings, product data, and samples.
3. Verification submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List submittals required to maintain orderly progress of the work and those required early due to long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Construction Manager, if applicable.
5. Name of Contractor.
6. Name of firm or entity that prepared submittal.
7. Names of subcontractor, manufacturer, and supplier.
8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
9. Category and type of submittal.
10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.
15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals:

1. All submittals on this Project are intended to be transmitted to the Architect in electronic format. Acceptable format includes PDF files with searchable text

options activated. Files shall be fully coordinated with integrated bookmarks outlining all primary, secondary and tertiary subsections of the document for navigation.

2. All electronic submittals shall be transmitted to the Architect using the identified Web Based Project Software and tracking system.
3. All samples and color selection charts, draw down cards or other such items for selecting colors, finishes and textures shall be provided to the Architect in hard copy form, linked to an electronic submittal file for tracking purposes only.

E. Transmittals:

1. Identification and Information: Identify and incorporate information in each electronic submittal file:

   a. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
   b. Name file with submittal number or other unique identifier, including revision identifier.

      1) File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01. A).

   c. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

2. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number and date.

   a. Format: Use software generated form from electronic project management software acceptable to Project team, containing the following information:

      1) Project name.
      2) Date.
      3) File name and submittal number.
      4) Name and address of Architect.
      5) Name of Construction Manager. If applicable.
      6) Name of Contractor.
      7) Name of firm or entity that prepared submittal.
      8) Names of subcontractor, manufacturer, and supplier.
      9) Type of submittal.
      10) Specification Section number and title.
      11) Specification paragraph number or drawing designation and generic name for each of multiple items.
      12) Drawing number and detail references, as appropriate.
      13) Location(s) where product is to be installed, as appropriate.
      14) Related physical samples submitted directly.
      15) Indication of full or partial submittal.
      16) Transmittal number, numbered consecutively.

17) Submittal and transmittal distribution record.
18) Remarks.

b. Metadata: Include the following information as keywords in the electronic submittal file metadata:

1) Project name.
2) Number and title of appropriate Specification Section.
3) Manufacturer name.
4) Product name.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web Based Project Software: Prepare submittals in PDF form, and upload to web based Project software website. Enter required data in web based software site to fully identify submittal.

B. 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. Submit submittal items required for each Specification Section concurrently unless partial submittals for portions of the work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized due to failure to transmit submittals enough in advance of the work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Consulting Engineers: Submit submittals for structural, mechanical, and electrical items directly to consulting engineer with copy of transmittal sent to Architect. Upon completion of review, consulting engineer will send its reviewed submittal to Architect.

3. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
4. Resubmittal Review: Allow 10 days for review of each resubmittal.
5. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.
6. Submittals received by Architect after 2:00 p.m. Central Time will be considered as received the following workday.

D. 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. Make revisions in submittals required by Architect, mark number of submission, and resubmit as required until accepted.
4. Shop Drawings and Product Data:

    a. Revise initial drawings or data, and resubmit as specified for initial submittal.
    b. Indicate changes been made other than those requested by Architect.
    c. Mark number of submission and resubmit until accepted.

5. Samples: Submit new samples as required for initial submittal. Remove samples which are rejected or designated as resubmit.
6. Resubmit submittals until marked with approval notation from Architect's action stamp.

E. 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.

1. Distribute reproductions of reviewed Shop Drawings and Product Data that do not require revisions to the following:

    a. Job site file.
    b. Project Record Documents file.
    c. Other affected contractors.
    d. Subcontractors.
    e. Supplier or Fabricator.

2. Distribute accepted samples as directed by Architect.

F. Use for Construction: Retain complete copies of submittals on Project site. Use final action submittals marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule and in sequence that does not delay the work. Submittals shall be made to Architect by Contractor. Submittals from other entities will be returned unreviewed.

B. Electronic Submittal Requirements:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number, including revision identifier, and other unique identifiers at Contractor's discretion.

    a. File name and submittal number shall use the Specification Section number, with spaces, followed by a dash and then a sequential 3-digit submittal number (e.g., 061053 – 001). File name and submittal shall also include a 2-digit revision identifier suffix after another dash, starting with "00" on the initial submission (e.g., 061053 – 001 – 00).

3. Provide electronic stamp to permanently record Contractor's review and approval markings and space for electronic stamp for action taken by Architect and Consultants as needed.
4. Transmittal Form for Electronic Submittals: Use software generated form from electronic project management software acceptable to Project team, containing the following information:

    a. Project name.
    b. Date.
    c. File name and submittal number.
    d. Name and address of Architect.
    e. Name of Construction Manager.
    f. Name of Contractor.
    g. Name of firm or entity that prepared submittal.
    h. Names of subcontractor, manufacturer, and supplier.
    i. Type of submittal.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.
    o. Indication of full or partial submittal.
    p. Transmittal number, numbered consecutively.
    q. Submittal and transmittal distribution record.
    r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

    a. Project name.

b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

6. Post electronic submittals in PDF format directly to Project Web site.
7. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

C. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable 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 catalog cuts.
b. Show performance characteristics and capacities.
c. Show dimensions and clearances required.
d. Manufacturer's technical data.
e. Color charts.
f. Statement of compliance with specified referenced standards.
g. Testing and test results by recognized testing agency.
h. Application of testing agency labels and seals.
i. Notation of coordination requirements.
j. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory installed wiring.
b. Wiring or piping diagrams and controls.
c. Printed performance curves.
d. Operational range diagrams.
e. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Manufacturer's Schematic Drawings and Diagrams: Modify drawings and diagrams to delete information that is not applicable.

a. Supplement standard information to provide information applicable to work.

6. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

D. Shop Drawings: Prepare Project specific information, drawn accurately to scale, indicating materials (kind, thickness, and finish), dimensions, connections, and details

necessary to ensure accurate interpretation of the Contract Documents including attachment to other work, in detail necessary.

1. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
2. Identify details by reference to sheet and detail, schedule or room numbers shown on Contract Drawings.
3. Consecutively number shop drawings for each portion of work. Retain numbering system throughout revisions.
4. Show detail, materials, dimensions, thickness, methods of assembly, attachments, relationship to adjoining work and pertinent data and information.
5. Verify dimensions and field conditions. Clearly indicate field dimensions and field conditions.
6. Verify and coordinate shop drawings for each specification section for each trade with requirements of related specifications and trades and as necessary for proper and complete installation of work.
7. Prepare composite shop drawings and installation layouts when necessary or requested to depict proposed solutions for field conditions. Coordinate in field and with affected subcontractors for proper relationship to work of other trades based on field conditions.
8. Preparation: Fully illustrate specified requirements. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

9. Paper Sheet Size: Except for templates, patterns, and similar full size Drawings, submit Shop Drawings on sheets at least 8-1/2 inches by 11 inches (215 mm by 280 mm), but no larger than 30 inches by 42 inches (750 mm by 1067 mm).

E. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

    a. Project name and submittal number.
    b. Generic description of Sample.
    c. Product name and name of manufacturer.
    d. Sample source.
    e. Number and title of applicable Specification Section.
    f. Specification paragraph number and generic name of each item.

3. Web Based Project Software: Prepare submittals in PDF form, and upload to web based Project software website. Enter required data in web based software site to fully identify submittal.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

F. Coordination Drawings: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination" for preparation.

1. Conduct coordination meetings with trades attending to coordinate work of trades for each mechanical or electrical area.
2. Print Coordination Drawings using 1/4 inch (6 mm) minimum scale with congested areas and sections through shafts at 3/8 inch (4.5 mm) minimum scale.
3. Coordinate with architectural ceiling plans exact location and dimensioning of items which occur within hung ceilings. In event of conflict, request clarification from Architect as to correct locations of items in question.
4. Submit Coordination Drawings to Architect for review indicate conflicts that could not be resolved in coordination meeting. Submit total sleeving, piping, ductwork, lighting, sprinkler, and HVAC coordination drawings.
5. After review by Architect, prepare shop drawings for each separate trade.

6. Coordination drawings are for Architect's and Contractor's use during construction and shall not be construed as replacing shop drawings or Record Documents required by Contract Documents.

G. Product Schedule: Where required by the individual Specification Sections, prepare a written summary indicating types of products required for the work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

H. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

I. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

J. Certificates:

1. Certificates and Certifications Submittals: Submit a 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. Provide a notarized signature where indicated.
2. Installer Certificates: Submit 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.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

K. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

A. Review of submittals is for compliance with design concept of Project and compliance with information stated in Contract Documents.

1. Contractor is responsible for verifying and correlating dimensions, information that pertains solely to fabrication process or to techniques of construction, and coordination of work of trades. Architect’s acceptance of a submittal does not relieve the Contractor of its responsibility for deviation from requirements of Contract Documents.

B. Action Submittals and Informational Submittals: Review each submittal and verify 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 Architect.

C. Contractor's Action: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval or submittals rejected by Contractor.

1.9 ARCHITECT'S REVIEW

A. Architect's review of Submittals is for general design conformance and compliance with information provided in Contract Documents. Contractor is responsible for complying with requirements and characteristics of products and systems specified; dimensions and quantities to be confirmed and correlated at the Project site; and information that pertains solely to fabrication processes, installation techniques, and coordination of work required by other trades. Architect's review and indication of action to be taken shall not relieve Contractor of responsibility for deviation from requirements of Contract Documents.

B. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it. Architect will indicate, via markup on each submittal, the appropriate action as follows:

1. Final Unrestricted Release: When submittal is marked "No Exception Taken," that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final But Restricted Release: When submittal is marked "Comments Included," that part of the Work covered by the submittal may proceed provided it complies

with both the Architect's notations and comments on the submittal and requirements of the Contract Documents; final acceptance will depend upon that compliance.

3. Returned for Resubmittal: When submittal is marked "Revise and Submit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the Architects notations or corrections; resubmit without delay.

    a. Do not permit submittals marked "Revise and Submit" to be used at the Project site or elsewhere where construction is in progress.

4. Rejected: When submittal is marked "Rejected" do not proceed with that part of the work as submission is either incomplete, not coordinated, or does not conform to requirements of Contract Documents. Resubmission of the same submittal will not be considered. Prepare and submit new submittal meeting requirements of Contract Documents.
5. Not Reviewed: When submittal is marked "Not Reviewed. Submittal not required by Contract Documents" it has not been reviewed because the submittal was neither requested nor required by Contract Documents.
6. Close Out Submittal: When submittal is marked "Reviewed for Project Close Out Requirements Only" it has been reviewed only for compliance with close out submission requirements. It has not been reviewed for accuracy or completeness. Burden of accuracy and completeness rests with the Contractor.
7. Substitution Request: When a submittal is marked "Proposed Substitution. Resubmit. Comply with Section 01 25 00 "Substitution Procedures," submission does not comply with requirements of Contract Documents. Contractor may elect to resubmit under the provisions, conditions, and procedures outlined in Section 01 25 00 "Substitution Procedures" or prepare and submit new submittal meeting requirements of Contract Documents.

C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements.

D. Partial Submittals prepared for a portion of the Work will be reviewed when use of partial Submittals has received prior approval from Architect.

E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

F. Architect will return without review submittals received from sources other than Contractor.

G. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Special procedures for alteration work.

1.2 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle : To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep existing items that are not to be removed or dismantled.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 COORDINATION

A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.

1. Schedule construction operations in sequence required to obtain best Work results.
2. Coordinate sequence of alteration work activities to accommodate the following:

    a. Owner's continuing occupancy of portions of existing building.
    b. Owner's partial occupancy of completed work.
    c. Other known work in progress.
    d. Tests and inspections.

3. Detail sequence of alteration work, with start and end dates.
4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.
6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the work accordingly.

1.4 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at project site.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, testing service representative, specialists, and chemical cleaner manufacturer(s) shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Fire prevention plan.
    c. Governing regulations.
    d. Areas where existing construction is to remain and the required protection.

e. Hauling routes.
f. Sequence of alteration work operations.
g. Storage, protection, and accounting for salvaged and specially fabricated items.
h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
i. Qualifications of personnel assigned to alteration work and assigned duties.
j. Requirements for extent and quality of work, tolerances, and required clearances.
k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at monthly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:

1) Interface requirements of alteration work with Project Work.
2) Status of submittals for alteration work.
3) Access to alteration work locations.
4) Effectiveness of fire prevention plan.

5) Quality and work standards of alteration work.
6) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.5 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the work, regardless of whether they were previously documented, remain Owner's property.

1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed at project site.

1.6 INFORMATIONAL SUBMITTALS

A. Alteration Work Subschedule:

1. Submit alteration work subschedule within 30 days of date established for commencement of alteration work.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

C. Alteration Work Program: Submit 30 days before work begins.

D. Fire-Prevention Plan: Submit 30 days before work begins.

1.7 QUALITY ASSURANCE

A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.

1. Field Supervisor Qualifications: Full time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.

a. Construct new mockups of required work whenever a supervisor is replaced.

B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead safe work practices.

C. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate whole Project alteration work program with specific requirements of programs required in other alteration work.

1. Dust and Noise Control: Include locations of proposed temporary dust and noise control partitions and means of egress from occupied areas coordinated with continuing on site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

D. Fire Prevention Plan: Prepare a written plan for preventing fires during the work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire control devices during each phase or process. Coordinate plan with Owner's fire protection equipment and requirements. Include fire watch personnel's training, duties, and authority to enforce fire safety.

E. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.8 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work

and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 degrees F (3 degrees C) or more above the dew point.

E. Storage Space:

1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space does not include security and climate control for stored material.
2. Arrange for offsite locations for storage and protection of salvaged material that cannot be stored and protected on site.

1.9 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the work by use of preconstruction photographs .

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed.

D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

A. Follow fire prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled Owner's Responsibility for Fire Protection.
2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

    a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat generating equipment or combustible materials, including welding, torch cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. Obtain Owner's approval for operations involving use of welding or other high heat equipment. Use of open flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
2. As far as practicable, restrict heat generating equipment to shop areas or outside the building.
3. Do not perform work with heat generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

    a. Train each fire watch in the proper operation of fire control equipment and alarms.
    b. Prohibit fire watch personnel from other work that would be a distraction from fire watch duties.
    c. Cease work with heat generating equipment whenever fire watch personnel are not present.
    d. Have fire watch personnel perform final fire safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area

to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.

C. Fire Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs . Comply with requirements in Section 01 32 33 "Photographic Documentation."

D. Perform surveys of Project site as the work progresses to detect hazards resulting from alterations.

E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality assurance and quality control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by quality provisions.
4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, unless otherwise noted, experienced is defined as having a minimum of five years documented experience in work similar in nature, size, and extent to this project; familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality Control Tests: Tests and inspections that are performed on site for installation of the work and for completed work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a specialized construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Mockups: Full size physical assemblies that are constructed onsite either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface

between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not samples. Unless otherwise indicated, approved mockups establish the standard by which the work will be judged.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the work, to verify performance or compliance with specified criteria.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality Control Tests: Tests and inspections performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements. Contractor's quality control services do not include contract administration activities performed by Architect.

1.3 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Delegated Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality Control Plan: Submit plan for quality assurance and quality control activities and responsibilities.

1. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

B. Qualification Data: Submit data for Contractor's quality control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Main wind force resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: Testing agencies who have demonstrated their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the work.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical 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.

C. Factory Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory authorized service representative's tests and inspections specified. Include the following:

1. Name, address, telephone number, and email address of factory authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm having a minimum of 5 years documented experience in manufacturing products or systems similar to those indicated, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory authorized service representative requirements.

B. Fabricator Qualifications: A firm having minimum 5 years documented experience in producing products similar to those indicated, a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Installer Qualifications: A firm or individual having minimum 5 years documented experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated, whose work has resulted in construction with a record of successful in-service performance.

D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated.

E. Specialists: Certain Specification Sections require that specific construction activities are performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:

1. Build mockups in location and of size indicated or as directed by Architect.
2. Notify Architect a minimum of seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
7. Demolish and remove mockups when directed unless otherwise indicated.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality control activities, regardless if specified, to verify and document that the complies with requirements.

1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, regardless if specified.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when work that requires testing or inspection will be performed.
4. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and reinspecting, for construction that replaced work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory authorized service representative to inspect field assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the work, and submittal of written reports.

G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents as a component of Contractor's quality control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, indicated in the Statement of Special Inspections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality control procedures and reviewing the completeness and adequacy of those procedures to perform the work.
2. Submitting a certified written report of each test, inspection, and similar quality control service to Architect with copy to Contractor and to authorities having jurisdiction.
3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.

B. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and in the Statement of Special Inspections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams

that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

3.3 SCHEDULE OF SPECIAL INSPECTIONS

A. As specified in Section 01 45 23.

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Regulatory requirements.

1.2 GOVERNING REQUIREMENTS

A. Governing Law: Applicable governing laws, codes, and regulations of the jurisdiction of the location of the project are found in the Contract Documents.

B. Codes, Regulations, and Standards:

1. Where references are made on Drawings or Specifications to codes, they shall be considered an integral part of the Contract Documents as minimum standards. Nothing contained in Contract Documents shall be construed to conflict with law, bylaws, or regulation of municipal, State, Federal, or authorities having jurisdiction.
2. Perform Work in compliance with the Building and other Codes listed on Drawings as adopted by the City of Rockwall, Texas.
3. Perform work in compliance with:

    a. The Building Codes listed on Drawings.
    b. National, state, and local barrier free regulations, laws, and ordinances.

1.3 FIRE RESISTANCE REQUIREMENTS

A. Fire Resistance Ratings and Fire Tests: Determine fire resistance ratings of building elements, components, and assemblies in accordance with the test procedures set forth in ASTM E119 or UL 263, or by alternative methods approved by applicable authorities having jurisdiction.

1. Determine fire resistance ratings or listing based on fire tests performed by one of the following testing agencies, or an agency acceptable to governing authorities having jurisdiction.

    a. Factory Mutual Laboratories.
    b. Intertek.
    c. Southwest Research Institute.
    d. Underwriters Laboratories, Inc.

2. Where reference is made to one testing authority, equivalent fire ratings determined or listed by another testing agency are acceptable if approved by applicable authorities having jurisdiction.

B. Marking and Identification: Permanently identify fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions, and other walls or partitions required to have protected openings or penetrations with signage or stenciling. Identification shall be:

1. Located in accessible floor plenums, ceiling plenums, or attic spaces as applicable.
2. Repeated at intervals not exceeding 30 feet (10 m) o.c., measured horizontally along the partition or wall.
3. Of lettering not less than 1/2 inch (13 mm) in height, worded as follows: "FIRE AND/OR SMOKE BARRIER - PROTECT OPENINGS AND PENETRATIONS."

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are necessary to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations.

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 45 23

TESTING AND INSPECTING SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements and qualifications including but not limited to:

1. Professional testing and laboratory services.
2. Accessories necessary for the completion of testing and laboratory services.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions.
4. Specific test and inspection requirements are not specified in this Section.

C. A qualified independent testing laboratory and/or geotechnical engineering service selected and paid by Owner and approved by Architect will perform professional testing and laboratory services specified.

1. The Owner will pay for the initial laboratory services of materials that comply with the requirements of the Contract Documents. The Contractor shall pay for testing and retesting of materials that do not comply with the requirements of the Contract Documents.

D. Inspecting agency shall perform inspections and tests in accordance with the rules and regulations of the building code, local authorities, Specifications of ASTM, and the Contract Documents.

E. Materials and workmanship found not in compliance with required standards or performance obligations shall be removed and replaced. Replacement and subsequent testing shall be at Contractor’s expense.

F. Where terms "Inspector" and "Laboratory" are used, it is meant and in reference to an officially designated and accredited inspector of the testing laboratory or geotechnical service engaged by Owner.

G. Laboratory inspections shall not relieve the Contractor or Fabricator of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

H. Contractor or Fabricator shall cooperate with the testing laboratory in matters pertaining to the work.

1.2 INFORMATIONAL SUBMITTALS

A. Schedule of Special Inspections and Testing: Submit a schedule indicating the special inspections required by Code, the party responsible for each inspection and test, the type and frequency of inspections, and identifying the entity performing special inspections or testing.

B. Statement of Special Inspections: Submit Statement of Special Inspections identifying:

1. Materials, systems, components and work required to have special inspections or tests by the building official or by the registered design professional responsible for each portion of the work.
2. Type and extent of each special inspection.
3. Type and extent of each test.
4. Additional requirements for special inspections or tests for seismic or wind resistance required by Code.
5. Identify whether each type of special inspection will be continuous special inspection, periodic special inspection, or performed in accordance with notation used in the referenced standard that define the inspection.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, documented according to ASTM E329 and ASTM E534; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities having jurisdiction.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
3. Testing agencies shall be insured against errors and omissions by a professional liability insurance policy having a minimum limit of liability of $500,000.00.

B. Inspection and testing services the of testing agency shall be performed under the direction of a Registered Engineer licensed in the State of Texas, charged with engineering managerial responsibility, and having a minimum of five years engineering experience in inspection and testing of construction materials.

C. Concrete Inspectors: Inspecting personnel monitoring concrete work shall be ACI certified inspectors.

D. Structural Steel: Primary inspectors performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI Standard and Guide for Qualification and Certification of Welding Inspectors.

1. Inspector may be supported by assistant inspectors who perform specific inspection functions under the direct supervision of the Primary Inspector. Assistant inspectors shall be currently certified AWS Certified Associate Welding Inspectors (CAWI). Work of assistant inspectors shall be monitored daily by the inspector.

E. Testing Equipment: Equipment shall be calibrated at intervals not exceeding 12 months by devices of accuracy traceable to the National Bureau of Standards.

F. Referenced Standards: Latest adopted edition of standards referenced apply to the work. In the event of conflict between the Contract Documents and referenced standards, the Contract Documents shall govern. In case of conflict between Contract Documents and the Building Code, the more stringent shall govern.

1.4 QUALITY CONTROL

A. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform the services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality control activities required to verify that the work complies with requirements, whether specified or not.

1. Refer to the individual specification sections for specific requirements.
2. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.
3. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform the quality control services. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
4. Notify testing agencies at least 24 hours in advance of time when work that requires testing or inspecting will be performed.
5. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
6. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
7. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

8. Associated Responsibilities and Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

    a. Provide access to the work.
    b. Deliver of samples to testing laboratory, without cost to Owner, in adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    c. Advise laboratory and Architect sufficiently in advance of construction operations to allow laboratory to complete required inspections or tests and to assign personnel for field inspection and testing as specified.
    d. Provide facilities for storage and curing of concrete test samples on site for the first 24 hours and for subsequent field curing required by ASTM C31.
    e. Incidental labor, facilities, and equipment necessary to assist laboratory personnel in obtaining and handling samples at the site.
    f. Preliminary design mix proposed for use for material mixes that require control by testing agency.
    g. Provide concrete mix designs in accordance with ACI 301 Section 3.9 made by an independent testing laboratory or qualified concrete supplier. Where mix designs by an independent testing laboratory are required, select and pay for laboratory.
    h. Obtain required inspections or approvals of the building official. Inspection requests and notifications required by building code are responsibility of the Contractor.
    i. Provide current welder certificates for each welder employed.
    j. Provide fabrication and erection inspection and testing of welds in accordance with AWS D1.1, Chapter 6.

        1) Use prequalification of welding procedures in executing the work.

    k. Security and protection for samples and for testing and inspecting equipment at Project site.

9. Retesting/Reinspecting: Regardless of payment responsibility of the original tests or inspections, provide quality control services, including retesting and reinspecting, for construction that replaced work failing to comply with the Contract Documents or Code requirements.

C. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the work.
6. Do not perform any duties of Contractor.

D. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.5 AUTHORITY AND DUTIES OF LABORATORY PERSONNEL

A. A representative of the testing laboratory, who has reviewed and is familiar with the project and specifications, shall participate in preconstruction conferences. The representative shall coordinate material testing and inspection requirements with the Contractor and its subcontractors consistent with the planned construction schedule. The laboratory representative shall attend conferences required or requested to address quality control issues.

B. Laboratory personnel shall inspect and test materials, assemblies, specimens, and work performed, including design mixes, methods and techniques and report the progress to the Architect.

C. If material or work fails to meet requirements of Contract Documents, laboratory inspector shall notify the Construction Manager, Architect, Engineers, supplier or subcontractor providing or preparing the materials or work being tested of such failure.

D. Laboratory personnel shall not perform the work of the Contractor or act as foremen or superintendents. Work will be inspected as it progresses, but failure to detect defective work or materials shall not prevent later rejection when a defect is discovered.

E. Laboratory personnel are not authorized to revoke, alter, relax, enlarge, or release the requirements of the Contract Documents or approve or accept portions of work, except where approval is specifically specified in the Specifications.

F. Comply with building code requirements for Special Inspections.

1.6 SUBMITTALS

A. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the work progresses.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.

4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality control service.

C. Test and Inspection Reports: Prepare and submit certified written reports specified. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Submit copies of reports of each inspection and test:

1. Owner, Program or Project Manager, Architect, and each Engineer or outside consultants regarding their particular phase of the project: One copy each.
2. Construction Manager and Contractor: Two copies each.

E. In addition to furnishing a written report, notify Construction Manager and Contractor verbally of uncorrected conditions or failures to comply with requirements of the Contract Documents, and immediately fax and email corresponding report to the Architect and Engineer.

F. At completion of each trade or branch of work requiring inspecting and testing, submit a final certificate attesting to satisfactory completion of work and full compliance with requirements of Contract Documents.

G. Submit copies of test results sealed by a Registered Engineer to municipal authorities having jurisdiction, as required.

1.7 TESTING LABORATORY GUIDELINES AND PROCEDURES

A. Technicians scheduled to perform specific testing services must be qualified to review and perform other services that overlap, i.e. earthwork, foundation inspections, rebar inspection, and concrete when scheduled concurrently at the site.

B. Technician time for services performed will be reimbursed at a regular time rate. Compensation at the overtime rate will be considered for hours over eight hours spent at the site on a single day, field testing services performed on a Saturday or Sunday, and field services performed on a recognized holiday.

C. There shall be a three hour minimum for each scheduled testing service. Vehicle charges will be included on a $25.00 per trip basis.

D. Cylinder pick up will be controlled by the technician performing test on a scheduled pick up day. If there are no testing services scheduled, the cylinder pick up fee is $40.00 on week days and $50.00 on weekends and holidays with no technician or vehicle charge.

E. The Contractor shall bear the responsibility of scheduling the testing services. The Contractor and the testing laboratory shall assume full responsibility to coordinate the testing services. Cancellations or failed test shall be reimbursable to the Owner by the responsible party for the cancellations or failure of a test or service.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 TESTING AND INSPECTION SERVICES

A. Testing services shall include, but not be limited to those specified below or which are necessary or required during course of construction to ascertain specification compliance and which may be deemed necessary by Architect, Engineer, or Owner to ensure the quality of the work.

B. The Owner reserves the right to add to or delete any or all inspection and testing specified, excluding testing required by the applicable building codes.

C. If conflicts arise between Drawings and Specifications, notify Architect immediately. The most stringent requirements shall dictate procedure.

3.3 TESTING OF EARTHWORK

A. Testing Services (As specified or required):

1. References (Applicable for tests required):

a. American Society for Testing and Materials (ASTM):

1) D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft3 (600 kN-m/m3).
2) D2922, Standard Test Method for Density of Soil and Soil Aggregate In Place By Nuclear Methods (Shallow Depth).
3) D4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

b. American Association of State Highway and Transportation Officials (AASHTO):

1) T89, Determining the Liquid Limit of Soils.
2) T90, Determining the Plastic Limit and Plasticity Index of Soils.
3) T99, Moisture Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 in) Drop.
4) T238, Density of Soil and Soil Aggregates In Place By Nuclear Methods (Shallow Depth).

2. Perform sieve analysis to develop grain size distribution curves for materials to be used for subgrade, fill under slab on grade, and backfills.
3. Establish the moisture density relation of soils to be used as fill using the method best suited to the type of fill material.
4. Determine moisture content of all fill materials before placement and advise Contractor when it is or is not suitable to achieve required compaction.
5. Determine Liquid Limit in accordance with ASTM D4318 or AASHTO T89, Plastic Limit in accordance with ASTM D4318, and Plasticity Index in accordance with ASTM D4318 of all fill material,
6. Perform one in place density test for each 2,500 square feet (280 square yards) of existing subgrade material.
7. Perform Moisture Density curve in accordance with ASTM D698 or AASHTO T99 for one type of fill material. If the original choice of material does not meet the specifications, the Contractor shall pay for additional testing.
8. Perform in place density tests of each lift of compacted fill at locations adequate to evaluate the degree of compaction of all fill areas. Conduct one test for each 2,500 square feet (280 square yards) of each lift of compacted fill.
9. Perform testing at a frequency of one in-place density and moisture test for each 75 lineal feet or less of utility trench, with a minimum of three tests per lift.

B. Reports: Submit reports with the following information:

1. Type and condition of soil at footing bottoms.
2. Level of water table in the excavated areas.
3. Grain size distribution of fill materials (average of three tests).
4. Moisture density test results.

5. In place density test results with moisture content and relative density of each layer of compacted fill. Include with in place density test results, a plan showing location of each test.
6. Notify Architect by telephone within one hour of the discovery of the following conditions and follow up telephone notification with written report.

    a. Materials used, or degree of soil compaction not meeting specified requirements.
    b. Frost and freeze protection requirements for excavation bottoms not being complied with.
    c. Water in excavations which is not being removed prior to work being performed in excavation.

3.4 INSPECTION OF PIPED SITE UTILITIES

A. Laboratory representative shall observe and report on the following:

1. Proper alignment and grade of trenches.
2. Pipe bedding and supports.
3. Pipe, joints, jointing material, and thrust blocks prior to installation of pipe.
4. Installation of pipe and joints.
5. Testing of piped utilities performed by Contractor.

3.5 PAVING

A. Testing Services: Perform field tests for moisture density properties:

1. Provide field testing of the subgrade as specified.
2. Paving Subbase: Provide one field test for every 5,000 square feet of area of crushed limestone or caliche subbase.
3. Lime Treated Subgrade: Provide one field test for every 5,000 square feet of area of lime treated subgrade for content of lime and subgrade compaction.
4. Cement Soil Stabilization: Provide one field test for every 5,000 square feet of area of cement stabilized subgrade for content of cement and subgrade compaction.

3.6 PIER DRILLING OPERATION

A. A representative of a qualified geotechnical laboratory shall provide services specified.

B. Laboratory representative shall make continuous inspections to determine that proper bearing stratum is obtained and utilized for bearing and that shafts are properly clean and dry before placing concrete.

C. Laboratory shall furnish complete pier log showing the diameter, top and bottom elevations of each pier, casing required or not required, actual penetration into bearing stratum, elevation of top of bearing stratum, volume of concrete used, and deviations from specified tolerances.

D. Laboratory representative shall make continuous inspections of drilled pier construction to check the following:

1. Verify soundness of bearing stratum and desired penetration.
2. Verify pier dimensions and reinforcing used.
3. Monitor condition of hole and removal of water and loose material from bottom.
4. Monitor placement of concrete and use of tremie or pumps.
5. Monitor the extraction of casing, if used.

E. Request probe holes when deemed necessary to confirm safe bearing capacity.

3.7 CONCRETE REINFORCING STEEL AND EMBEDDED METAL ASSEMBLIES

A. Inspect concrete reinforcing steel prior to placing concrete for compliance with Contract Documents and approved shop drawings. Noncompliance with Contract Documents and approved shop drawings shall be immediately brought to the attention of the Contractor for correction and, if left uncorrected, reported to the Architect.

B. Laboratory representative shall observe and report on the following:

1. Number and size of bars.
2. Bending and lengths of bars.
3. Splicing.
4. Clearance to forms, including chair heights.
5. Clearance to sides and bottom of trench if soil formed.
6. Clearance between bars or spacing.
7. Rust, form oil, and other contamination.
8. Grade of steel.
9. Securing, tying, and chairing of bars.
10. Excessive congestion of reinforcing steel.
11. Installation of anchor bolts and placement of concrete around such bolts.
12. Fabrication and installation of embedded metal assemblies, including visual inspection of all welds.
13. Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with Contract Documents. Check number, spacing and weld quality. If, after welding, visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud or bar, such stud or bar shall be struck with a hammer and bent 15 degrees off perpendicular and then bent back into position. Anchors failing this test shall be replaced.

C. Provide a qualified, experienced inspector to inspect reinforcing steel. Inspector shall have a minimum of three years experience inspecting reinforcing steel in projects of similar size.

3.8 CONCRETE INSPECTION AND TESTING

A. Receive and evaluate proposed concrete mix designs submitted by Contractor. If mix designs comply with Drawings and Specifications, the laboratory shall submit a letter to the Architect certifying compliance. Mix designs not complying with Drawings and

Specifications shall be returned by the laboratory as being unacceptable. Check the proposed mixes for proportions, water cement ratio and slump in accordance with ACI 613 and 318.

B. Comply with ACI 311 Guide For Concrete Inspection and ACI Manual of Concrete Inspection (SP-2).

C. Sample and test concrete placed at the site in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis.

D. Concrete Testing:

1. Mold and cure five specimens from each sample.

    a. For each 50 cubic yards or fraction thereof of structural building concrete; and
    b. For each 100 cubic yards or fraction thereof of nonstructural concrete and site work paving and sidewalks.
    c. Laboratory cure two cylinders in accordance with ASTM C192.
    d. Field cure remaining cylinders in accordance with ASTM C31.

2. Two specimens shall be tested at seven days for information, two shall be tested at 28 days for acceptance.
3. Store one cylinder for testing at 56 days in the event the 28 days strength tests do not meet strength requirements.

E. Deviations from the requirements of ASTM Secifications shall be recorded in the test report. Test concrete specimens in accordance with ASTM C39.

F. Specimens for pumped concrete shall be taken at the discharge end of pumping equipment.

G. Supervise curing and protection provided for test specimens in field, and transportation from the field to laboratory. Test cylinders shall be stored in the field 24 hours and then carefully transported to laboratory and cured in accordance with ASTM C31.

H. Make one strength test (four cylinders) of each mix design of concrete placed in any one day.

I. Make one slump test for each set of cylinders following procedural requirements of ASTM C143 and ASTM C172. Make additional slump tests whenever consistency of concrete appears to vary. Slump tests corresponding to samples from which strength tests are made shall be reported with strength test results. Other slump tests need not be reported.

J. Determine total air content of air entrained normal weight concrete sample for each strength test in accordance with ASTM C231.

K. Determine air content and unit weight of lightweight concrete sample for each strength test in accordance with ASTM C173 and ASTM C567.

L. Determine temperature of concrete sample for each strength test.

M. Inspect each batch of concrete, monitor addition of mixing water to assure uniform consistency from truck to truck. Check mixing form mixers before mix begins to set and within time limits set forth in ASTM C94.

1. Monitor addition of water and high range water reducer to concrete at job site and length of time concrete is allowed to remain in truck during placement.

N. Testing agency shall furnish and maintain a competent inspector at the mixing plant at the start of each day's mixing. Inspector shall examine concrete materials for compliance with Specifications and approved mix design, weighing and measuring devices, proportioning and mixing of materials, water and cement content of each batch, general operation of the plant, and transportation of concrete to jobsite. Inspector shall verify that amount of free surface moisture contained in fine and course aggregate has been properly accounted for in the concrete mixing to achieve required consistency and water cement ratio.

O. Testing laboratory shall monitor addition of water to concrete at the jobsite and the length of time concrete is allowed to remain in the truck before placement. Inspector shall compare mixture with criteria on the approved mix design and report any significant deviation to the Architect, Contractor and concrete supplier. Do not permit addition of water which will exceed maximum water/cement ratio for the mix as given on the approved mix design.

P. Observe placing of concrete, except nonstructural slabs on grade and site work. Observe and report on placing method, consolidation, cold joints, length of drop, and displacement of reinforcement. Report deficiencies to Contractor immediately for corrective action. Inspections may be reduced to a periodic basis when all procedures have been deemed satisfactory by the laboratory.

Q. Test reports shall include but no be limited to the following information: date of concrete placement, concrete mix identification number or proportion of ingredients, truck ticket number, time test was made, time of batching, location of each placement, slump, unit weight, water content (microwave test) and air content of concrete sampled and date and results of strength test.

R. Report promptly to Architect all details of reasons for rejection of any and all quantities of concrete. Give all information concerning locations of the concrete pours, quantities, date of pours, and other pertinent facts concerning concrete represented by the specimens.

S. Testing laboratory shall certify each delivery ticket indicating class of concrete delivered (or placed), amount of water added and time at which cement and aggregate were dispensed into the truck, and time at which concrete was discharged from the truck.

T. Evaluation and Acceptance:

1. If measured slump, or air content of air entrained concrete, falls outside specified limits, a check test shall be made immediately on another portion of the same

sample. In the event of a second failure, concrete shall be considered to have failed to meet the requirements of the specifications, and shall not be used in the structure.

2. Strength level of concrete will be considered satisfactory if the averages of sets of three consecutive strength tests results are equal to, or exceed, specified strength and no individual test result (average of two cylinders) is below specified strength by more than 500 psi.
3. Completed concrete work will be accepted when requirements of ACI 301 Chapter 18 Specifications for Structural Concrete for Buildings have been met.

U. Concrete Test Reports: Reports shall be made and distributed immediately after respective tests or inspections are made.

1. Where reports indicate deviations from Contract Documents, they shall also include a determination of the probable cause of deviation and where applicable, a recommendation for corrective action.

V. Submit statistical analysis for each class of concrete placed on the project in accordance with ACI 214 and ACI 318. Information shall be updated and distributed once a month as directed by the Architect. Information shall include, but not be limited to, the following:

1. Strength tests at seven days.
2. Strength tests at 28 days of two cylinder averages.
3. 28 day moving average strength tests of last three test groups.
4. Standard deviation and coefficient of variation based on 28 day strength tests.
5. Average strength and number of 28 days tests for most recent month.
6. Strength test one cylinder at 56 days in the event the 28 days strength tests do not meet strength requirements.

W. Test Footings (Shafts) (Piers) (Caissons): Same diameter and type specified for footings, placed in same manner. Accepted test footings may be used in the Work.

X. Noncompliant Test Reports: Fax test reports indicating noncompliance immediately to each party on the test report distribution list. Copies shall be on different colored paper.

Y. Inspect application of curing compound and monitor curing conditions to assure compliance with specification requirements. Report curing deficiencies to the Contractor immediately and submit a written report to the Architect.

3.9 TESTING OF NONSHRINK GROUT

A. Make one strength test for all plates grouted and for all grout used in joints between members.

B. Each test shall consist of four cubes, two tested at 7 days and two at 28 days, made and tested in accordance with ASTM C109, with the exception that grout shall be restrained from expansion by a top plate.

3.10 STRUCTURAL STEEL

A. Inspect structural steel during and after erection for compliance with Contract Documents and shop drawings. Review and report on fabricator's quality control procedures and capabilities.

B. Field Inspection:

1. Proper erection of pieces.
2. Proper touch up painting of shop primed structural steel exposed to view or in crawl space.
3. Proper installation of bolts.
4. Plumbness of structure and proper bracing.
5. Proper field painting.
6. Initial inspection of welding process and periodically thereafter as necessary.
7. Visual examination of completed welds.
8. Ultrasonic testing of penetration field welds.
9. Installation of field welded shear studs.
10. Inspect shop fabricated members, upon arrival at the site, for defects incurred during transit and handling.
11. Measure and record camber of beams upon arrival and before erection for compliance with specified camber. Measure lying flat with web horizontal. Return members outside specified camber tolerance to shop for correction.

C. Qualifications of Welders: Fabricator and erector shall provide the testing laboratory with names of welders employed on work, along with certification that each welder has passed qualification tests within the past 12 months, using procedures covered in AWS D1.1 Structural Welding Code - Steel. Verify welder qualifications.

D. Inspection of field welding shall include:

1. Visually inspect fillet welds for size, soundness, and proper return around ends. Inspect seams, folds, and delaminations.
2. Visually inspect welds for proper repair of painting.
3. Ultrasonically test penetration welds in accordance with ASTM E164.
4. Inspect surfaces to be welded. Note surface preparations, fit up, and cleanliness of surface. Verify electrodes for size, type, and condition.
5. Welding inspector shall be present during alignment and fit up of members being welded, and shall verify for correct surface preparation of root openings, sound weld metal, and proper penetration in the root pass. Where weld has not penetrated completely, inspector shall order the joint to be chipped down to sound metal, or gouged out, and rewelded. Thoroughly inspect root passes for cracks. Gouge out cracks and rewelded to 2 inches beyond each end of crack.
6. Inspector shall verify that welds have been marked with welder's symbol and shall mark welds requiring repairs and reinspection. Inspector shall maintain a written record of welds. Work completed and inspected shall receive an identification mark by the inspector. Identify unacceptable material and work identified by word reject or repair marked directly on the material.
7. Testing agency shall advise the Owner and Architect of any shop and/or field conditions which may require further tests and examination by means other than

those specified. Additional tests and examinations shall be performed as authorized by the Owner and Architect.

8. Owner reserves the right to use ultrasonic or radiographic inspection to verify adequacy of welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1.
9. Weld quality to comply with the American Institute of Steel Construction (AISC) Manual of Steel Construction.
10. Determine percentage of weld tested by the number of welds that fail the initial testing.
11. Reweld and retest welds that fail until the welds pass. Test two additional welds for every weld failure.

E. Inspect bolted construction in accordance with AISC Specification for Structural Steel Buildings:

1. Visually inspect bolts ensuring that plies have been brought into snug contact.
2. Inspect high strength bolt in accordance with Section 9 of the Specifications for Structural Joints Using ASTM A325 or A490 Bolts.

F. Inspect stud welding in accordance with Section 7.8, of AWS D1.1 Structural Welding Code:

1. Weld at least two shear studs at the start of each production period to determine correct generator, control unit, and stud welder setting. The studs shall be capable of being bent 45 degrees from vertical without weld failure.
2. When the temperature is below 32 degrees F (0 degrees C), test one stud in each 100 after cooling. Do not weld studs at temperatures below 0 degrees F or when surface is wet with rain or snow. If stud fails in the weld, two new studs shall pass the test before resumption of welding.
3. Visually inspect studs for compliance with the requirements of the Contract Documents. Verify number, spacing, and weld quality. If, after welding, visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud, that stud shall be struck with a hammer and bent 15 degrees off perpendicular in the direction away from the missing weld. Studs failing test shall be replaced.

3.11 REINFORCING STEEL MECHANICAL SPLICES

A. Inspection and Observation Services:

1. Visually inspect and report on completed condition of each mechanical splice of reinforcing steel.
2. Visually inspect each mechanical splice to ensure compliance with the ICC-ES Reports and the manufacturer's published criteria for acceptable completed splices.
3. Place special emphasis on the inspection of the end preparation of each bar to be spliced required by the ICC-ES Report.

B. Reports: Submit reports to Architect:

1. Submit copies of manufacturer's published criteria for acceptable completed splices prior to observing mechanical splices.
2. Reports on each mechanical splice shall indicate location of the splice, size of bars spliced, and acceptability or rejection of splice. Indicate reasons for rejection on each report.

3.12 OPEN WEB JOISTS AND JOIST GIRDERS

A. Inspect joists at jobsite for compliance with specified fabrication requirements. Verify welded connections between web and chord, splices, and straightness of members.

B. Inspect installation of joists at jobsite. Check connections to supporting members, chord extensions, number of rows of bridging, and bridging connections for compliance with Contract Documents and referenced standards.

C. Verify welder qualification certificates for both shop and field welding operators.

3.13 METAL FLOOR DECK

A. Field inspection shall consist of:

1. Verifying types, gauges and finishes for compliance with Contract Documents and shop drawings.
2. Examine composite floor deck exposed to crawl space for damage to galvanizing due to welding or construction activities. Repair galvanized composite floor deck in accordance with the specifications.
3. Examine the erection of metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting or other coating.
4. Certification of welders.
5. Inspect and test field welded shear studs used to fasten metal floor decking to supporting steel as specified for structural steel.

3.14 METAL ROOF DECK

A. Field inspection shall consist of:

1. Verify types, gauges and finishes for compliance with Contract Documents and shop drawings.
2. Examine the erection of the metal deck, including fastenings at supports and side laps, reinforcing of holes, and miscellaneous deck supports.
3. Certification of welders.
4. Visual inspection of at least 25 percent of welds.

3.15 SPRAYED FIREPROOFING

A. Verify applied thickness, density, and bond strength of sprayed fireproofing meets fire rating requirements of approved design.

B. Verify installation complies with fire rating requirements of approved design.

C. Inspect and test for thickness:

1. Test 25 percent of structural frame columns and beams in each building level.
2. Test 10 percent of beams other than structural frame in each building level.
3. Test one slab per 5,000 square feet of building area.

D. Inspect and test in accordance procedures of ASTM E605 and ASTM E736.

3.16 EXPANSION BOLT INSTALLATION

A. Inspect drilling of each hole and installation of each expansion bolt for compliance with Contract Documents and shop drawings.

B. Verify installation torque for each expansion bolt for compliance with manufacturer's installation instructions.

3.17 LIGHTWEIGHT INSULATING CONCRETE FILL

A. Inspection and Observation Services (As required):

1. Inspection of roof deck prior to start of work.
2. Inspection during installation of insulation and lightweight insulating concrete fill work to ascertain compliance with Contract Documents.
3. Observation of base ply fastener pull tests performed by Contractor to ascertain minimum withdrawal resistance of 40 pounds per fastener.

B. Testing Services (As required):

1. References (As applicable for tests required):

a. American Society for Testing and Materials (ASTM)

1) C177, Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties By Means of the Guarded Hot Plate Apparatus
2) C495, Test Method for Compressive Strength of Lightweight Insulating Concrete
3) C578, Specification for Rigid, Cellular Polystyrene Thermal Insulation

2. Test EPS insulation board for thermal insulation value in accordance with ASTM C177.

3. Test lightweight insulating concrete fill in accordance with ASTM C495 for:

    a. Mix design compressive strength.
    b. Mix design wet and dry density range.
    c. Number of Tests:

        1) One per 5,000 square feet
        2) Not less than one for each day's work

4. Test EPS insulation board for density in accordance with ASTM C578.

3.18 TESTING OF ROOFING

A. Inspection and Observation Services (As required):

1. Inspection of roof deck prior to start of work.
2. Inspect on site condition of stored roofing materials.
3. Inspection during roofing, roof insulation, and sheet metal work to ascertain compliance with Contract Documents.
4. Observation of roof test cuts performed by Contractor to ascertain that they are properly made.
5. Observation of patching of roof test cuts to ascertain that they are properly made.

B. Testing Services (As required):

1. Perform dissection and analysis on cuts provided by Contractor to confirm number of plies, bonding of plies, weight of bitumen and softening temperature to ascertain compliance with specifications.

3.19 MASONRY

A. Inspection and Observation Services:

1. Inspection of placement of reinforcement including condition, grade, size, location, spacing, and lap splices.
2. Review mortar design mixes.
3. Inspection of laying, mortaring, and grouting of concrete masonry units and elements.

B. Testing Services:

1. References (As applicable for tests required):

    a. ASTM International (ASTM):

        1) C140, Standard Test Methods of Sampling and Testing Concrete Masonry Units.
        2) C780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
        3) C1019, Standard Test Method for Sampling and Testing Grout.

4) E447-97, Standard Test Methods for Compressive Strength of Laboratory Constructed Masonry Prisms.

2. Testing of Concrete Masonry Units (CMU):

a. Preconstruction: Perform the following tests in accordance with ASTM C140.

1) Compressive Strength.
2) Absorption.
3) Weight.
4) Moisture Content.
5) Dimensions.

3. Mortar Tests:

a. Preconstruction: Perform the following tests in accordance with ASTM C780 on each type of mortar mix used on the Project.
b. 28 Day Compressive Strength.
c. Water Retention.
d. Construction: Perform 28 day compressive strength test in accordance with ASTM C780 on each type of mortar mix used on the Project at the rate of one test per 2,000 square feet of masonry.

4. Refer to and include work for reinforcing steel specified.
5. Grout Tests:

a. Preconstruction: Perform the following tests in accordance with ASTM C1019 on each type of grout mix used on the Project.

1) Slump Test.
2) 28 Day Compressive Strength.
3) Construction: Perform 28 day compressive strength test in accordance with ASTM C1019 on each type of grout mix used on the Project at the rate of one test per 2,000 square feet of masonry.
4) Prism Test: Perform preconstruction 28 day compressive strength test on concrete masonry walls in accordance with ASTM E447-97, Method B.

3.20 REPAIR AND PROTECTION

A. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 29.

B. Protect construction exposed by or for quality control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION

SECTION 01 45 36

CONCRETE IMAGING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Procedural requirements for the nondestructive examination (NDE) of concrete, three dimensionally locating, mapping and identifying embedments in concrete prior to drilling, coring, cutting or breaking activities.

1. NDE services include inspections, tests, and related actions, including reports performed by an approved, independent testing agency.
2. NDE services are required to verify compliance with requirements specified or indicated in the contract documents. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

B. Requirements to provide quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by these requirements.

1.2 RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, provide NDE inspections, tests, and quality control services specified in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

B. Retesting: Retesting is the Contractor’s responsibility where results of NDE inspections, tests, or quality control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless who was responsible for the original test.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the NDE agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Provide the NDE agency with available as-built drawings and project design documentation as requested by the agency.

D. Duties of the NDE Testing Agency: The independent agency engaged to perform concrete NDE inspections and surveys shall cooperate with the Architect and the

Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect and the Contractor promptly of potential clashes between proposed penetrations of the subject concrete and embedments observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the work.
3. The agency shall not perform the duties of the Contractor.

E. Coordination: Coordinate the sequence of activities to accommodate required NDE services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

F. Schedule date and time for inspections, tests, taking samples, and similar activities.

1.3 SUBMITTALS

A. The independent NDE testing agency shall submit a written report, in duplicate, of each inspection, test, survey, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of tests or inspection
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method(s).
    g. Complete NDE test data with annotations.
    h. Survey results and an interpretation of the results.
    i. Site conditions at the time of NDE testing.
    j. Comments or professional opinions on whether proposed concrete penetrations clash or interfere with observed embedments in the concrete.
    k. Name and signature of NDE report preparer.
    l. Recommendations on retesting.

1.4 QUALITY ASSURANCE

A. Qualifications for NDE Service Agencies:

1. NDE Agency: Entity having a minimum of 10 years documented experience in the use of ground penetrating radar (GPR) for the three dimensional locating,

mapping and identification of concrete embedments for similar, mission critical, facilities.

a. Ability to archive project reports, collected data, and related documents for a period of not less than 5 years from completion of the NDE Work.

2. GPR Field Technicians and Analysts: Individuals having minimum 5 years documented experience in the use of ground penetrating radar (GPR) for the three dimensional locating, mapping, and identification of concrete embedments for similar, mission critical, facilities.

a. Demonstrated ability to accurately, dimensionally locate concrete survey and data collection areas.

3. Professional Liability Insurance ("Errors and Omissions") with minimum limits of $2 million per occurrence / $2 million annual aggregate.
4. NDE Work shall be performed in accordance with the applicable sections of ASTM D6432, CSDA Best Practice BP-007.
5. Acceptable NDE Service Agencies:

a. Dearborn Companies - Bridgeview, IL (708-430-7600)
b. CTLGroup - Skokie, IL (847-965-7500)

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

3.1 NONDESTRUCTIVE EXAMINATION (NDE) OF CONCRETE

A. Utilize ground penetrating radar (GPR) as the primary NDE investigative tool deployed for the three dimensional (3D) imaging of concrete.

B. Prior to drilling, coring, cutting, or breaking of concrete, image the area utilizing GPR by an approved NDE agency and evaluated by the agency for potential clashes with embedded elements in the concrete (conduit, piping, reinforcing bar, post tensioning tendons, etc.).

3.2 GROUND PENETRATING RADAR (GPR)

A. GPR system shall utilize a ground coupled antenna system with minimum center frequency of 1000 MHz.

B. Collect data utilizing defined, bi-directional grids with supplemental line scans being performed deemed necessary by the operator. Collect data on a grid basis, unless physical constraints restrict the data collection process to only line scans.

C. Grid locations shall be dimensionally located relative to fixed building or site elements. Identify the grid origin position and grid axis orientation and recorded.

D. Data shall be initially processed on-site, with observed embedments "real-time" marked on the concrete surface. Marking methods and materials shall be approved by the Owner in advance of the NDE services commencing. Marks shall be documented using digital photography.

E. Digitally record and post-process data utilizing the system manufacturer's analytical software. Line scan images and GPR plan map images shall be annotated to convey the nature and three dimensional location of observed embedments. Annotated images shall be included as part of each written report.

3.3 RESTRICTION ON LOCATION OF PROPOSED CONCRETE PENETRATIONS

A. Concrete penetrations shall not be made within 4 inches (100 mm) of any fixed obstruction (wall, etc.) due to the physical limitation presented by the typical GPR antenna dimensions.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Erosion and Sedimentation Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

E. Fire Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

F. Moisture and Mold Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

G. Dust and HVAC Control Plan: Submit coordination drawing and narrative that indicates the dust and HVAC control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air filtration system discharge.
4. Waste handling procedures.
5. Other dust control measures.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1 and Texas Accessibility Standards (TAS).

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain Link Fencing: Minimum 2-inch (50-mm), 0.148 inch (3.8 mm) thick, galvanized steel, chain link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts, with 1-5/8 inch (42 mm) OD top and bottom rails. Provide galvanized steel bases for supporting posts.

B. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

C. Polyethylene Sheet: Reinforced, fire resistive sheet, 10 mil (0.25 mm) minimum thickness, with flame spread rating of 15 or less per ASTM E84 and passing NFPA 701 Test Method 2.

D. Dust Control Adhesive Surface Walk Off Mats: Provide mats minimum 36 inches by 60 inches (914 mm by 1524 mm).

E. Insulation: Unfaced mineral fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame spread and smoke developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 1 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4 foot (1.2 m) square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 degrees F to 72 degrees F (20 degrees C to 22 degrees C).
5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Use of Owner’s existing permanent HVAC system is permitted to the extent it is available during the work.

1. Use of gasoline burning space heaters, open flame heaters, or salamander type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with minimum MERV of 8 at each return air grille in system, remove at end of construction, and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."

C. HVAC Equipment: Provide vented, self-contained, liquid propane gas or fuel oil heaters with individual space thermostatic control.

1. Use of gasoline burning space heaters, open flame heaters, or salamander type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."

D. Air Filtration Units: Primary and secondary HEPA filter equipped portable units with four stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. Connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. When tapping into Owner’s existing services, coordinate with Owner’s Representative before tapping into existing utility services available in the facility.

B. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.
2. Provide electric distribution system of sufficient size, capacity, and power characteristics required for construction operations.
3. Connect temporary service to Owner's existing power source as directed by Owner.

C. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

D. Water Service: Install water distribution piping in sizes and pressures adequate for construction.

E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, provided facilities are cleaned and maintained in a sanitary condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

    a. Provide toilet paper, paper towels, and related accessories and maintenance items.
    b. Thoroughly clean and disinfect toilet rooms daily.
    c. At the end of the work, thoroughly clean and sanitize, disinfect, and restore toilet rooms to like new condition. Replace plumbing fixtures and toilet accessories broken, damaged, or removed by construction personnel. If necessary, repaint paintable surfaces.

F. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select

equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.

    a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within work area using HEPA equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the work. Use vacuum collection attachments on dust producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA filter equipped vacuum equipment.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

I. Telephone Service: Provide temporary telephone service in common use facilities for use by all construction personnel. Install WiFi cell phone access equipment and at least one land based telephone line(s) for each field office.

1. Provide additional telephone lines as determined by useage.
2. At each telephone, post a list of important telephone numbers.

    a. Police and fire departments.
    b. Ambulance service.
    c. Contractor's home office.
    d. Contractor's emergency afterhours telephone number.
    e. Architect's office.
    f. Engineers' offices.
    g. Owner's office.
    h. Principal subcontractors' field and home offices.

3. Include costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by party who places call.

J. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: 4 gigabyte.
3. Disk Storage: 500 gigabyte hard disk drive and combination DVD-RW/CD-RW drive.
4. Display: 24 inch (610 mm) LCD monitor with 256-Mb dedicated video RAM.
5. Full size keyboard and mouse.
6. Network Connectivity: 10/100BaseT Ethernet or Gigabit.
7. Operating System: Microsoft Windows 10 Professional.
8. Productivity Software:

    a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
    b. Adobe Reader 11.0 or higher.
    c. WinZip 7.0 or higher.

9. Printer: All in one unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 1.0 Mbps upload and 15 Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
12. Backup: External hard drive, minimum 2 terabyte, with automated backup software providing daily backups.

3.4 SUPPORT FACILITIES INSTALLATION

A. Install and maintain support facilities until Substantial Completion inspection. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Facilities and Services:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

C. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

D. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31.
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot mix asphalt pavement until immediately before Substantial Completion. Repair hot mix asphalt base course pavement before installation of final course according to Division 32.

E. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for firefighting equipment and access to fire hydrants.

F. Parking: Provide temporary parking areas for construction personnel.

1. Parking is limited. Provide temporary parking unless Owner designates parking areas for construction personnel.

G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

I. Waste Disposal Facilities: Provide waste collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities

having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered tools and equipment and are not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with specified work restrictions.

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Division 31.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Pest Control: Engage pest control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

J. Temporary Partitions: Provide floor to ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire retardant treated plywood on construction operations side.
2. Construct dustproof partitions with two layers of 6 mil (0.14 mm) polyethylene sheet on each side. Cover floor with two layers of 6 mil (0.14 mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire retardant treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water dampened foot mats in vestibule.

3. Where fire resistance rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
4. Insulate partitions to control noise transmission to occupied areas.
5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
6. Protect air handling equipment.
7. Provide walk off mats at each entrance through temporary partition.

K. Temporary Fire Protection: Install and maintain temporary fire protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water damaged materials, protocols for mitigating water intrusion into completed work, and replacing water damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum based products, that become wet during the course of construction

and remain wet for 48 hours are considered defective and require replacing.

b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.

c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements in Section 01 77 00 "Closeout Procedures."

END OF SECTION

EROSION AND SEDIMENT CONTROL PLAN-SWPPP

Rockwall ISD Cain and Williams MS Athletic, Site, and Interior Renovation In Rockwall, Texas

Prepared for:

Rockwall Independent School Distract

February 2026

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SECTION 01 5723 - EROSION & SEDIMENT CONTROL PLAN

PART 1 – GENERAL

SUMMARY

This plan has been designed for drainage improvements and will identify and describe pollutant sources from the subject property (construction of the infill turf) with the potential to affect the quality of storm water discharges from the site. The Erosion & Sediment Control Plan will further describe measures to be used to prevent or reduce pollutants in storm water. These measures will include:

Erosion and sediment controls to be implemented to reduce pollutants generated during construction in storm water discharges;

Storm water management measures to limit storm water pollutants in discharge which generally occur after construction activities are completed;

Other controls (i.e., housekeeping practices, etc.);

Spill prevention and control practices; and

Description of non-storm water discharges.

Copies of the plan shall be maintained at the site of activity by the General Contractor until Certification of Substantial Completion is issued and made available to the Environmental Protection Agency (EPA) and appropriate State and local agencies upon request.

This document is to be retained by the General Contractor during construction until Final Certificate of Occupancy is issued and then by the school district for a period of at least three years from the date of final stabilization.

SITE EVALUATION

Site Description

On-going activities at the subject site will include construction of the Rockwall ISD Cain and Williams MS Athletic, Site and Interior Renovation. Construction of the utilities and grading is the first phase of a common plan which includes construction of the building. Soil disturbing activities will include: clearing and grading; installing a stabilized construction entrance, perimeter and other erosion and sediment controls; excavation for utilities, construction of additions and paving; and preparation for final planting and seeding. The proposed sequence of construction activities is listed below and will include an area of _____± acres. Approximately _____± acres are estimated to be disturbed through construction activities including the installation of water, sanitary sewer storm sewer, and building additions.

Install stabilized construction entrance;

Clearing and grubbing;

Demolition of existing structures

Rough grading;

Construct drainage swales;

Install erosion control devices (silt fences, hay bales, etc.) See Sediment Control Plan Sheet;

Stabilize denuded areas and stockpiles within fourteen (14) days as outlined in Section III A;

Install utilities;

Construct improvements (including building);

Complete final paving;

Remove accumulated sediment from drainage swales;

When all construction activity is complete and site is stabilized, remove erosion control devices and reseed any areas disturbed by their removal.

Figure 1 Site Location Map

PART 3 - EXECUTION

CONTROLS

Erosion and Sediment Controls

Erosion and sediment controls for each major activity resulting in soil disturbance stated in Section II B shall include stabilization practices as well as structural practices (See Sediment Control Plan). Stabilization practices will be implemented to preserve existing vegetation and trees where practical and to outline stabilization practices for disturbed areas. Structural practices will be initiated to limit the discharge of pollutants from exposed areas of the site to the degree attainable by diverting or reducing flow velocities from exposed soils, detention of flows or otherwise limiting run-off.

Stabilization

Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed as soon as practical and not more than fourteen (14) days after the construction activity in that portion of the site that has temporarily or permanently ceased unless construction activities are to resume within twenty-one (21) days. Interim and permanent stabilization practices will include the following:

Top soil stockpiles and disturbed portions of the site where construction activity temporarily ceases for at least twenty-one (21) days will be stabilized with temporary seasonal grass seed and mulch or other acceptable practices.

At the end of each working day, place a temporary diversion dike around the top of each cut or fill slope to direct any possible run-off away from the face of the slope to a non-erosive outlet area.

Stabilize all points of ingress and egress with crushed stone until just prior to paving operations to prevent tracking of mud onto public roadways.

Seed all embankments and all drainage swales immediately after grading. Permanent stabilization of embankment may be done by hydromulching with Bermuda during the months of May through September and Cool Grow during the months of October through April.

Permanent stabilization of embankment may be done by hydromulching with Bermuda during the months of May through September and Cool Grow during the months of October through April. If stabilization of disturbed areas is to be accomplished during September 15 through April 1, the stabilization shall consist of Cool Grow or Winter Rye.

Protect all trees to be preserved during construction operations.

Disturbed portions of the site where construction activities permanently cease shall be stabilized with seasonal seed no later than fourteen (14) days after the last construction activity. Permanent stabilization shall include seeding with an appropriate grass mixture (See above).

During hot summer months, the General Contractor may need to install temporary irrigation to insure adequate watering of grasses.

Structural Practices

At a minimum, silt fences or hay bales, or equivalent sediment controls are required for all side slopes and down slope boundaries of the construction area. Structural measures should be placed on upland soils to the degree attainable. The following structural controls will also be implemented:

All construction and materials shall conform to local erosion and control measures.

Silt barriers shall be constructed around all inlets and shall be maintained throughout construction. Sediment accumulated behind silt barriers shall be removed when it reaches a depth of six inches or the capacity is reduced by one-half (See Erosion Control Plan for details).

Temporary straw bale berms/dikes shall be installed across drainage channels/swales from disturbed areas. Hay bales shall be securely anchored utilizing steel or wooden stakes. Bales should be replaced at least once every two months or upon failure, etc.

Contractor shall install straw bale dike as shown on Erosion Control Plan and as required by City/architect/engineer/owner.

Contractor shall control mud accumulation on all streets surrounding the project. No mud accumulation will be allowed in public streets. Mud found in streets shall be cleaned up at the end of each work day.

General Contractor shall maintain all erosion control devices during construction to prevent any blockages from accumulated sediment. Additional straw bales may be required during construction as specified by architect, engineer, or City inspector.

All proposed parking areas to be paved as soon as possible after subgrade is prepared.

General Contractor shall remove all temporary erosion and sediment controls and remove siltation only when there is a sufficient growth of ground cover to prevent further erosion.

Storm Water Management

Storm water management practices should be implemented during construction activities to limit pollutants in storm water discharged from the site subsequent to completion of construction processes. The measures will attempt to control the potential increase in the amount and velocity of run-off and amount of pollutants from the site which may result from the change in land use. The following measures should be implemented:

Re-vegetation and natural depressions to provide pollutant removal and storm water infiltration.

Installation of retention structures and/or storm water detention areas.

Other Controls

"Other controls" targets the housekeeping practices of construction sites to limit increases in pollutant discharges. The following should be implemented:

Equipment wash down areas should be located in an area where wash down water can be controlled.

Comply with applicable State and local waste and sanitary regulations by providing adequately maintained sanitary facilities and waste receptacles.

All hazardous waste materials will be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed sanitary waste management contractor, as required by local regulation.

Equipment shall only be repaired and maintained in specific and adequately prepared areas.

Stabilize all points of ingress and egress with crushed stone until just prior to paving operations to prevent tracking of mud and construction sediments onto public ways.

All chemicals, paints, solvents, etc. should be stored in protected areas (See Section IV).

Certification of Compliance with Federal, State, and Local Regulations

The storm water pollution prevention plan reflects local requirements for storm water management and erosion and sediment control.

SPILL PREVENTION AND CONTROL

Spill Prevention

Good housekeeping practices will be implemented to reduce the potential for spills of materials maintained on-site. General housekeeping/management practices to be utilized will include the following:

Construction materials will be covered or stored in a covered area if practical.

Products will be kept in their original containers with the original manufacturer's label.

Substances will not be mixed with one another unless recommended by the manufacturer.

Whenever possible, all of a product will be used up before disposing of the container.

Manufacturers' recommendations for proper use and disposal will be followed.

The site pollution prevention inspector will routinely inspect construction site to ensure proper use and disposal of materials on-site.

Original labels and material safety data will be retained.

If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

Specific products and materials maintained on-site and good housekeeping practices to be utilized are presented in the table below:

Materials/Products	Material Management Practices
Petroleum Products	Routine maintenance practices and checks for equipment leaks will be implemented for on-site vehicles. Petroleum products maintained on-site (i.e., gasoline, diesel, oil, tar) will be stored in labeled, sealed containers and will be maintained over an impermeable surface in a bermed area. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations. Material Safety Data Sheets (MSDS) will be retained.
Fertilizers	Fertilizers will be stored over an impermeable surface and covered. Quantities will be used, per manufacturer's recommendations. Exposure of fertilizers to storm water will be minimized during and following application and storage. MSDS will be retained.
Paints	All containers will be tightly sealed and stored when not being used. Excess paint will not be discharged to the storm sewer system or discharged to the ground but will be properly disposed of according to manufacturer's instructions or State and local regulations. MSDS will be retained.
Detergents, Cleaners	Substances will be stored in original labeled containers. MSDS will be retained. Excess detergents and cleaners will not be discharged to the storm sewer or discharged to the ground but will be properly disposed of according to manufacturer's instructions or State and local regulations.
Concrete, Wood, Construction Materials	Materials will be covered or stored in an enclosed area if practical.

Spill Control

The following spill control practices will be implemented to reduce the potential for exposure of spilled materials to storm water run-off.

Fuel storage tanks will be maintained over an impermeable synthetic liner in an area bermed with hay bales to minimize run-off contaminated rainwater.

Manufacturers' recommended methods for spill clean-up will be available and site personnel will be made aware of the procedures and the location of the information and clean-up supplies.

All spills will be cleaned up immediately after discovery.

Personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, including the Texas Water Commission (TWC) Spill Response (800/633-9368 or 298-6171). The Owner and Engineer will also be contacted.

Per regulations found at 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, in the event of a release which exceeds Reportable Quantity, contact the National Response Center immediately at (800/424-8802). Within fourteen (14) days, submit a written description of the release to the EPA Regional office providing the date and circumstances of the release and the steps to be taken to prevent another release. For a listing of reportable quantities call the E.P.A.

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 clean-up measures will also be included.

The site pollution prevention inspector responsible for the day-to-day site operations will be the spill prevention and clean-up coordinator. This individual will become responsible for prevention and clean-up.

MAINTENANCE AND INSPECTION

This plan must be amended for changes in design, construction, operation, or maintenance that may result in significant effects on the potential for the discharge of pollutants. Additional requirements for amendments may include ineffective practices of the plan in its current state, or a change in contractor or subcontractor.

Regular inspections must be performed by General Contractor and supplied to the Client. The areas to be inspected shall include:

- non-finally stabilized areas of the subject property;
- storage areas exposed to precipitation; and
- locations of vehicle ingress and egress.

The following inspection and maintenance practices will be implemented by General Contractor:

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within twenty-four (24) hours of report.
- Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.
- 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.
- Diversion dike will be inspected and any breaches promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- The site pollution prevention inspector will select individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance report.

The inspections by General Contractor should take place not less than once every seven calendar days and within twenty-four (24) hours of any storm of 0.5 inches or greater. Inspections shall occur once per month for areas which are *finally* stabilized. *The attached report forms (See Appendix B) should be used during inspections and should be retained by the Owner as part of the Storm Water Pollution Prevention Plan for at least three years from the date that the site is finally stabilized.*

Any inadequacies revealed in the inspection require revision of the site description and pollution prevention measures. Any changes to the plan must be carried out within seven days of the site inspection. Revisions to the plan are to be included in *Appendix C* and submitted to Glenn Engineering Corporation.

Retention of Records

The Owner is required to retain records or copies of all reports required by this permit, including storm water pollution prevention plans and records of all data used to complete the NOI to be covered by the permit, for a period of at least three years from the date of final stabilization. This period may be extended by request of the EPA. The General Contractor shall turn over this report with the Certification of Substantial Completion and file a N.O.T with the EPA.

NON-STORM WATER DISCHARGES

It is expected that the following non-storm water discharges will occur from the site during the construction period:

- Water from water line flushing and testing;
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred); and
- Uncontaminated groundwater (from dewatering excavation).

All non-storm water discharges will be directed to discharge points (i.e., storm sewer, filtration devices, grassy swale, etc.) capable of appropriately handling the suspected contaminants contained within the discharge.

EROSION CONTROL PLAN

STORM WATER POLLUTION PREVENTON

01 5723 - EROSION CONTROL DETAILS

STONE OUTLET SEDIMENT TRAP SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. This includes all labor and materials associated with installation and maintenance of the stone outlet sediment trap as shown in the construction drawings or similar document.

The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than five (5) acres.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction plans, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

In the event of conflict between these requirements and storm water pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Filter Stone shall conform to North Central Texas Council of Governments (NCTCOG) specifications for Type 'A' Rip Rap as defined in section 2.1.6. (b).

Geotextile Fabric shall be a non-woven polypropylene fabric conforming to NCTCOG specification number 2.23.3 and be designed specifically for use as a soil filtration media with an approximate weight of 6 OZ. /YD2, a mullen burst rating of 140 psi as measured by ASTM D 751 and having an equivalent opening size (EOS) greater than a #70 sieve as measured by ASTM D 4751.

PART 3 - EXECUTION

TEMPORARY STONE OUTLET SEDIMENT TRAP

Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.

Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet shall be placed across the opening of the earth embankment and shall be covered by geotextile fabric which shall extend a minimum distance of 2 feet in either direction from the base of the filter stone core.

Filter Stone Embankment: Filter stone shall be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete.

Maintenance: Accumulated silt shall be removed from behind the embankment when the level of silt is one foot below the top of the filter stone at its lowest point.

PART 4 - MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for stone outlet sediment trap will be complete in place according the Drawings and these Specifications.

BASIS OF PAYMENT

Earth embankment, geotextile fabric and stone will be paid for by lump sum, which payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished unit as specified.

SILT FENCE SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

Silt Fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. This includes all labor and materials associated with installation and maintenance of the silt fence as shown in the construction drawings or similar document.

The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas to a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence shall remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way or where soil conditions prevent a minimum toe-in depth of six (6) inches or installation of support post to depth of 12 inches. If concentrated flow occurs after installation, corrective action must be taken such as placing rock berm in the areas of concentrated flow.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction drawings, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

A. In the event of conflict between these requirements and storm water pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Silt Fence Fabric shall be nylon reinforced polypropylene fabric which conforms to NCTCOG specification number 2.24.4 and has a built-in cord running the entire length of the top edge of the fabric. The fabric must meet the following minimum criteria:

1. Tensile Strength, ASTM D4632 90 lbs.,
2. Puncture Rating, ASTM D4833 60 lbs.,
3. Mullen Burst Rating, ASTM D3786 280 psi,
4. Apparent Opening Size, U.S. Sieve No. 70.

Fence Posts shall be galvanized steel and may be rolled, formed or tubular in cross-section in accordance with NCTCOG standard specification 2.8.2. (b) (2) "T" posts may be used when in conformance with specification.

Woven Wire Support: The minimum acceptable support material shall be W1.4 x W1.4, 4" x 4", and zinc coated (galvanized) steel woven wire fence fabric conforming to ASTM A116. Standard 2" x 2" chain link fence fabric is acceptable as well as other welded steel fabrics consisting of equal or greater gauge wire and equal or smaller spacing as that listed herein.

PART 3 - EXECUTION

SILT FENCE

Silt Fence shall consist of nylon reinforced polyester netting supported by woven wire mesh, W1.4 x W1.4 and galvanized steel posts set a minimum of I foot depth and spaced not more than 6 feet on center. A 6 inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence. Fabric shall overlap at abutting ends a minimum of 3 feet and shall be joined such that no leakage or bypass occurs.

PART 4 - MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for Silt Fence will be made by the linear foot, complete, in place and ready for use inclusive of all components necessary for a complete and working installation.

BASIS OF PAYMENT

Silt Fencing, measured as herein specified will be paid for at the unit price bid per linear foot, which payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished product as specified.

STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

The work shall consist of constructing a temporary stabilized construction entrance as shown in the plans and remaining in place for the duration of the construction period to prevent sediment from leaving the project site and becoming a nuisance on a paved surface. This includes all labor and materials associated with installation and maintenance of the stabilized construction entrance as shown in the construction drawings or similar document.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction drawings, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

In the event of conflict between these requirements and pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Stone material shall consist of type 'A' rip-rap conforming to NCTCOG standard specification 2.1.6. (b) (2) and shall be placed in a layer of at least 6 inches thickness.

Geotextile Fabric shall be a non-woven polypropylene fabric conforming to NCTCOG specification number 2.23.3 and be designed specifically for use as a soil filtration media with an approximate weight of 6 OZ. /YD2, a mullen burst rating of 140 psi as measured by ASTM D 751 and having an equivalent opening size (EOS) greater than a #50 sieve as measured by ASTM D 4751.

PART 3 - EXECUTION

STABILIZED CONSTRUCTION ENTRANCE

A temporary stabilized construction entrance shall be installed at any point where traffic will be entering or leaving a construction site to or from a paved surface such as a street, alley, sidewalk or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking or flowing of sediment onto paved surfaces. The entrance must be properly graded or incorporate a drainage swale to prevent runoff from leaving the construction site. The length of the entrance shall be as shown on the plans.

The temporary stabilized construction entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto paved surfaces. This may require periodic top dressing with additional stone as conditions demand. All sediment spilled, dropped, washed or tracked onto public rights of way must be removed immediately by the contractor.

When necessary, vehicles must be cleaned to remove sediment prior to entrance onto public right of way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into and approved sediment trap or sediment basin or other sedimentation/ filtration device. All sediment shall be prevented from entering any storm drain, ditch or watercourse using approved methods.

PART 4 --MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for stabilized construction entrance will be made by the square foot, complete, in place and ready for use inclusive of all components necessary for a complete and working installation.

BASIS OF PAYMENT

Stabilized construction entrance, measured as herein specified, will be paid for at the unit price bid per square foot. Payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished product as specified.

CERTIFICATION FORMS

LIST OF OPERATORS	
OPERATOR (Company Name)	(Company Owner, Address, Phone No.)
OWNER: Rockwall ISD	Rockwall ISD 1191 T.L. Townsend Drive Rockwall, Texas 75067 469.689.7031
Operator w/ Control over Construction Plans and Specifications; OWNER: Rockwall ISD	Rockwall ISD 1191 T.L. Townsend Drive Rockwall, Texas 75067 469.689.7031
Operator w/ Day to Day operational Control; GENERAL CONTRACTOR:	

POLLUTION PREVENTION PLAN CERTIFICATION
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
Signed: _____ Cheralyn Armijo, P.E. Project Engineer Title Glenn Engineering Corporation Company
Date: _____

Storm Water Pollution Prevention Plan
Owner/Contractor Certification Form

Site Description

As identified on the Storm Water Pollution Prevention Plan (SWPPP).

Project Name: Cain and Williams MS Athletic, Site and Interior Renovation

Project Location: Rockwall, Texas

A duly authorized representative of the Owner and a duly authorized representative of the Contractor must be identified and sign the following certification statement.

Persons signing this certification must do so in compliance with the signatory requirements of the permit as found at CFR 122.22 as follows:

For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

For the municipality, State, Federal or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrators of EPA)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Owner: Rockwall Independent School District

By: _____ _____
Signature **Title**

_____ _____
Printed Name **Date**

Contractor:

By: _____ _____
Signature **Title**

_____ _____
Printed Name **Date**

Letter of Authorization

February 25, 2026

"Executive Director"
TCEQ
Storm Water & General Permits Team: MC-148
P.O. Box 13087
Austin, Texas 78711-3087

Dear Executive Director:

This letter serves to designate either a person or specifically described position as an authorized person for signing reports, storm water pollution prevention plans, certifications or other information as required. The following person or position is hereby authorized to sign reports, plans or certifications other than an NOI application.

A qualified Storm Water Inspector Employed by:_____

Name:_____ Title:_____

Project Name: Cain and Williams MS Athletic, Site and Interior Renovation

Project Location: Rockwall, Texas

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in the Texas Administrative Code Title 30 Part 1 Chapter 305 Subchapter C Rule 305.44 and Title 30 Part 1 Chapter 305 Subchapter F Rule 305.128.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Signature:_____ Date_____

Printed Name:_____ Title:_____

Company Name:_____

February 25, 2026

"Executive Director"
TCEQ
Storm Water & General Permits Team: MC-148
P.O. Box 13087
Austin, Texas 78711-3087

Dear Executive Director:

This letter serves to designate a Company who will have day-to-day operational control of those activities at a construction site which are necessary to ensure compliance with the storm water pollution prevention plan that has been developed for this site.

Name: _____

Title: General Contractor/Daily Operational Controls

Project Name: Cain and Williams MS Athletic, Site and Interior Renovation

Project Location: Rockwall, Texas

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in the Texas Administrative Code Title 30 Part 1 Chapter 305 Subchapter C Rule 305.44 and Title 30 Part 1 Chapter 305 Subchapter F Rule 305.128.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Signature:_____ Date:_____

Printed Name:_____ Title:_____

Owner Name: **Rockwall Independent School District**

Endangered Species and Historical Places Certification

Endangered Species

A list of endangered species in Rockwall County is attached. There is no evidence upon review of the site that this project will have any adverse affect on any of the endangered species listed.

Historical Places

A list of Historic Places in Rockwall County per the National Register of Historical Places is attached. There is no evidence upon review of the site that this project will have any adverse affect on any of the historic sites listed.

_____ _____
Signature **Date**

Printed Name: Cheralyn Armijo, P.E., Project Engineer
Glenn Engineering Corporation

SWPPP for:

Rockwall Independent School District

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Owner Certification:

_____ _____
Signature **Date**

Printed Name:

Contractor Certification:

_____ _____
Signature **Date**

Printed Name:

APPENDICES

APPENDIX A

Inspection Report Forms

Make copies as needed

INSPECTION REPORT FORM

Name and qualifications of Inspector: _____

_____

_____

_____

Date: _____

Date of last rainfall and amount: _____

DISTURBED AREAS:

Inspect for evidence of, or the potential for, pollutants entering the drainage system. Comments/Observations:

_____

_____

_____

_____

STORAGE AREAS EXPOSED TO PRECIPITATION:

Inspect for evidence of, or the potential for, pollutants entering the drainage system. Comments/Observations:

_____

_____

_____

_____

EROSION/SEDIMENT CONTROL MEASURES:

Hay bale berms/dikes

Is this system operating correctly? _____ **Yes** _____ **No**

Comments: _____

_____

_____

_____

Silt Fences

Is this system operating correctly? _____ **Yes** _____ **No**

Comments: _____

_____

_____

_____

ACCESSIBLE DISCHARGE POINTS:

Inspect to determine whether erosion control measures are effective in preventing significant impacts to receiving waters i.e., any signs of erosion or sediments associated with discharge location. Comments/Observations: _____

_____

_____

_____

INGRESS/EGRESS LOCATIONS:

Any evidence of off-site sediment tracking:_____

_____

_____

_____

_____

_____

Signature

APPENDIX B

Pollution Prevention Plan Revisions

POLLUTION PREVENT PLAN REVISIONS

Date:_____

Reason for revision:_____

_____

_____

_____

Description of revision:_____

_____

_____

_____

_____

_____

_____

APPENDIX C

EPA Forms

APPENDIX D

BMP Descriptions

The BMP Descriptions that follow were obtained from the North Central Texas Council of Government's (NCTCOG) iSWM Design Manual for Construction, December 2003. These descriptions are for reference and example and are not all inclusive. Additional BMPs, approaches and methodologies are described in the iSWM Manual.

Variations to these BMPs, approaches and methodologies may be required to adapt to varying site conditions and design considerations.

Copies of the entire manual can be obtained from NCTCOG or downloaded from their website (www.iswm.nctcog.org).

NOTE:

The Owner and General Contractor must complete and sign the NOI before mailing. Please complete sections A, C, and F as necessary. Also complete the "Check/ Money Order No." and "Name Printed on Check" information on the top of the first page of the NOI.

The NOI should be sent to:

Texas Commission on Environmental Quality
Storm Water Processing Center (MC288)
12100 Park 35 Circle
Austin, TX 78753

The Payment Submittal Form and check should be sent to:

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

For immediate coverage, complete the NOI online using STEERS (State of Texas Environmental Electronic Reporting System).

https://www6.tceq.state.tx.us/steers/

Send a copy of your NOI(s) and NOT(s) to the following MS4:

The City of Rockwall:

Street Sweeping Log

This Street Sweeping log applies to Cain and Williams MS Athletic, Site and Interior Renovation:

Area Swept	Date	Name	Company	Comments

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis of Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis of design product," including make or model number or other designation. In addition to the basis of design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. Should a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.3 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis of design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with specified requirements.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: Specified in Section 01 33 00 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis of Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service connected or power operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.

d. Speed.
e. Ratings.

3. Refer to individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long term storage at site.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and losses.
3. Deliver products to site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials to avoid endangering Project structure and building elements.
3. Store products subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in the specification sections are in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a product and specifically endorsed by manufacturer to Owner.

2. Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified and coordinated to include Project specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to the individual specification sections for specific content requirements and requirements for submitting warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. Product Requirements: Provide products complying with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

5. Basis of Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

    a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 SUSTAINABLE PRODUCTS

A. Where the Specifications include products with sustainable attributes, select products that comply with sustainability requirements.

1. Where there is an option to provide one of the listed products, give preference to products with minimal packaging and easily recyclable packaging.
2. Maximize use of source reduction and recycling procedures.
3. Provide environmentally preferable products (EPP) to the extent possible.

a. Environmentally Preferable Products: Products and materials that have a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product.

2.3 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: General administrative and procedural requirements governing execution of the work including, but not limited to, the following:

1. Installation of the work.
2. Coordination of Owner installed products.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.

1.2 QUALITY ASSURANCE

A. Manufacturer's Installation Instructions: Obtain and maintain on site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. Existing Materials: Use materials for patching identical to existing materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of existing materials.

C. Progress Cleaning:

1. Provide covered containers for deposit of waste materials, debris and rubbish.
2. Use cleaning materials that do not create hazards to health and property and do not damage surfaces.
3. Use cleaning materials recommended by manufacturer of surface to be cleaned.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not warranted. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the work, examine substrates, areas, and conditions for compliance with requirements for installation tolerances and conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the work is required, include the following:

a. Description of the work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation after correcting unsatisfactory conditions. Proceeding with the work constitutes acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the work properly. Recheck measurements before installing each product. Where portions of the work are indicated to fit to other construction, verify dimensions of other construction by field

measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 INSTALLATION

A. Locate the work and components of the work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Sequence the work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. 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.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

K. Repair or remove and replace damaged, defective, or nonconforming work.

1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective work.

3.4 OWNER INSTALLED PRODUCTS

A. Site Access: Provide access to the site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.5 PROGRESS CLEANING

A. Clean project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F (27 degrees C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint use areas where Contractor and contractors are working concurrently.
5. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate conditions that could affect final finishing.

B. Site: Maintain Project free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the work, broom clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal:

1. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F (27 degrees C).
2. Provide onsite dumpsters and containers for collection of waste materials, rubbish, and debris.
3. Do not allow waste materials, rubbish, and debris to accumulate and become an unsightly and hazardous condition. Provide additional collection and dispose of debris when scheduled removal is inadequate to prevent accumulation.
4. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to EPA and local regulations.

a. Utilize containers intended for holding hazardous waste to be stored.

5. Terminate closed chutes into appropriate containers with lids. Open free fall chutes are not permitted.
6. Do not overload trucks to prevent spillage on access and haul routes. Examine traffic areas and maintain clear routes.
7. Clean site and work areas daily, including common areas. Enforce requirements strictly. Legally dispose of waste materials, rubbish, and debris away from site.

a. Do not bury or burn waste materials onsite. Do not wash waste materials down sewers or into waterways.
b. Legally dispose of waste materials and comply with disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

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SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements and limitations of cutting and patching of work.

1. Execute cutting, fitting, and patching, including attendant excavation and backfill, required to complete work or to:

a. Cutting, fitting, and patching necessary to complete the work.
b. Cutting, fitting, and patching necessary to repair existing work or work damaged by construction activities.
c. Uncover and replacement for work performed out of sequence.
d. Removal and replacement of defective work and work deemed as not in compliance with the Contract Documents.
e. Uncovering and replacement of work that had been covered prior to required observations.
f. Fit parts of the work.
g. Uncover work covered prior to Architect's required observation.
h. Removal or field samples and mockups.
i. Removal of testing samples.
j. Repair of penetrations for mechanical, electrical, and plumbing work.

1.2 DEFINITIONS

A. Cutting: Removal of construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore surfaces to original condition or like new after installation of other work.

1.3 SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and significant visual elements.
3. Products: List products used for patching and entities that will perform patching work.

4. Dates: Indicate when cutting and patching will be performed.
5. Structural Integrity: Identify if the structural integrity of the building or a member will be penetrated and indicate how the overall structural integrity will be maintained.
6. Utilities, Mechanical, and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

B. Submit written request to Architect in advance of executing cutting or alteration which affects:

1. Work of Owner or separate contractor.
2. Structural value or integrity of any element of project.
3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
4. Efficiency, operational life, maintenance, or safety of operational elements.
5. Visual qualities of sight exposed elements.

C. Request Include:

1. Identification of Project.
2. Date and time of the work.
3. Location and description of affected work.
4. Necessity for cutting, alteration, or excavation.
5. Effect on work of Owner or separate contractor, or on structural or weatherproof integrity of Project.
6. Description of proposed work:

    a. Scope of cutting, patching, alteration, or excavation.
    b. Trades who will execute work.
    c. Products proposed to be used.
    d. Extent of refinishing to be done.
    e. Cost proposal when applicable.

7. Alternatives to cutting and patching.
8. Written permission of separate contractor whose work will be affected.

D. Should conditions of work or schedule indicate change of products from original installation, submit request for substitution as specified in Section 01 25 00 "Substitution Procedures."

E. Submit written notice to Architect designating date and time work will be uncovered or altered.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

B. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

C. Operational Elements: Do not cut and patch operating elements and related components that results in reducing the capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.
2. Fire separation assemblies.
3. Air or smoke barriers.
4. Fire suppression systems.
5. Mechanical systems piping and ducts.
6. Control systems.
7. Communication systems.
8. Fire detection and alarm systems.
9. Conveying systems.
10. Electrical wiring systems.
11. Operating systems of special construction.

D. Miscellaneous Elements: Do not cut and patch elements or related components that change the load bearing capacity, resulting in a reduction of capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise and vibration control elements and systems.
7. Sprayed fire resistive material.

E. Visual Requirements: Do not cut and patch construction resulting in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain original Installer or fabricator to cut and patch exposed work. If possible, engage original Installer or fabricator. If original installer is not available, engage recognized, experienced, and specialized firm for the work.

    a. Processed concrete finishes.

b. Ornamental metal.
c. Matched veneer woodwork.
d. Preformed metal panels.
e. Roofing.
f. Firestopping.
g. Window system.
h. Fluid applied flooring.
i. Wall covering.
j. HVAC enclosures, cabinets, or covers.

F. Cutting and Patching Conference: Before proceeding, meet at site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 COORDINATION

A. Coordinate cutting and patching with selective demolition and deconstruction.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials complying with conditions of existing warranties.

1. Notify warrantor before cutting and patching warranted work. If necessary for warranty, engage authorized installer or repair personnel to perform patching and repair work.
2. Notify warrantor on completion of cutting and patching. Obtain documentation verifying that existing work has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with specified requirements, governing codes, and recognized product and material standards for each product and material.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, submit a request for a substitution complying with Section 01 25 00 "Substitution Procedures." In the Substitution Request, recommend materials that, when installed, will match the visual and functional performance of existing materials.

C. Should conditions of work or schedule indicate change of products from original installation, submit request for substitution as specified in Section 01 25 00 "Substitution Procedures."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions of Project, including elements subject to damage or to movement during cutting, patching, excavating, and backfilling.

B. After uncovering work, examine conditions affecting installation of Products, or performance of work.

C. Report unsatisfactory or questionable conditions to Architect in writing. Do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of work to insure continued structural integrity of the work.

B. Protection: Protect existing construction during cutting and patching to prevent damage to adjacent work. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 50 00 "Temporary Facilities and Controls."

D. Existing Services: Where removal, relocation, or abandonment is necessary, bypass existing services before cutting to avoid interruption of services to occupied areas. Comply with requirements of Section 01 50 00 "Temporary Facilities and Controls" for temporary utilities and services.

E. Provide positive methods of dust control and apply dust control materials to minimize raising dust from cutting and patching operations.

3.3 DUST CONTROL

A. Provide positive methods of dust control and apply dust control materials to minimize raising dust from cutting and patching operations.

3.4 EXECUTION

A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.

B. Execute fitting and adjustment of products to provide finished installation to comply with specified products, functions, tolerances, and finishes.

C. Restore work which has been cut or removed. Install new products to provide Work in accordance with requirements of Contract Documents.

D. Fit work airtight to pipes, sleeves, ducts, conduit, and penetrations through surfaces. Where fire rated separations are penetrated, fill space around pipe or insert with material with physical characteristics equivalent to fire resistance requirement of penetrated surface.

E. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.
2. For assembly, refinish entire unit.

F. Employ original installer or fabricator of work performed to perform cutting and patching for:

1. Weather exposed or moisture resistant elements.
2. Sight exposed finished surfaces.

3.5 CUTTING AND PATCHING

A. Cutting and Patching: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of components or performance of construction, and subsequently patch as necessary to restore surfaces to an original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. Use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond core drill.

4. Excavating and Backfilling: Comply with requirements in applicable earthwork specifications by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction to eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions are removed, extend one finished area into another, patch and repair floor and wall surfaces in new space. Provide even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
4. Painted Surfaces: Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
5. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.
6. Mechanical, Electrical, and Plumbing: Fit work airtight to pipes, sleeves, ducts, conduit, and penetrations through surfaces.
7. Fire Resistive Separations and Penetrations: Where fire rated separations are penetrated, fill space around pipe or insert with material complying with fire resistance requirements of penetrated surface. Refer to fireproofing and fire stopping requirements.
8. Exterior Building Enclosure: Patch components and restore enclosure to a weathertight condition.

3.6 CLEANING

A. Restore surfaces to match adjacent surfaces. Clean area dust, dirt, and debris caused by cutting and patching. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

B. Return to condition existing before cutting and patching.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Closeout submittals and warranties.
4. Payment and release of liens.
5. Final cleaning.
6. Repair of the work.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data for each type of cleaning agent.

B. Contractor's List of Incomplete Items (Punchlist): Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.3 CLOSEOUT SUBMITTALS

A. Submit the following:

1. Final application for payment.
2. Certificate of Occupancy.
3. Certificate of inspections for mechanical and electric systems.
4. Certificates of Release: Certificates from authorities having jurisdiction.
5. Certificate of Insurance: Certificates for continuing coverage.
6. Certificate of Insurance for Products and Completed Operations.
7. Project record documents.
8. Operation and maintenance data.
9. Warranties and bonds.
10. Evidence of payments and release of liens.
11. Final adjustment of accounts.
12. Spare parts, maintenance materials, and extra materials.
13. Field Report: Report of pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: Submit extra materials as specified in the individual specification sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Upon determination that the work is substantially complete, notify Architect and submit written certification that the Work is complete.

B. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

1. Contractor’s 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.

C. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit specified closeout submittals, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit extra materials specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of extra material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

D. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified.
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

E. Substantial Completion Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 7 days prior to date the work will be completed and ready for inspection and tests accompanied by the list of incomplete items.

1. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.
2. 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, the Architect will supplement the Contractor’s list with such items.

    a. Architect’s 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.

3. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
4. Reinspection: Upon correction of deficiencies, notify Architect requesting a reinspection accompanied by the list of items to be complete or corrected and date of anticipated completion.

F. Substantial Completion: Upon concurrence that the project is substantially complete, the Architect will prepare a Certificate of Substantial Completion on AIA Form G704 accompanied by the Constructor’s List of Incomplete Items that has been verified and amended by Architect.

1. The Architect will submit the Certificate of Substantial Completion to the Owner and Contractor for written acceptance of the responsibilities assigned in the Certificate.

G. Contractor Activities: Upon receipt of the certification of Substantial Completion, perform the following activities:

1. Allow Owner occupancy of the project as stated in the Certification of Substantial Completion provisions.
2. Obtain and submit the Certificate of Occupancy, operating certificates, and similar releases enabling the Owner unrestricted use of the work.
3. Complete work listed for completion or correction within designated form.
4. Advise Owner of pending insurance change over requirements.
5. Perform final cleaning.
6. Make final changeover of permanent locks and transmit keys to Owner.
7. Advise Owner of change over in security provisions.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit final Application for Payment in accordance with Section 01 29 00 "Payment Procedures." and the Agreement.
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items for completion or correction (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Equipment Testing: Submit certified list of completed testing of installed equipment and system stating that testing was performed in the presence of the Owner’s representative and are operational.
4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
5. Submit pest control final inspection report.
6. Submit final completion photographic documentation.

B. Final Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests.

1. Inspection: On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
2. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected with written certification that:

    a. The Contract Documents have been reviewed and the work has been examined for compliance and completed in accordance with Contract Documents.
    b. Equipment and systems have been tested in presence of Owner's representative and are operational.
    c. The work is completed and ready for final examination.

C. Determination of Final Completion: Architect will inspect the work to verify status of completion within seven calendar days after receipt of certification.

1. Should Architect deem the work is incomplete or defective, the Architect will notify Contractor in writing, itemizing the work that is incomplete or defective.
2. Take immediate action to finish incomplete work and remedy deficiencies before requesting a second inspection accompanied by a second written certification that work is complete.
3. Architect will reinspect the work.

    a. If the work is found complete, Architect will request submission of closeout submittals.
    b. If the work is again found incomplete, complete the work and request a reinspection accompanied by a third written certification that work is complete.

1.7 REINSPECTION FEES

A. In the event the Architect is required to perform reinspections due to the failure of the work to comply with claims of completion certified by Contractor:

1. The Owner will compensate Architect for additional services.
2. The Owner will deduct amount of compensation from final payment to Contractor.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following formats:

    a. MS Excel electronic file. Architect will return annotated file.
    b. PDF electronic file. Architect will return annotated file.

1.9 CLOSEOUT SUBMITTALS

A. Upon request of Architect after a successful Final Completion Inspection, submit the following documents for closeout:

1. Evidence of compliance with requirements of governing authorities:

    a. Certificate of Occupancy.
    b. Certificate of Inspection: Mechanical and electrical systems.

2. Project Record Documents: Refer to Section 01 78 39 "Project Record Documents."
3. Operating and Maintenance Data: Refer to Section 01 78 23 "Operation and Maintenance Data."
4. Warranties and bonds.
5. Spare Parts and Maintenance Materials: Provide products, spare parts, and maintenance materials in quantities specified in each specification section in addition to that required for completion of work.

    a. Coordinate delivery with Owner; deliver to site, store properly, and obtain receipt prior to final payment.

6. Certificates of Insurance:

    a. Certificates for products and completed operations.
    b. Certificate for continuing coverage.

7. Field Report: Submit report for pest control inspection.

1.10 PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents in an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit by uploading to web based project software site.

E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy duty, three ring, vinyl covered, loose leaf binders, thickness necessary to accommodate contents, and sized to receive 8-1/2 inch by 11 inch (215 mm by 280 mm) paper.
2. Provide heavy paper dividers with plastic covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.11 PAYMENT AND RELEASE OF LIENS

A. Evidence of Payment:

1. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
2. Contractor's Affidavit of Release of Liens: AIA G706A.
3. Attachment to Contractor's Affidavit of Release of Liens:

a. Consent of Surety to Final Payment: AIA G707.
b. Contractor's Release or Waiver of Liens.
c. Separate releases of waivers of liens from subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

4. Submittals shall be duly executed before delivery to Owner.

B. Adjustments of Accounts: Submit final statement of accounting to Architect.

1. Statement shall reflect adjustments to Contract Sum: Include the following data:

a. Original Contract Sum.
b. Additions and deductions resulting from:

1) Previous Change Orders.
2) Allowances.
3) Unit Prices.
4) Deductions for uncorrected work.
5) Penalties and bonuses.
6) Deductions for liquidated damages.
7) Deductions for reinspection payments.
8) Other adjustments.

c. Total Contract Sum, as adjusted.
d. Previous payments.
e. Sum remaining due.

C. Upon receipt and review, Architect will prepare final Change Order, reflecting approved adjustments to Contract Sum that were not previously made by Change Orders.

D. Final Application for Payment: Refer to Section 01 29 00 "Payment Procedures."

E. Adjustment: No adjustments to Contract requested by Contractor will be allowed if asserted after execution of Final Payment of Contract.

1.12 CONTRACTOR CORRECTION PERIOD

A. Prior to expiration of the Contractor’s Correction Period prior to the one year anniversary of the Date of Substantial Completion, Owner and Contractor will make visual inspection of the project to determine whether further correction of work is required in accordance with provisions of Contract Documents.

B. During the Correction Period, the Owner will promptly notify the Contractor in writing of observed deficiencies. Schedule a time and establish a schedule for correction of deficiencies.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. Perform final cleaning. Conduct cleaning and waste removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete cleaning operations before requesting inspection for certification of Substantial Completion for entire project or for a designated portion of project:

    a. Clean site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard surfaced finishes to a dirt free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and noticeable, vision obscuring materials. Replace chipped or broken glass and damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

E. Testing and Inspections: Comply with Section 01 40 00 "Quality Requirements" and the individual specification sections for required testing and inspections.

1. Submit a schedule of tests and inspections and indicate the date results of inspections and testing.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.

9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4 "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.

8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties: Submit copies of warranties and lists of circumstances and conditions that would affect validity of warranties or bonds. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Submit manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Submit lists of materials and local sources of materials and related services.

G. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit clean set(s) of marked up record prints.

a. Initial Submittal:

1) Submit one paper copy set of marked up record prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit one clean paper copy set(s) of marked up record prints.
2) Submit PDF electronic files of scanned record prints.
3) Print and PDF each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one annotated paper copy and an annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy and an annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked up Product Data as a component of manual.

D. Miscellaneous Record Submittals: Refer to the individual Specification Sections for miscellaneous recordkeeping requirements and submittals in connection with various

construction activities. Submit one paper copy and an annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.3 BURDEN OF ACCURACY

A. The burden of accuracy is the responsibility of the Contractor who shall bear costs of damages incurred by Owner due to inaccuracies or incompleteness of submitted Record Documents for the period of time following Substantial Completion defined by Agreement and the Conditions of the Contract.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.

n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red colored pencil. Use other colors to distinguish between changes for different categories of the work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
b. Architect will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Architect for scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
    3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
    4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file and an annotated paper copy of the project manual.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
    3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file and a paper copy.

    1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the work. Bind or file miscellaneous records and identify each, ready for continued use and reference. Miscellaneous record submittals include but are not limited to:

1. Reviewed shop drawings, product data, and samples.
2. Field test reports.
3. Inspection certificates.
4. Manufacturer's certificates.
5. Inspections by authorities having jurisdiction.
6. Documentation of foundation depths.
7. Special measurements or adjustments.
8. Tests and inspections.
9. Surveys.
10. Design mixes.

B. Format: Submit miscellaneous record submittals as PDF electronic file and a paper copy.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION

3.1 RECORD DOCUMENTS

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to the Documents as they occur. Do not wait until the end of the project. Architect will periodically review record documents to assure compliance.

B. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION

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SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements including cutting away, breaking out, and removing portions of existing paving.
3. Removal of designated equipment and fixtures.
4. Identification of utilities.
5. Legal offsite disposal of demolition materials.
6. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 ACTION SUBMITTALS

A. Schedule: Submit sequence of demolition operations to Owner for review prior to start of work to prevent interruption of onsite operations.

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Coordinate shutoff, capping, and continuation of utility services as required and interruption of utility services.
3. Details for dust and noise control protection.
4. Coordinate with Owner's continuing occupation of portions of existing building.
5. Use of elevator and stairs.
6. Location of salvageable items.
7. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on site operations.
8. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
9. Locations of temporary partitions and means of egress.

B. Shop Drawings: Indicate location and construction of temporary work.

C. Concrete Cutting: Submit 3 copies of proposed cutting procedures and operations for each type of concrete demolition for review and approval prior to starting the work. Outline types of equipment proposed, protections to be installed, and cutting schedule.

D. Roof Removal: Submit procedures indicating compliance with manufacturer's warranty (if required) and schedule for roof removal.

1.5 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of condition of building.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property form dust control and noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Dust and noise control protection
5. Location of salvageable items.
6. Location of construction for temporary work
7. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed work.

D. Permits: Submit permits, notices and certificates authorizing demolition work, necessary for utility work, and for transportation and disposal of debris.

E. Project Record Documents: Accurately record actual locations of capped utilities, subsurface obstructions, and insert other pertinent items.

F. Warranties: Documentation indicating that existing warranties remain in effect after completion of selective demolition.

G. Inventory: Submit a list of items for removal and salvage prior to start of demolition.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with applicable federal, state, and local codes for demolition work, dust and noise control, safety of structure, and debris removal.
2. Obtain required permits from authorities having jurisdiction.

B. Predemolition Conference: Conduct conference at site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.7 FIELD CONDITIONS

A. Occupancy: Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide minimum of 72 hours' notice to Owner of demolition activities that will affect Owner's operations including but not limited to:

1. Interruption of power.
2. Interruption of utility services.
3. Excessive noise.

B. Condition of Structure: Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not anticipated that hazardous materials will be encountered in the work.

1. Hazardous materials will be removed by Owner prior to the commencement of the work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract. Work shall continue in other areas of project unaffected by hazardous materials.

E. Storage or sale of removed items or materials on site is not permitted.

F. Traffic: Conduct operations and debris removal to ensure minimum interference with roads, streets, drives, fire lanes, walks, accessible paths, and adjacent occupied or used facilities.

1. Do not close, block, or obstruct streets, drives, walks, or occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around obstructed traffic ways.

G. Flame Cutting: Do not use cutting torches for removal until flammable materials are removed. At concealed spaces, verify conditions prior to flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.

H. Environmental Controls: Use water sprinkling, temporary enclosures, or other acceptable methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions.

I. Utility Services: Maintain existing utilities and protect against damage during demolition operations.

1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, acceptable to Owner and governing authorities.
2. Maintain fire protection facilities in service during selective demolition operations.

J. Protections: Provide temporary barriers to protect Owner's personnel and public from injury from work.

1. Take protective measures to provide free and safe passage to occupied portions of building.
2. Provide protection to ensure safe passage of the Owner’s personnel and the public around demolition areas and to and from occupied portions of adjacent areas, buildings, and structures.
3. Provide shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.

4. Protect existing work which becomes exposed during demolition operations.

    a. Protect existing improvements, appurtenances, and conditions to remain.
    b. Protect adjacent floors with coverings.
    c. Protect walls, openings, roofs, and adjacent exterior construction to remain and exposed to building demolition operations.

5. Construct temporary insulated dustproof partitions to separate areas from noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
6. Provide temporary weather protection when exposing exterior conditions to prevent water leakage or damage to structure or interior areas of existing building.

K. Damages: Promptly repair damages caused to adjacent facilities by demolition work.

L. Firearms and Explosives: Firearms and explosives are not permitted at the site.

1.8 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

B. Coordinate selective demolition work with cutting and patching requirements.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Demolition Standards: Comply with ASSE A10.6 and NFPA 241.

2.2 MATERIALS

A. Repair Materials: Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials visually matching existing adjacent surfaces.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

D. Verify hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings or preconstruction photographs and video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Pest Control: Employ certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.

B. Site Access and Temporary Controls: Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Comply with requirements for access and protection.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTIONS

A. Temporary Protection: Provide temporary barricades and protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

    a. Erect temporary pathways and means of egress necessary for ongoing operations compliant with Code and accessibility regulations.
    b. Provide temporary barricades and protection required to prevent injury and damage to adjacent buildings and facilities to remain.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

    a. Protect existing work which becomes exposed during demolition operations.

b. Protect adjacent entrances from damage due to demolition activities.
c. Protect existing improvements, appurtenances, and conditions to remain.
d. Protect floors with covering.
e. Protect walls, openings, roofs, and adjacent exterior construction to remain and exposed to building demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling.

a. Construct temporary insulated dustproof partitions to separate areas from noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
b. Construct dustproof partitions of not less than nominal 4 inch (100mm) studs, 5/8 inch (16mm) gypsum wallboard with joints taped on occupied side, and 1/2 inch (13mm) fire retardant plywood on the demolition side.
c. Insulate partition to provide noise protection to occupied areas.
d. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
e. Protect air handling equipment.
f. Weatherstrip openings.

6. Damage: Promptly repair damages to adjacent components cause by demolition activities.

B. Temporary Partitions and Enclosures: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

1. Construct dustproof partitions of not less than nominal 4 inch (100mm) studs, 5/8 inch (16mm) gypsum wallboard with joints taped on occupied side, and 1/2 inch (13mm) fire retardant plywood on the demolition side.
2. Insulate partition to provide noise protection to occupied areas.
3. Seal joints and perimeter to prevent dust from mitigating to occupied areas. Equip partitions with dustproof doors and security locks.
4. Protect air handling equipment.

C. Furnishings and Equipment: Cover and protect furniture, equipment, and fixtures from spoilage or damage as necessary.

D. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

E. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

A. Conduct demolition to minimize interference with existing and adjacent building areas and to cause as little inconvenience to Owner and employees of occupied buildings as possible. Do not interfere with use of adjacent public streets.

1. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.
2. Maintain protected egress and access to work.
3. Do not burn or bury materials on site. No explosive or blasting will be allowed for demolition.

B. Demolish and remove existing construction to the extent required by new construction and as indicated. Use methods required to complete the work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.
5. Maintain fire watch during and for at least 24 hours after flame cutting operations.
6. Maintain ventilation when using cutting torches.
7. Remove decayed, vermin infested, and dangerous or unsuitable materials and promptly and legally dispose off site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

C. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

D. Removed and Salvaged Items: Remove items and equipment indicated for salvage. Photograph items with existing damage prior to removal. Submit list of damage items with supporting photographs and videos. Clean and pack or crate items after cleaning. Identify contents of containers. Store items in secure area until delivery to Owner.

1. Transport items to Owner's storage area designated by Owner. Protect items from damage during transport and storage.

E. Removed and Reinstalled Items: Clean and repair items to functional condition adequate for intended reuse.

1. Pack or crate items after cleaning and repairing. Identify contents of containers.
2. Protect items from damage during transport and storage.
3. Store items in secure storage, off ground, and covered. Protect until items are reinstalled.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in original locations after selective demolition operations are complete.

G. Patching and Repair: Repair damage to adjacent construction caused by selective demolition operations promptly.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power driven saw, and then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power driven saw, and then remove masonry between saw cuts.

D. Concrete Slabs on Grade: Saw cut perimeter of area to be demolished, and then break up and remove.

E. Interior Slab on Grade: Use best practice removal methods to prevent cracking or structurally disturbing adjacent slabs or partitions. Use power saw where possible.

F. Below Grade Voids: Completely fill below grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches (150 mm) in diameter, roots, or organic matter.

G. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI Recommended Work Practices for the Removal of Resilient Floor Coverings.

H. Partitions: Completely remove indicated interior partitions and interior finishes indicated. Leave adjacent work scheduled to remain sound and ready for patching or for new finishes.

I. Doors and Frames: Remove doors, frames, and hardware where indicated. Remove anchors, shims, trim, and attachments. Leave opening ready to receive new work. Remove from site.

J. Cut existing masonry walls for new openings where indicated. Leave openings ready to receive new work or patching.

K. Windows: Remove existing windows where indicated. Remove associated anchors, shims, blocking, operating devices, sealant, and trim. Cut back interior finishes required for plumb surface for patching. Leave openings ready for installation of new materials and finishes or to be infilled.

L. Mechanical, Electrical, and Structural Elements: If unanticipated mechanical, electrical, or structural elements conflicting with intended function or design are encountered, investigate and measure both nature and extent of the conflict.

1. Submit written report to Architect in accurate detail. Pending receipt of directive, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.
2. HVAC Equipment: Remove air conditioning equipment without releasing refrigerants.

3.7 REMOVAL OF STRUCTURAL ELEMENTS

A. Foundation: Demolish foundation walls to a minimum depth of 12 inches (300mm) below existing ground surface. Demolish and remove below grade wood or metal construction. Break up below grade concrete slabs.

1. Interior Slabs on Grade: Employ removal methods to prevent cracking or structurally disturbing adjacent slabs or partitions. Use power saw where possible.
2. Completely fill below grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 (150mm) inches in diameter, roots, or other organic matter.

B. Pneumatic Operated Hammers: When possible, reduce use of pneumatic operated hammers. When necessary to use pneumatic tools, locate compressors as remote form occupied areas as possible.

1. To break large pieces of concrete, isolate concrete from floor slabs and building structure to prevent structure borne vibration.

C. Saw Cutting: Locate compressors as remote as possible from occupied areas of facility.

1. Use diamond tipped saw blades and related equipment.

2. Saw cut portions of walls and slabs. Angle saw blade at floors and corners to cut as closely as possible to desired location.
3. Control runoff water used with saw to prevent damage to existing materials.

3.8 ROOF REMOVAL

A. Roof Assembly: Remove existing roofing to the extent that can be covered in one day by new roofing. Maintain building interior in watertight and weathertight condition.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

B. At new column extensions, cut through roofing as required for welding of new extension. Provide temporary watertight enclosure over stubs and temporarily flash to existing roof to make completely watertight.

C. At existing parapets, remove portions of roofing, flashing, stone, and masonry necessary to weld new steel and set form work. Provide temporary watertight enclosures over areas of open roof and temporarily flash to make watertight.

D. As column forms are placed, temporarily flash columns to existing roofing and cover with watertight tarpaulins before and after pouring. After column forms have been removed, temporarily flash new concrete structure into existing roofing immediately to maintain watertight roof.

E. When removing roofing to place supports for shoring of form work to transfer loads to existing columns or approved structure or to support scaffolding, work platforms, or similar loads, temporarily flash supports to make roof watertight.

F. Remove excess residue. Thoroughly clean and remove asphalt, dust, loose materials and leave ready for new work.

3.9 PATCHING AND REPAIRS

A. Promptly repair damage to adjacent construction caused by selective demolition operations. Refinish construction or item to a condition comparable or better than before selective demolition operations or replace with new.

B. Patching: Comply with Section 01 73 29 "Cutting and Patching."

C. Repairs: When necessary to repair to existing surfaces, patch to produce surfaces suitable for new materials.

1. Fill holes and depressions in existing masonry walls to remain with masonry patching material applied according to manufacturer's written recommendations.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

E. Floors and Partitions: Where walls or partitions are demolished, extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.10 DISPOSAL OF DEMOLISHED MATERIALS

A. Legally remove demolition waste materials from site and dispose in an EPA approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.11 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

B. Remove partitions and temporary work. Restore surfaces to match adjacent surfaces.

END OF SECTION

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SECTION 02 41 20

SELECTIVE DEMOLITION

PART 1 - GENERAL

RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

1. This Section includes the following: Demolition and removal of selected site elements.

DEFINITIONS

1. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

2. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Owner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

MATERIALS OWNERSHIP

1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

SUBMITTALS

1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.

QUALITY ASSURANCE

1. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Owner.

SCHEDULING

1. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.

PART 2 – PRODUCTS: NOT USED.

PART 3 - EXECUTION

EXAMINATION

1. Verify that utilities have been disconnected and capped.

2. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

UTILITY SERVICES

1. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

A. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.

I. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.

2. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services to be removed.

A. Arrange to shut off indicated utilities with utility companies.
B. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other areas before proceeding with selective demolition.

3. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

PREPARATION

1. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

2. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

A. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.

A. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
B. Protect existing site improvements, appurtenances, and landscaping to remain.

SELECTIVE DEMOLITION

1. Demolish and remove existing construction only to the extent required by new construction and as indicated.

2. Break up and remove concrete slabs on grade, unless otherwise shown to remain.

DISPOSAL OF DEMOLISHED MATERIALS

1. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

2. Burning: Do not burn demolished materials.

3. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 02 41 20

SECTION 03 30 01

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
B. Cast-in-place concrete includes the following:

1. Foundations and footings.
2. Slabs-on-grade.
3. Fill for steel deck.
4. Foundation walls.
5. Shear walls
6. Load-bearing building walls
7. Building frame members.
8. Equipment pads and bases.
9. Fill for steel pan stairs.

1.3 RELATED SECTIONS

A. The following Sections contain requirements that relate to this Section:
1. Division 2 Section "Portland Cement Concrete Paving" for concrete paving and walks.
2. Division 3 Section "Concrete Toppings" for concrete floor toppings.
3. Division 3 Section "Lightweight Concrete" for lightweight concrete.
4. Division 3 Section "Tilt-Up Precast Concrete" for tilt-up precast concrete.
5. Division 5 Section "Steel Floor Deck" for steel floor deck construction.

1.4 SUBMITTALS

A. General
1. Submit the following according to Conditions of the Contract and Division 1 Spec Sections.

B. Product Data

1. For proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect/Engineer.

C. Shop Drawings
1. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures. Include all special reinforcement on elevation drawn at a scale of not less than 1/4" to 1'-0". Original contract drawings shall not be reproduced for use as a portion of the Shop drawing.

2. Shop Drawings; Construction Joints: Submit original shop drawings indicating the proposed construction joint locations to the Architect/Engineer at least 14 days prior to beginning formwork on the portion of the building in question.

D. Concrete Mix Design
1. Submit mix designs and aggregate analysis of each class of concrete. Designs shall be submitted a minimum of 48 hours prior to the placement of any concrete.

2. Mix designs shall include material proportions, material weights, material sources, manufacturer's data on any admixture used, and proof that the design meets the requirements of this specification. Proof shall include the water/cement ratio, slump, and the compressive strengths from concrete test cylinders. Substantiative data may be taken from historical records or independent laboratory tests. Manufacturer's data shall include recommended dosages. Aggregate analysis shall include the sieve analysis, dry rodded unit weight of coarse aggregate, and the specific gravities of both fine and coarse aggregates.

E. Material Certificates
1. Material certificates in lieu of material laboratory test reports when permitted by Architect/Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

F. Testing Reports
1. The independent testing laboratory shall submit laboratory test reports for concrete materials directly to the Architect/Engineer with copy to others in accordance with the provisions of section 01400 "Quality Control Services." State in each report whether or not the test specimens comply to the specified requirements and indicate any deviations therefrom.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
2. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, & Placing Concrete"
3. ACI 305 "Hot Weather Concreting".
4. ACI 306 "Recommended Practice for Cold Weather Concreting"
5. ACI 311 "Recommended Practice for Concrete Inspection"
6. ACI 318, "Building Code Requirements for Reinforced Concrete."
7. ACI 347 "Recommended Practice for Concrete Formwork".
8. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."

B. Mix designs
1. Test in accordance with the requirements of PART 2 - PRODUCTS, article "PROPORTIONING AND MIX DESIGNS".

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 – PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete

1. Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

2. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.

3. Use 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.

B. Forms for Unexposed Finish Concrete
1. Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns and Supports
1. Metal, glass-fiber-reinforced plastic, or paper or fiber tubes that will produce smooth surfaces without joint indications. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.

D. Pan-Type Forms
1. Glass-fiber-reinforced plastic or formed steel, stiffened to support weight of placed concrete without deformation.

E. Form Release Agent
1. Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

F. Form Ties
1. Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

2. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed. Provide Grade 40 for #3 bars, column ties, and beam stirrups.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Deformed-Steel Welded Wire Fabric: ASTM A 497.

E. Deformed Bar Anchors: ASTM A 706.

F. Supports for Reinforcement: 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 specifications.

G. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

H. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement
1. ASTM C 150, Type I. Type III cement may be used in lieu of Type I at contractor's option, when acceptable to the Architect/Engineer.

2. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Normal-Weight Aggregates
1. ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

2. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling. Do not use aggregates containing soluble salts or other substrates such as iron sulfides, pyrite, marcasite or ocher which can cause stains on exposed concrete surfaces.

3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect/Engineer.

C. Water: Potable.

D. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Air-Tite, Cormix Construction Chemicals.
Air-Mix or Perma-Air, Euclid Chemical Co.
Darex AEA or Daravair, W.R. Grace & Co.
MB-VR or Micro-Air, Master Builders, Inc.
Sealtight AEA, W.R. Meadows, Inc.
Sika AER, Sika Corp.

F. Water-Reducing Admixture: ASTM C 494, Type A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Chemtard, ChemMasters Corp.
PSI N, Cormix Construction Chemicals.
Eucon WR-75, Euclid Chemical Co.
WRDA, W.R. Grace & Co.
Pozzolith Normal or Polyheed, Master Builders, Inc.
Metco W.R., Metalcrete Industries.
Prokrete-N, Prokrete Industries.
Plastocrete 161, Sika Corp.

G. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Super P, Anti-Hydro Co., Inc.
   Cormix 200, Cormix Construction Chemicals.
   Eucon 37, Euclid Chemical Co.
   WRDA 19 or Daracem, W.R. Grace & Co.
   Rheobuild or Polyheed, Master Builders, Inc.
   Superslump, Metalcrete Industries.
   PSPL, Prokrete Industries.
   Sikament 300, Sika Corp.

H. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Q-Set, Conspec Marketing & Manufacturing Co.
   Lubricon NCA, Cormix Construction Chemicals.
   Accelguard 80, Euclid Chemical Co.
   Daraset, W.R. Grace & Co.
   Pozzutec 20, Master Builders, Inc.
   Accel-Set, Metalcrete Industries.

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   PSI-R Plus, Cormix Construction Chemicals.
   Eucon Retarder 75, Euclid Chemical Co.
   Daratard-17, W.R. Grace & Co.
   Pozzolith R, Master Builders, Inc.
   Protard, Prokrete Industries.
   Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.

C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.

1. For Expansion joints: Provide 6"x3/8"x3/4" split flange center bulb type waterstops, minimum.

2. For Cold joints: Provide 4"x3/16"x1/2" dumbbell type, endbell style, minimum.

3. Rubber Waterstops: Corps of Engineers CRD-C 513.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

The Burke Co.
Progress Unlimited.
Williams Products, Inc.

4. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

      The Burke Co.
      Greenstreak Plastic Products Co.
      W.R. Meadows, Inc.
      Progress Unlimited.
      Schlegel Corp.
      Vinylex Corp.

5. Preformed Plastic Adhesive Waterstops: Federal Specification SS-S-210A. It shall be supplied in extruded form of suitable cross-section and of a size to seal the joint areas of concrete sections. The plastic waterstop shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:

      "Synko-Flex"; Synko-Flex Products, Inc.
      "Ram-Nex"; K.T. Snyder Company, Inc.
      "Waterstop-RX"; American Colloid Company.

D. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

   1. Polyethylene sheet not less than 6 mils thick.

E. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 0.00 grains per sq. ft. per hr. when tested according to ASTM E 96, Method B. Provide manufacturer's recommended mastics and gusset tape.

   1. Product: Subject to compliance with requirements, provide Sealtight Premoulded Membrane by W.R. Meadows, Inc.

F. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

   1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

      "Surfhard"; Euclid Chemical Co.
      "Lapidolith"; Sonneborne-Rexnord.
      "Saniseal"; Master Builders.
      "Burk-O-Lith"; The Burke Co.
      "Penalith"; W.R. Meadows, Inc.

G. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

H. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

I. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I-D, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.

2. Do not use curing compound on recessed slab areas which receive paver tile, quarry tile, ceramic tile or terrazzo finish floor material. These areas shall be water cured only.

a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

A-H 3 Way Sealer, Anti-Hydro Co., Inc.
Spartan-Cote, The Burke Co.
Conspec #1, Conspec Marketing & Mfg. Co.
Sealco 309, Cormix Construction Chemicals.
Day-Chem Cure and Seal, Dayton Superior Corp.
Eucocure, Euclid Chemical Co.
Horn Clear Seal, A.C. Horn, Inc.
L&M Cure R, L&M Construction Chemicals, Inc.
Masterkure, Master Builders, Inc.
CS-309, W.R. Meadows, Inc.
Seal N Kure, Metalcrete Industries.
Kure-N-Seal, Sonneborn-Chemrex.
Stontop CS2, Stonhard, Inc.

J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Highseal, Conspec Marketing and Mfg. Co.
Sealco - VOC, Cormix Construction Chemicals.
Safe Cure and Seal, Dayton Superior Corp.
Aqua-Cure, Euclid Chemical Co.
Dress & Seal WB, L&M Construction Chemicals, Inc.
Masterkure 100W, Master Builders, Inc.
Vocomp-20, W.R. Meadows, Inc.
Metcure, Metalcrete Industries.
Stontop CS1, Stonhard, Inc.

K. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Aquafilm, Conspec Marketing and Mfg. Co.

Eucobar, Euclid Chemical Co.
E-Con, L&M Construction Chemicals, Inc.
Confilm, Master Builders, Inc.
Waterhold, Metalcrete Industries.

L. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

K-15, Ardex, Inc.
Self-Leveling Wear Topping, W.R. Bonsal Co.
Conflow, Conspec Marketing and Mfg. Co.
Corlevel, Cormix Construction Chemicals.
LevelLayer II, Dayton Superior Corp.
Flo-Top, Euclid Chemical Co.
Gyp-Crete, Gyp-Crete Corp.
Levelex, L&M Construction Chemicals, Inc.
Underlayment 110, Master Builders, Inc.
Stoncrete UL1, Stonhard, Inc.
Concrete Top, Symons Corp.
Thoro Underlayment Self-Leveling, Thoro System Products.

M. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Polyvinyl Acetate (Interior Only):

Superior Concrete Bonder, Dayton Superior Corp.
Euco Weld, Euclid Chemical Co.
Weld-Crete, Larsen Products Corp.
Everweld, L&M Construction Chemicals, Inc.
Herculox, Metalcrete Industries.
Ready Bond, Symons Corp.
Intralok, W.R. Meadows, Inc.

2. Acrylic or Styrene Butadiene:

Acrylic Bondcrete, The Burke Co.
Strongbond, Conspec Marketing and Mfg. Co.
Day-Chem Ad Bond, Dayton Superior Corp.
SBR Latex, Euclid Chemical Co.
Daraweld C, W.R. Grace & Co.
Hornweld, A.C. Horn, Inc.
Everbond, L&M Construction Chemicals, Inc.
Acryl-Set, Master Builders Inc.
Intralok, W.R. Meadows, Inc.
Acrylpave, Metalcrete Industries.
Sonocrete, Sonneborn-Chemrex.
Stonlock LB2, Stonhard, Inc.
Strong Bond, Symons Corp.

N. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Burke Epoxy M.V., The Burke Co.
   Spec-Bond 100, Conspec Marketing and Mfg. Co.
   Resi-Bond (J-58), Dayton Superior.
   Euco Epoxy System #452 or #620, Euclid Chemical Co.
   Epoxtite Binder 2390, A.C. Horn, Inc.
   Epabond, L&M Construction Chemicals, Inc.
   Concresive Standard Liquid, Master Builders, Inc.
   Rezi-Weld 1000, W.R. Meadows, Inc.
   Metco Hi-Mod Epoxy, Metalcrete Industries.
   Sikadur 32 Hi-Mod, Sika Corp.
   Stonset LV5, Stonhard, Inc.
   R-600 Series, Symons Corp.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

B. The testing laboratory shall perform an aggregate analysis for each type of aggregate used. The aggregate analysis shall be performed on current stockpiles, and shall include sieve analysis, specific gravities, and the dry rodded unit weight of absorption on coarse aggregates. Sieve analysis for coarse aggregate shall include all sieve sizes for each class of coarse aggregate. An additional test shall be performed for every 300 yards of concrete placed, and a new aggregate analysis shall be performed whenever a new source of material is used.

C. Submit written reports to Architect/Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect/Engineer.

D. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

   1. 4000-psi, 28-day compressive strength
      6.5 sacks of cement per cu. yard of concrete (minimum)

   2. 3600-psi, 28-day compressive strength
      6 sacks of cement per cu. yard of concrete (minimum)

   3. Cement content may be reduced by 1/2-sack per cu. yd. when an approved water reducing admixture or high range water reducing admixture, conforming to the requirements of this specification, is used. This water reducing admixture shall be used in accordance with the manufacturer's recommendations, provided that mix tests yield concrete of not less than the specified strength, and such reduction of cement is accepted in writing by the Architect/Engineer.

E. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

   1. All concrete: W/C 0.50.
   2. Subjected to freezing and thawing: W/C 0.50.
   3. Subjected to deicers/watertight: W/C 0.40.
   4. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps and sloping surfaces: Not more than 3 inches.
2. Reinforced foundation systems: Not less than 1 inch and not more than 5 inches.
3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
4. Drilled Piers: Not less than 5 inch and not more than 6 1/2 inches.
5. Other concrete: Not less than 1 nor more than 5 inches.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect/Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect/Engineer before using in Work.

2.6 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

1. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
2. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

B. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

1. All concrete: 3 percent to 5 percent.

2. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.

4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1-inch maximum aggregate.

5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.

5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.

Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

C. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

A. General: Concrete may be mixed at batch plants or it may be transit-mixed as specified herein. Batch plants must comply with the requirements of ACI 304, with sufficient capacity to produce concrete of the quality specified, in quantities required to meet the construction schedule. All plant facilities are subject to the acceptance of the Architect/Engineer. Plant facilities shall be calibrated by testing agencies specifically qualified for this as frequently as necessary to insure accuracy to plus or minus 0.4% of the total capacity of the components of the plant, but at a frequency not to exceed 6 months.

B. Job-Site Mixing: Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. Do not exceed the catalog rating or nameplate capacity for a total volume of materials used per batch. Equip the mixer with automatic controls, or semi-automatic controls, if acceptable, for proportioning materials and the proper measured quantities. Do not exceed 30 minutes total elapsed time between intermingling of damp aggregates and cement to the discharge of the completed mix.

1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified, provided the quantity and rate of delivery will permit unrestricted progress of the work in accordance with the placement schedule. Discharge of the concrete shall be completed within l-l/2 hours after water is added to the mix or by the time the drum has revolved 300 times, whichever occurs first.

When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.8 FABRICATION OF REINFORCEMENT

A. General: Shop-fabricate reinforcing bars to conform to the required shapes and dimensions, with fabrication tolerances complying with ACI 315. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.

C. Identification: Deliver all reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

D. Rejected Materials: Reinforcing with any of the following defects will not be permitted in the work:

1. Bar lengths, depths, and bends exceeding the specified fabrication tolerances. Bends or kinks not indicated on drawings or final shop drawings.

2. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - EXECUTION

3.1 GENERAL

1. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

Provide Class A tolerances for concrete surfaces exposed to view.

Provide Class C tolerances for other concrete surfaces.

B. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of the structure during construction.

C. Construction loads, including reshoring loads, on in-place construction shall at no time exceed the live load for which the in-place construction was designed. If the contractor is uncertain about the design live loads, it shall be his responsibility to obtain these from the Architect/Engineer.

D. 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 the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

E. 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 keyways, reglets, recesses, and the like for easy removal.

F. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. 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.

H. Forms for Exposed Concrete: Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.

1. Do not use metal cover plates for patching holes or defects in forms.

I. 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.

J. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

B. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

1. Provide sufficient numbers of supports and of strength to carry the reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

E. Place reinforcement to maintain minimum coverages as indicated 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. Space reinforcing bars to comply with ACI 318-83, Section 7.6. Reinforcing bars may be relocated as necessary to avoid interference with other reinforcement, conduit, or other embedded items. However, if any reinforcing bar is moved a distance exceeding one bar diameter or the specified placing tolerance, the resulting rearrangement of the reinforcement will be subject to acceptance by the Architect/Engineer.

F. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect/Engineer.

B. Locate construction joints, if required, but not shown so as to divide the slab into areas not in excess of 6000 sq. ft.(as close to square in configuration as possible), unless otherwise accepted by the Architect/Engineer. Conform to slab placement, where shown. Before adjacent pour is made, the surface shall be roughened to an amplitude of a minimum of 1/4 inch except at exposed surfaces.

C. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs. Keyways are to be horizontal or vertical as directed by the Architect/Engineer. Install preformed plastic adhesive waterstops in the keyway of all construction joints where vinyl, bulb-type waterstops are not detailed.

D. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

E. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

F. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

G. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

H. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated. Where detailed, contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate, but not longer than 12 hours after slab finishing.

1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, at least 7 days remove inserts and clean groove of loose debris.

2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork 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.

B. Anchor bolts shall be set with securely fastened templates, and the threaded area shall be protected from concrete laitance.

C. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

D. Where conduit, pipe, or other items are to be embedded in concrete beams, slabs, or columns, they shall be placed not closer than the diameter of the largest of the adjacent items and with a net reduction in the concrete area (of a 12 inch wide strip in slabs) not in excess of 9% without prior approval of the Engineer. The location of such embedded items shall generally be at the middle or centroid of the member.

E. Install dovetail anchor slots in concrete structures as indicated on drawings.

F. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work. Notify the Architect/Engineer and Testing Laboratory 24 hours before placing concrete.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Do not use concrete which becomes non-plastic and unworkable, or does not meet the requirements quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the project site and dispose of in an acceptable location.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

E. Concrete Conveying: Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the locations of final deposit as rapidly as practical by methods which will prevent segregation and loss of concrete mix materials.

F. Provide mechanical equipment of such size and design for conveying concrete to insure a continuous flow of concrete at the delivery end. Provide run-ways above top of finished slab in all places for wheeled concrete conveying equipment for the concrete delivery point to the locations of final deposit. Do not wheel concrete directly over steel reinforcement. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice, and other deleterious materials.

G. Pumping Concrete: The Contractor may at his option use pumping machines for placing the concrete subject to the following requirements:

1. If for pumping requirements the mix design is other than specified, the Contractor shall furnish to the Architect/Engineer a mix for approval not less than 15 days prior to the time required for its use. The laboratory will make and test this mix design. After the results of these tests are noted and approval is received, this mix can be used. Cost of this laboratory work shall be paid by the Contractor.

2. Whenever concrete is placed by pumping, it is recommended a second pump complete with sufficient pipes and hose for a complete and independent set up, or other placement equipment, be at the job prior to any placing of concrete. The Contractor shall be responsible for any corrective work which results from equipment breakdown.

H. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches 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.

I. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

J. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches 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 mix to segregate.

K. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.

L. Bonding: Roughen surfaces of set concrete at all joints, except where bonding is obtained by use of a concrete bonding agent. Clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate, or damaged concrete at the surface.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. 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 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.

1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.

2. Thoroughly wet concrete surfaces, 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.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces 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.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. 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 specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, 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. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. 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 a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a 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 finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155 or not exceeding 1/8 inch in 10 feet when tested with a 10 foot straight edge. Grind smooth any surface defects that 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 a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

F. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect/Engineer before application.

G. Chemical-Hardener Finish: On concrete floors which remain exposed and as directed apply chemical-hardener finish to interior concrete floors. 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.

1. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

2. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

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 specified to blend with in-place 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 by 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 diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 72 hours.

B. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

C. Provide moisture curing by the following methods:

1. Keep concrete surface continuously wet by covering with water.

2. Use continuous water-fog spray.

3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

D. Provide moisture-retaining 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 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions, followed by shading or moist curing adequate to keep temperature of the concrete at 80 degrees F or below during the curing period. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

F. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

H. Temperature of Concrete During Curing: When the atmospheric temperature is 85 degrees F. and above, or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of wind breaks or shading, and for fog spraying, wet sprinkling, or moisture retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305.

Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceed 5 degrees F. in any one hour and 50 degrees F. in any 24 hour period.

I. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations. Concrete trucks, cranes, or excessive concentrations of loads will not be permitted on any slab without prior written approval of the Architect/Engineer during the curing period or subsequent construction.

J. Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.13 SHORES AND SUPPORTS

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

C. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.14 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained at least 70 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect/Engineer.

3.16 CONCRETE EVALUATIONS

A. Evaluation of Quality Control Tests: The concrete quality control testing as herein before specified will be evaluated by the following criteria:

1. Do not use concrete delivered to the final point of placement which has a slump or total air content outside the values specified.

2. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to additional testing as herein specified.

B. Formed Concrete Dimensional Tolerances: Formed concrete having any dimension smaller than required, and outside the specified tolerance limits, will be considered deficient in strength and subject to additional testing as herein specified.

Formed concrete having any dimension greater than required will be rejected if the appearance or function of the structure is adversely affected, or if the larger dimensions interfere with other

construction. Repair, or remove and replace rejected concrete as required to meet the construction conditions. When permitted, accomplish the removal of excessive material in a manner to maintain the strength of the section without affecting function and appearance.

C. Strength of Concrete Structures: The strength of the concrete structure in-place will be considered potentially deficient if it fails to comply with any of the requirements which control the strength of structure, including the following conditions:

Failure to meet compressive strength test requirements.

Concrete which differs from the required dimensions or location in such a manner to reduce strength.

Concrete subjected to damaging mechanical disturbances; particularly load stresses, heavy shock, and excessive vibration.

Poor workmanship and quality control likely to result in deficient strength.

3.17 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect/Engineer.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

C. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

D. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

E. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

F. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect/Engineer.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

G. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

H. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

I. Repair methods not specified above may be used, subject to acceptance of Architect/Engineer. Under no circumstances will "dusting" of wet concrete during finishing operations be allowed.

3.18 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: An independent testing agency shall perform tests and to submit test reports.

The testing laboratory shall monitor concrete properties at time of placement and report to the Contractor any deviation from the project specifications. It shall be the responsibility of the Contractor to control the concrete and comply with the project specifications. If the Contractor cannot adequately control the quality of the concrete, then the Architect/Engineer shall direct the testing laboratory to control the concrete. The cost of this service shall be paid for by the Contractor.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect/Engineer.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

2. Slump: ASTM C 143; one test at point of discharge for each concrete load, and for each set of compression test specimens.

3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each set of compression tests specimens.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

5. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

6. Compressive-Strength Tests: ASTM C 39; for each class of concrete poured in any one day, one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

   When the concrete test cylinders are representing suspended structural members, at the contractor's option, two additional cylinders shall be made for the purposes of determining concrete strength for form removal in accordance with the provisions outlined in this section.

   When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

   Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Curing of Compression Test Specimens: After preparation of the test cylinders, to prevent evaporation of water from the unhardened concrete, cover the cylinders immediately after finishing with a non-reactive plate or impervious plastic sheeting. Protect the outside surface of cardboard molds from any source of water for the first 24 hours after casting. Field curing procedures for test cylinders for 28 day compressive strengths are not the same as those for determining strength for form removal time.

D. For test cylinders for 28 days compressive strength determination, during the first 24 hours after molding, store all test cylinders under conditions that maintain the temperature immediately adjacent to the cylinders in the range of 60 to 80 degrees F. and prevent loss of moisture from the specimens. If the Architect/Engineer or testing laboratory have questions concerning the storage temperature, they may require that the contractor provide a temperature record of the cylinders by means of maximum-minimum thermometers. At the end of 20 hours plus or minus four hours, cylinders are to be transported to the laboratory, removed from the molds, and placed in a moist condition at 73.4 plus or minus 3 degrees F. until the moment of testing.

   Cure test cylinders to be used for determining strength for form removal time as nearly as practical in the same manner as the concrete in the structure. Cylinders shall be stored in or on the structure as near the point of use as possible, and as far as is practical, with the same exposure to the elements. Remove test cylinders from field storage and store in lime water at 73.4 plus or minus 3 degrees F. for 24 hours plus or minus 4 hours immediately before testing.

   Cylinders shipped from the field to the laboratory shall be packed in sturdy wood boxes or other suitable containers surrounded by wet sawdust or other suitable packing material and shall be protected from freezing during shipment.

E. Concrete Batch Facility: The testing laboratory shall perform inspections of the concrete batching facility at intervals not to exceed one per 1,000 cubic yards of concrete placed or at least one each six months. The inspection shall include verification of the calibration of scales, aggregate analysis of the current stockpiles, verification of batching procedures, and compliance with the original mix design. First inspection shall take place before any concrete is placed. The cost of each inspection shall be paid by the testing allowance.

F. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests. If any breaks are below specified or expected strengths, the Testing Laboratory shall report any visible anomalies.

G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

H. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

SECTION 03 54 16

HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 HYDRAULIC CEMENT UNDERLAYMENTS

A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ARDEX Americas.
    b. Dayton Superior Corporation.
    c. Hacker Industries, Inc.
    d. MAPEI Corporation.
    e. Maxxon Corporation.
    f. TEC; H.B. Fuller Construction Products, Inc.
    g. USG Corporation.

2. Cement Binder: ASTM C150/C150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
3. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C109/C109M.
4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

E. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.

1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m.) in 24 hours.

C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.

D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.2 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to product surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Apply surface sealer at rate recommended by manufacturer.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.3 INSTALLATION TOLERANCES

A. Unless stated in writing by floor covering manufacture, finish and measure surface, so gap at any point between hydraulic cement underlayment surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3 mm) except 1/16 inch (1.6 mm) in 2 feet (610 mm) for porcelain tile.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brick.
2. Mortar and grout materials.
3. Reinforcement.
4. Ties and anchors.
5. Embedded flashing.
6. Accessories.
7. Mortar and grout mixes.

1.2 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
4. Weeps and ventilation: Show locations of weeps and cell vents used for ventilation. Show installation of each type of application to ensure proper flow of water at weeps and free flow of air at vents.
5. Mockup shop drawings: Submit integrated shop drawings including backup system, air barrier, insulation, ties, anchors, flashing, weeps, and cladding. Include one typical transition to fenestrations specified in Division 08 including means of controlling and diverting water to weeps. Coordinate submittal with related Work submittals to allow design team to review the complete extent of Work.

C. Samples for Initial Selection:

1. Clay face brick soaps mounted to board with nominal 3/8 inch space between samples to allow insertion of mortar samples.
2. Cured colored mortar in metal sleeves, nominal 3/8 inch wide, to permit insertion and removal from brick sample boards.
3. Weep/cavity vents.

1.5 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
c. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M.
d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.
7. Reinforcing bars.
8. Joint reinforcement.
9. Anchors, ties, and metal accessories.

C. Qualification Statements: For testing agency.

D. Delegated design engineer qualifications.

E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602.

G. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Installers: All masonry flashing installers must complete the International Masonry Institute Flashing Upgrade training course.
2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in state of Texas and who is experienced in providing engineering services of the type indicated.
3. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.7 MOCKUPS

A. Sample Panel Mockups: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.

1. Build sample panels constructed of 3 different cubes of brick in sizes approximately 8 feet long by 6 feet high by full thickness.
2. Build exterior sample panels facing south.
3. Clean one-half of exposed faces of exterior panels with masonry cleaner indicated.
4. Protect approved sample panels from the elements with weather-resistant membrane.
5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of exposed masonry unit, cementitious mortar component, and mortar aggregate from single source, producer, or manufacturer.

B. For exposed masonry units and cementitious mortar components, obtain each color and grade from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements."

B. Seismic Performance: Masonry to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

C. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with TMS 602.
2. Determine net-area compressive strength of masonry by testing masonry prisms in accordance with ASTM C1314.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.4 BRICK: BR-1 AND BR-2

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications shown.

B. Clay Face Brick: Facing brick complying with ASTM C216, Grade SW, Type FBS.

1. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on Drawings and Finish Schedule or comparable products by one of the following when approved by Architect:

a. Acme Brick Company.
b. Belden Brick Company (The).
c. Boral Bricks, Inc; Boral Limited.
d. Endicott Clay Products Co.
e. General Shale Brick, Inc.
f. Glen-Gery Corporation.

2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.
3. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."
4. Sizes: As shown.
5. Application: Use where brick is exposed unless otherwise indicated.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color specified.

1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M. Not permitted

E. Mortar Cement: ASTM C1329/C1329M.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Masonry Cement: Not permitted
2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
3. Pigments do not exceed 10 percent of portland cement by weight.
4. Pigments do not exceed 5 percent of mortar cement by weight.

H. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime, sand, water repellents, and admixtures and complying with ASTM C1714/C1714M.

I. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

J. Aggregate for Grout: ASTM C404.

K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

L. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.187-inch diameter.

4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 ft., with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

E. Masonry-Joint Reinforcement for Multiwythe Masonry: One of the following:

1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.
2. Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.
3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

F. Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch-diameter, hot-dip galvanized carbon steel continuous wire.

2.7 TIES AND ANCHORS

A. General: Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long for masonry constructed from solid units.
2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
3. Wire: Fabricate from 1/4-inch-diameter, wire.

D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie made from 0.25-inch-diameter, hot-dip galvanized steel wire.

E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; furnished by Work of Division 03 for installation as Work of this Section.

F. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

H. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

a. Fabricate sheet metal anchor sections and other sheet metal parts at brick and CMU veneer from 0.1084-inch-thick steel sheet, galvanized after fabrication.
b. Fabricate anchor sections and other sheet metal parts at Stone ST-1 from 0.109-inch thick Type 304 stainless steel.
c. Fabricate wire ties at brick and CMU veneer from 0.25-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.
d. Fabricate wire ties at Stone ST-1 from 0.25 inch diameter Type 304 stainless steel.

2. Masonry-Veneer Anchors; Single-Barrel Screw: Self-drilling, single-barrel screw designed to receive wire tie. Screw has a smooth barrel the same thickness as

insulation with factory-installed gasketed washer to seal at face of insulation and sheathing.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Pos-I-Tie; Heckmann Building Products.

3. Masonry-Veneer Anchors; Single-Barrel Screw with Double-Pintle Wingnut: Self-drilling, single-barrel screw with thermally resistant wingnut head or thermally resistant clip designed to receive double-pintle wire tie. Screw has a smooth barrel the same thickness as insulation with factory-installed gasketed washer to seal at face of insulation and sheathing.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Pos-I-Tie; Heckmann Building Products.

4. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours in accordance with ASTM B117.

2.8 EMBEDDED FLASHING

A. Metal Flashing: At Contractor’s option comply with SMACNA's "Architectural Sheet Metal Manual" and as follows, pending review by Architect:

1. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.

a. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 ft.. Provide splice plates at joints of formed, smooth metal flashing.
b. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
c. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
d. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself-for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
e. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
f. Solder metal items at corners.

2. Flexible Flashing: Use one of the following unless otherwise indicated:

    a. Stainless Steel Fabric Flashing: Composite, flashing product consisting of 2-mil of Type 304 stainless steel sheet, bonded to a layer of polymeric fabric, to produce an overall thickness of 40-mil.

        1) Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

            a) Multi-Flash SS SA; York Flashing.

        2) Applications: Use 10-mil-thick flashing at windows, doors, and small wall penetrations; not at base of walls.

3. Drainage Plane Flashing: Fabricate from stainless steel and drainage membrane to shapes indicated, including weep tabs, termination bar, and drip edge. Provide flashing materials as follows:

        1) Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

            a) Flash Vent SS; York Flashing.

    b. Fabricate continuous flashings in sections 60 inches long, minimum.
    c. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

4. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

C. Termination Bars for Flexible Flashing: Stainless steel bars nominal 1 by 1/8 inch, prepunched at 6 inches on center.

2.9 ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with

ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vents: Use integral self-weeping flashing membrane or the following:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

a. Basis of Design: Quadro-Vent by Hohmann & Barnard.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Mortar Deflector: Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches or dimpled surface that prevent clogging with mortar droppings.

F. Proprietary Acidic Masonry Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Do not use acidic cleaners until water and detergents or other methods have been used based on BIA and NCMA guidelines.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S or Type N.

4. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior nonload-bearing partitions, Type N.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments do not exceed 10 percent of portland cement by weight.
2. Pigments do not exceed 5 percent of mortar cement by weight.
3. Mix to match Architect's sample.

E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match Architect's sample.

F. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond except provide stack bond at Commons Room walls shown; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors, and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

3.5 MORTAR BEDDING AND JOINTING

A. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

D. Cut joints flush where indicated to receive cavity wall insulation or air barriers unless otherwise indicated.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:

1. Individual Metal Ties: Provide ties as indicated installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.

b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.

2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.
c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

3. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not more than 8 inches clear horizontally and 16 inches clear vertically.
4. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

D. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as indicated.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed tie sections in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of

wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

B. Provide not less than 1 inch of airspace between back of masonry veneer and face of insulation.

1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches. Comply with Structural Drawings for engineered masonry reinforcing spacing.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide concrete, masonry, or offset angle support lintels where indicated and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are indicated without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe.
3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
4. At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.
5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are indicated to be built into masonry.

E. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products or self-draining flashing membrane to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.
3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

F. Place cavity drainage material in cavities and airspace behind veneers to comply with configuration requirements for cavity drainage material in "Accessories" Article.

G. Install cavity vents in head joints in exterior wythes at spacing indicated or, if not indicated, at maximum 15 feet on center vertically. Locate vents in head joints in line

with, and at same spacing as, weeps. Use specified weep/cavity vent products to form cavity vents.

1. Close cavities off vertically and horizontally with blocking in manner indicated to promote convection drying of the wall and masonry components. Install through-wall flashing and weep holes above horizontal blocking.

3.13 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense.

B. Inspections: Special inspections in accordance with Level 2 in TMS 402.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, in accordance with ASTM C67/C67M for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140/C140M for compressive strength.

G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

H. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content and compressive strength.

I. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

J. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at 7 days and at 28 days.

3.15 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

3.16 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 23 00 "Earthwork."
3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

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SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior wind-load bearing metal framing.
2. Interior metal framing exceeding height limitations of Division 09 metal framing.

B. Related Requirements:

1. Section 09 21 16 "Gypsum Board Assemblies" for standard, interior, and non-load bearing metal framing, within height limitations and ceiling-suspension assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data for cold formed steel framing components, including framing, clips, track, anchors, and gaskets, and to verify section properties of studs shown on the drawings and instructions for securing studs to tracks and other framing connections and for accessories including factory applied primers.

B. Shop Drawings: Submit detailed stud layout, spacing, size, thickness, and types of cold formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners, bracing and welds and related accessories.

1. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated Design Submittal: Submit to verify compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for testing agency.

B. Product Certificates: Submit for each type of code compliance certification for studs and tracks.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with the IBC as adopted and amended by the AHJ including special inspections.

a. Code Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Texas and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold formed metal framing similar to those indicated in material, design, and extent.

1. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and structural data.

C. Testing Agency Qualifications: Qualified in accordance with ASTM E 329 for testing indicated.

D. Preinstallation Conference: Conduct conference at the site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect cold formed steel framing members from weather exposure and damage. Deliver to site in bundles, fully identified with name, type and grade. Store off ground in dry, ventilated space or protect with suitable, venting waterproof coverings.

B. Inspect cold formed steel framing upon delivery for corrosion and damage to temporary primer. Remove corrosion and repair temporary primer.

C. Protect cold formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Texas, to design cold formed steel framing including comprehensive engineering analysis using performance requirements and design criteria indicated.

B. Structural Performance: Provide cold formed steel framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: Indicated on Drawings.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

    a. Exterior Nonload Bearing Framing: Horizontal deflection of 1/240 of the wall height.
    b. Floor Joist Framing: Vertical deflection of 1/360 for live loads and l/240 for total loads of the span.
    c. Roof Rafter Framing: Vertical deflection of 1/240 of the horizontally projected span for live loads.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 degrees F (67 degrees C).
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

    a. Upward and downward movement of 1/2 inch (13 mm).

5. Design exterior nonload bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing complies with the International Building Code.

2.2 COLD FORMED STEEL FRAMING MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Allied Studco.
2. AllSteel & Gypsum Products, Inc.
3. CEMCO; California Expanded Metal Products Co.
4. ClarkDietrich Building Systems.
5. Formetal Co. Inc. (The).
6. MarinoWARE.
7. Quail Run Building Materials, Inc.
8. SCAFCO Corporation.
9. Southeastern Stud & Components, Inc.
10. Steel Network, Inc. (The).
11. United Steel Manufacturing.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation:

1. Grade: Required by structural performance.
2. Coating: G60 (Z180), A60 (ZF180), AZ50 (AZM150), or GF30 (ZGF90).

C. Framing Materials: Fabricate steel framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

1. Provide accessories in standard thickness and configuration, unless otherwise indicated:

    a. Supplementary framing.
    b. Bracing, bridging, and solid blocking.
    c. Web stiffeners.
    d. Anchor clips.
    e. End clips.
    f. Foundation clips.
    g. Gusset plates.
    h. Stud kickers and knee braces.
    i. Joist hangers and end closures.
    j. Hole reinforcing plates.
    k. Backer plates.

D. Anchors, Clips, and Fasteners:

1. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot dip process in accordance with ASTM A 123/A 123M.
2. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon steel headless, hooked bolts, carbon steel nuts, and flat, hardened steel washers; zinc coated by mechanically deposition in accordance with ASTM B 695, Class 50.
3. Post Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.

    a. Uses: Securing cold formed steel framing to structure.
    b. Type: Torque controlled expansion anchor.
    c. 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.
    d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

4. Power Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
5. Mechanical Fasteners: ASTM C 1513, corrosion resistant coated, self-drilling, self-tapping, steel drill screws.

    a. Head Type: Low profile head beneath sheathing.

6. Welding Electrodes: Comply with AWS standards.

E. Miscellaneous Materials:

1. Galvanizing Repair Paint: High zinc dust content galvanizing repair paint ASTM A 780/A 780M or SSPC-Paint 20.
2. Nonmetallic, Nonshrink Grout: Factory packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30 minute working time.
3. Shims: Load bearing, high density, multimonomer, nonleaching plastic; or cold formed steel of same grade and metallic coating as framing members supported by shims.
4. Sealer Gaskets: Closed cell neoprene foam, 1/4 inch (6 mm) thick, selected from widths to match width of bottom track or rim track members as necessary.

F. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.3 EXTERIOR NONLOAD BEARING WALL FRAMING

A. Steel Studs: C shaped steel studs, of web depths indicated, punched, with stiffened flanges:

1. Minimum Base Metal Thickness: 0.0428 inch (1.09 mm).
2. Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: U shaped steel track, of web depths indicated, unpunched, with unstiffened flanges:

1. Minimum Base Metal Thickness: 0.0428 inch (1.09 mm).
2. Flange Width: 1-1/4 inches (32 mm).

C. Vertical Deflection Clips: Bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Products: Subject to compliance with requirements, provide products of one of the following:

a. AllSteel & Gypsum Products, Inc.
b. ClarkDietrich Building Systems.
c. Marino\WARE.
d. SCAFCO Corporation.
e. Simpson Strong-Tie Co., Inc.
f. Steel Network, Inc. (The).
g. Steeler, Inc.

D. Single Deflection Track (Slotted): Single, deep leg, U shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure:

1. Minimum Base Metal Thickness: 0.0538 inch (1.37 mm).
2. Flange Width: 1 inch (25 mm) plus the design gap for one story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Drift Clips: Bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FABRICATION

A. Fabricate cold formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, in accordance with referenced AISI specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install in accordance with Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, in accordance with approved Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960):

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and conditions affecting performance of the work. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Install load bearing shims or grout between the underside of load bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at underside of wall bottom track or rim track and at top of foundation wall or slab at stud or joist locations.

C. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION

A. Cold formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners, install in accordance with approved Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

        1) Make connection to concrete with self-tapping screws designed specifically for concrete connections.

D. Install framing members in one piece lengths unless splice connections are indicated for track or tension members.

E. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I. Welding:

1. Where welding is required, use low amperage welding equipment and small diameter rods to prevent blow holes in material.
2. Welds: 1/8 inch (3mm) fillet continuous across contact joint.
3. Puddle Welds: 3/4 inch (19 mm) diameter full fusion. Use weld washers where welds are made to material 3/16 inch (4.5 mm) or more in thickness.

    a. Use splices or butt welds at all butt joints in runner track. No splices shall be permitted in track over lintels, diaphragm sheathing, or diagonal bracing.

3.4 EXTERIOR NONLOAD BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated.

1. Stud Spacing: 24 inches (610 mm) unless indicated otherwise on Drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate nonload bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep leg deflection tracks and anchor to building structure.
2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
3. Connect drift clips to cold-formed steel framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on approved Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Channel Bridging: Cold rolled steel channel, welded, or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed in accordance with manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall framing system.

3.5 ERECTION TOLERANCES

A. Install cold formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960):

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Provide final protection and maintain conditions ensuring cold formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements including but not limited to:

1. Slotted channel support grid.
2. Steel framing and supports for:

    a. Applications where framing and supports not specified elsewhere.

3. Metal angles and plates
4. Pipe bollards.

1.2 ACTION SUBMITTALS

A. Product Data: Submit technical data for each miscellaneous metal fabrications and paint, coatings, and grout accessories.

B. Shop Drawings: Submit shop drawings detailing the fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. For installed products indicated to comply with design loads, include structural analysis data, for information only, signed and sealed by the qualified professional engineer responsible for their preparation.
2. Miscellaneous framing and supports
3. Metal angles and plates
4. Pipe bollards.

C. Delegated Design Submittal: Submit for products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Slotted Channel Support Grid: Provide support grid capable of withstanding imposed loads.

1.3 INFORMATIONAL SUBMITTALS

A. Certificates and Reports:

1. Welding certificates.
2. Mill certificates.

3. Paint Compatibility Certificates: Submit manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
4. Research/Evaluation Reports: ICC-ES reports for post installed anchors.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Welding: Qualify procedures and personnel according to the following:

a. AWS D1.1/D1.1M Structural Welding Code - Steel.
b. AWS D1.2/D1.2 M Structural Welding Code - Aluminum.
c. AWS D1.6/D1.6M Structural Welding Code - Sheet Steel.
d. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

B. Fabricator/Installer Qualifications: A firm having minimum 5 years documented experience in producing metal fabrications similar to those indicated.

C. Professional Engineer Qualifications: A professional engineer legally qualified to practice in jurisdiction is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated in material, design, and extent.

1.5 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 metal fabrications that are anchored to or that receive other work. 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.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

1.7 STORAGE, DELIVERY AND HANDLING

A. Store metal fabrications in a dry, well ventilated, weathertight place. Deliver and handle to prevent type of damage to the fabricated work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Texas, to design the following including comprehensive engineering analysis using performance requirements and design criteria indicated.

1. Slotted channel support grid.

B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.

2.2 MATERIALS

A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Ferrous Metal:

1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
2. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.
3. Stainless Steel Bars and Shapes: ASTM A276, Type 304.
4. Rolled Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
5. Rolled Stainless Steel Floor Plate: ASTM A793.
6. Abrasive Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallically bonded to steel.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) IKG Industries, a division of Harsco Corporation.
2) SlipNOT Metal Safety Flooring; W.S. Molnar Company.

7. Steel Tubing: ASTM A500/A500M, cold formed steel tubing.
8. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
9. Zinc Coated Steel Wire Rope: ASTM A741.

a. Wire Rope Fittings: Hot dip galvanized steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

10. Slotted Channel Framing: Cold formed metal box channels (struts) complying with MFMA-4.

a. Size of Channels: 1-5/8 inches by 1-5/8 inches (41 mm by 41 mm).
b. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 (Z275) coating; 0.079 inch (2 mm) nominal thickness.
c. Material: Cold rolled steel, ASTM A1008/A1008M, commercial steel, Type B; 0.0966 inch (2.5 mm) minimum thickness; hot dip galvanized after fabrication.
d. Cold Formed Metal Channels: Flange edges returned toward web and with 9/16 inch (14.3 mm) wide slotted holes in webs at 2 inches (51 mm) o.c.
e. Width of Channels: 1-5/8 inches (41 mm).
f. Depth of Channels: Indicated on Drawings.
g. Metal and Thickness: Galvanized steel complying with ASTM A653/A653M, structural quality, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108 inch (2.8mm) nominal thickness.
h. Finish: Hot dip galvanized after fabrication.

11. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

C. Nonferrous Metal:

1. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.
2. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.
3. Aluminum Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
4. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.
5. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).
6. Bronze Plate, Sheet, Strip, and Bars: ASTM B36/B36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).
7. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
8. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.
9. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

D. Fasteners: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc plated fasteners with coating complying with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless steel fasteners for fastening aluminum.
2. Provide stainless steel fasteners for fastening stainless steel.
3. Provide stainless steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.
5. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
6. Steel Bolts and Nuts: Regular hexagon head bolts, ASTM A325, Type 3 (ASTM A325M, Type 3); with hex nuts, ASTM A563, Grade C3 (ASTM A563M, Class 8S3); and, where indicated, flat washers.
7. Stainless Steel Bolts and Nuts: Regular hexagon head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 1 (A1).
8. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
    a. Hot dip galvanized or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
9. Anchors: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
10. Cast in Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot dip galvanized per ASTM F2329.
11. Post Installed Anchors: Torque controlled expansion anchors or chemical anchors .
    a. Material for Interior Locations: Carbon steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
    b. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

E. Miscellaneous Materials:

1. Shop Primer for Ferrous Metal: Universal primer, organic zinc rich primer, complying with SSPC-Paint 20 and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc rich primer.
    a. Product: Provide Series 10-99 (red) or 10-09 (gray) by Tnemec Company.

2. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc coated metal and compatible with finish paint systems indicated.
3. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

    a. Product: Provide Series 90-97 Tneme-Zinc by Tnemec Company.

4. Bituminous Paint: Cold applied asphalt emulsion complying with SSPC-Paint 12, containing no asbestos fibers, or cold applied asphalt emulsion complying with ASTM D1187 ASTM D1187/D1187M.
5. Nonshrink, Nonmetallic Grout: Factory packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
6. Concrete Materials and Properties: Composed of ASTM C150 Type I Portland cement, ASTM C33 sand and coarse aggregates and potable water to produce a low slump mix suitable for placement. Grade coarse aggregate from 1/8 inch (3 mm) with at least 95 percent passing a 3/8 inch (10 mm) sieve and not more than 10 percent passing a No. 8 sieve. Proportion fill to provide a minimum 28 day compressive strength of 3000 psi (21 MPa).

F. Concrete Materials and Properties: Composed of ASTM C150 Type I Portland cement, ASTM C33 sand and coarse aggregates and potable water to produce a low slump mix suitable for placement. Grade coarse aggregate from 1/8 inch (3 mm) with at least 95 percent passing a 3/8 inch (10 mm) sieve and not more than 10 percent passing a No. 8 sieve. Proportion fill to provide a minimum 28 day compressive strength of 3000 psi (21 MPa).

2.3 FABRICATION

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

1. 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.
2. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Form exposed work with accurate angles and surfaces and straight edges.
4. Weld corners and seams continuously to comply with the following:

    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
6. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
7. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
8. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
9. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 inch by 1-1/2 inches (3.2 mm by 38 mm), with minimum 6 inch (150 mm) embedment and 2 inch (50 mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.4 MISCELLANEOUS FRAMING AND SUPPORTS

A. Provide steel framing and supports necessary to complete the work and which are not a part of the structural framework, including but not limited to the items listed in this Article, overhead doors, equipment, and low partition supports.

1. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.

    a. Fabricate units from slotted channel framing where indicated.
    b. Furnish inserts for units installed after concrete is placed.

2.5 METAL ANGLES AND PLATES

A. Shelf Angles: Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4 inch (19 mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
3. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

    a. Galvanize and prime shelf angles located in exterior walls.
    b. Prime shelf angles located in exterior walls with zinc rich primer.
    c. Furnish wedge type concrete inserts, complete with fasteners, to attach shelf angles to cast in place concrete.

B. Steel Weld Plates and Angles: Provide steel weld plates and angles not specified elsewhere for items supported from concrete construction as necessary to complete the work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.6 PIPE BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe .

2.7 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.6 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.6 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation from Plane: 1/16 inch (1.6 mm) in 48 inches (1.2 m).

2.8 FINISH

A. Finish metal fabrications after assembly. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

B. Steel and Iron Finishes:

1. Galvanizing: Hot dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

    a. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

2. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
3. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
4. Preparation for Shop Priming: Prepare surfaces to comply with requirements:

    a. Exterior Items: SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning.
    b. Items Indicated to Receive Zinc Rich Primer: SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning.
    c. Items Indicated to receive primers specified for high performance Coatings: SSPC-SP 6/NACE No. 3 "Commercial Blast Cleaning.
    d. Other Items: SSPC-SP 3"Power Tool Cleaning.

5. Shop Priming: Apply shop primer to comply with SSPC-PA 1 Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel for shop painting.
6. Stripe paint corners, crevices, bolts, welds, and sharp edges.

C. Stainless Steel Finishes: Remove tool and die marks and stretch lines or blend into finish.

1. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
2. Bright, Directional Polish: No. 4 finish.
3. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

D. Aluminum Finishes:

1. As Fabricated (Mill) Finish: AA-M12.
2. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

a. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

G. Framing and Supports: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

1. Anchor supports securely to, and rigidly brace from, building structure.

H. Metal Bollards: Set bollard in true vertical position.

1. General Bollard: Unless noted otherwise, provide 4-inch (100 mm) diameter heavy weight steel pipe 6 feet (1830 mm) high with 2 foot (600 mm) embedment into 12-inch (300 mm) diameter by 2'-3" (690 mm) concrete footing. Fill with 2000 psi (14 MPa) concrete, domed to shed water.
2. Bollard Anchored to Existing Construction: Unless noted otherwise on Drawings, Provide 4-inch (100 mm) diameter heavy weight steel pipe welded to 6 by 6 by 1/4-inch (150 by 150 by 6 mm) thick steel plate. Anchor bollards to existing construction with anchor bolts. Provide four 3/4 inch (19 mm) bolts at each bollard unless otherwise indicated.

a. Embed anchor bolts at least 4 inches (100 mm) in concrete.

3.2 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch (6 mm) per story, noncumulative.

B. Maximum Offset from True Alignment: 1/4 inch (6 mm).

C. Maximum Out of Position: 1/4 inch (6 mm).

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 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.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

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SECTION 06 16 00

SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory fabricated product. Indicate component materials and dimensions and include construction and application details.

1. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass Mat Gypsum Sheathing: ASTM C1177/C1177M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GlasRoc by CertainTeed Corporation.
b. Dens-Glass Exterior Sheathing by Georgia-Pacific Building Products.
c. EXP Fire-Shield Sheathing by National Gypsum Company.
d. Securock by United States Gypsum Company.

2. Type and Thickness: Regular, 1/2 inch (13 mm) thick.
3. Size: 48 inches by 96 inches (1219 mm by 2438 mm) for horizontal installation.

2.2 FASTENERS

A. Provide fasteners of size and type indicated that comply with requirements for material and manufacture.

1. For wall sheathing, provide fasteners with hot dip zinc coating complying with ASTM A 153/A 153M.

B. Screws for Fastening Gypsum Sheathing to Cold Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing from 0.033 inch to 0.112 inch (0.84 mm to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.3 SHEATHING JOINT AND PENETRATION TREATMENT MATERIALS

A. Sealant for Glass Mat Gypsum Sheathing: Elastomeric, medium modulus, neutral curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 07 92 00.

B. Sealant for Glass Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

C. Sheathing Tape for Foam Plastic Sheathing: Pressure sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1 Fastening Schedule in the ICC International Building Code.
2. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and parapet sheathing installation with flashing and joint sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold formed metal framing with screws.
2. Install panels with a 3/8 inch (9.5 mm) gap where nonload bearing construction abuts structural elements.
3. Install panels with a 1/4 inch (6.4 mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw attached through sheathing to studs immediately after sheathing is installed.

D. Seal sheathing joints in accordance with sheathing manufacturer's written instructions.

1. Apply glass fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to

exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam plastic board.
2. Polyisocyanurate foam plastic board.
3. Glass fiber blanket.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data and installation instructions for each type of insulation product specified.

1.3 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

1. For blown in or sprayed fiberglass and cellulosic fiber loose fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
2. Sign, date, and post the certification in a conspicuous location on Project site.

B. Product Test Reports: Submit test report for tests performed by a qualified testing agency. based on tests performed by a qualified independent testing agency evidencing compliance of insulation products including thermal resistance, fire test response characteristics, water vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

C. Evaluation Reports: Submit current ICC-ES report for foam plastic insulation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam plastic board insulation:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Performance Characteristics: Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: ASTM E 84.

a. Flame Spread Index: Maximum 25.
b. Smoke Developed Index: Maximum 450.

2. Fire Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

B. National Fire Prevention Association (NFPA) 255 Test of Surface Burning Characteristics of Building Materials.

C. Underwriter's Laboratories (UL) 723 Tests for Surface Burning Characteristics of Building Materials.

2.2 EXTRUDED POLYSTYRENE FOAM PLASTIC BOARD

A. Extruded Polystyrene Board, Type X: ASTM C 578, Type X, 15-psi (104-kPa) minimum compressive strength; unfaced.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Styrofoam, Dow Chemical Company (The).
c. Foamular 150; Owens Corning.

2. Flame Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

B. Extruded Polystyrene Board, Type VII: ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Styrofoam Series, Dow Chemical Company (The).
c. Owens Corning;.Foamular 600;

C. Extruded Polystyrene Board, Type V: ASTM C 578, Type V, 100-psi (690-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Styrofoam Series, Dow Chemical Company (The).
c. Foamular 1000; Owens Corning.

2. Flame Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

2.3 POLYISOCYANURATE FOAM PLASTIC BOARD

A. Polyisocyanurate Board, Glass Fiber Mat Faced: ASTM C 1289, glass fiber mat faced, Type II, Class 2.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Atlas Roofing Corporation; EnergyShield CGF Pro.
b. Hunter Panels; Hunter Xci CG (Class A)
c. Rmax, Inc.; Durasheath

2. Flame Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.
5. Water Absorption: Less than 1-1/2 percent by volume maximum in accordance with ASTM D 2842.

2.4 GLASS FIBER BLANKET

A. Glass Fiber Blanket, Unfaced: ASTM C 665, Type I; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. CertainTeed Corporation; Unfaced Fiberglass Buliding Insulation.
    b. Johns Manville; a Berkshire Hathaway Company; Unfaced Fiberglass.
    c. Owens Corning; Unfaced PINK Next Gen Fiberglas Batt Insulation.

2. Flame Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

2.5 INSULATION FASTENERS

A. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame spread and smoke developed indexes of 5, per ASTM E 84.
2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame spread and smoke developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Board and Batt Insulation: Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thickness, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 CAVITY WALL INSULATION

A. Foam Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer.

1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
2. Press units firmly against inside substrates.
3. Supplement adhesive attachment of insulation by securing boards with two piece wall ties specified in Section 04 20 00 "Unit Masonry."

3.4 FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3 inch (76 mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces to prevent gaps in thermal envelop continuity to control air leakage using the following materials:

1. Glass Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 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.

END OF SECTION

SECTION 07 24 19

WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. EIFS-clad drainage-wall assemblies that are field applied over substrate.
2. Water-resistive coatings.

1.2 DEFINITIONS

A. Definitions in ASTM E2110 apply to Work of this Section.

B. EIFS: Exterior insulation and finish system(s).

C. IBC: International Building Code.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory, including water-resistive coatings.

B. Samples: For each exposed product and for each color and texture specified, 8 inches square in size.

C. Samples for Initial Selection: For each type of finish-coat color and texture indicated.

1. Include similar Samples of exposed accessories involving color selection.

D. Samples for Verification: 24-inch-square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work.

1. Include Samples to verify color selected.
2. Include a typical control joint filled with sealant of color selected, as specified in Section 07 92 00 "Joint Sealants."

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Manufacturer Certificates: Signed by EIFS manufacturer certifying the following:

1. EIFS complies with requirements.
2. Substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer.
3. Accessory products installed with EIFS, including joint sealants, flashing, and water-resistive coatings whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

C. Product Certificates: For insulation and joint sealant, from manufacturer.

D. Product Test Reports: For each EIFS assembly and component, and for water-resistive coatings, for tests performed by a qualified testing agency.

E. Field quality-control reports.

F. Evaluation Reports: For EIFS, including insulation, water-resistive coatings, flexible membrane flashing, from ICC-ES.

1.6 CLOSEOUT SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

B. Maintenance Data: For EIFS to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. 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 materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1. Stack insulation board flat and off the ground.
2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.9 FIELD CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.10 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Bond integrity and weathertightness.
   b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.

2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:

   a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
   b. Insulation installed as part of EIFS.
   c. Insulation adhesive.
   d. EIFS accessories, including trim components and flashing.
   e. Water-resistive coatings.
   f. EIFS drainage components.

3. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BASF Corporation; Wall Systems.
2. Dryvit Systems, Inc.
3. Finestone.
4. Master Wall Inc.
5. Omega Products International, Inc.
6. Parex USA, Inc.
7. Senergy.
8. SonoWall.
9. Sto Corp.
10. Total Wall, Inc.

B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. System Fire Performance: Fire-resistance rating of wall assembly.
3. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC219 when tested according to ASTM E2568.

    a. Wind Loads: Uniform pressure as indicated on Drawings.

4. Impact Performance: ASTM E2568, Standard impact resistance unless otherwise indicated.
5. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
6. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested according to ASTM D968, Method A.
7. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate; cured for 28 days and shows no growth when tested according to ASTM D3273 and evaluated according to ASTM D3274.

2.3 EIFS MATERIALS

A. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to protect substrates from moisture penetration and to improve the bond between substrate and insulation adhesive.

B. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water-resistive barriers; compatible with substrate and complying with physical and performance criteria of ASTM E2570.

C. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; specifically formulated to be applied to back side of insulation in a manner that creates open vertical channels designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall assembly; compatible with substrate; and complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C150/C150M, Type I, and polymer-based adhesive specified for base coat.
2. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
3. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.

E. Drainage Mat: Woven or fused, self-furring, PVC mesh lath designed to drain incidental moisture by gravity; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

F. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C578, Type I; and EIFS manufacturer's requirements for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:

1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks.
2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to ASTM E84.
3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
4. Dimensions: Provide insulation boards of not more than 24 by 48 inches and in thickness indicated, but not more than 4 inches thick or less than the thickness allowed by ASTM C1397.
5. Channeled Board Insulation: EIFS manufacturer's standard factory-fabricated profile with linear, vertical-drainage channels, slots, or waves on the back side of board.
6. Foam Build-Outs: Provide with profiles and dimensions indicated on Drawings.

G. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. according to ASTM E2098 and the following:

1. Reinforcing Mesh for EIFS: Panzer 20: a 20.5 oz. sq. yd. for high impact performance.
2. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd.
3. Detail Reinforcing Mesh: Not less than 4.3 oz./sq. yd.
4. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd.

H. Base-Coat Materials: EIFS manufacturer's standard mixture complying with one of the following:

1. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
2. Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
3. Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

I. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation and complying with one of the following:

1. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.

J. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

K. Finish-Coat Materials: EIFS manufacturer's standard water-based acrylic-based coating with integral color and texture, and formulated with DPR chemistry complying with the following:

1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
2. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, and fillers used with stone particles for embedding in finish coat to produce an applied-aggregate finish.

    a. Aggregate: Marble chips of size and color as selected by Architect from manufacturer's full range.

3. Colors: As selected by Architect from manufacturer's full range.
4. Textures: As selected by Architect from manufacturer's full range.

L. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.

M. Water: Potable.

N. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D1784, manufacturer's standard cell class for use intended, and ASTM C1063.

1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
3. Weep Screed/Track: Prefabricated, one-piece type for attachment behind insulation with perforated face leg extended to form a drip and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.
4. Expansion Joint: Prefabricated, one-piece V profile; designed to relieve stress of movement.
5. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.
6. Parapet Cap Flashing: Type for both flashing and covering parapet top with design complying with ASTM C1397.

2.4 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Begin coating application only after surfaces are dry.
2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

1. Concrete Substrates: Provide clean, dry, neutral-pH substrate for insulation installation. Verify suitability of substrate by performing bond and moisture tests recommended by EIFS manufacturer.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C1397, ASTM E2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Primer/Sealer: Apply over sheathing substrates and where required by EIFS manufacturer for improving adhesion of insulation to substrate.

B. Water-Resistive Coating: Apply over sheathing to provide a water-resistive barrier.

1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.

C. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates if required and install flashing to comply with EIFS manufacturer's written instructions and details.

3.5 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, and elsewhere as indicated. Coordinate with installation of insulation.

1. Weep Screed/Track: Use at bottom termination edges, at window and door heads of water-drainage EIFS unless otherwise indicated.
2. Windowsill Flashing: Use at windows unless otherwise indicated.
3. Expansion Joint: Use where indicated on Drawings.
4. Casing Bead: Use at other locations.
5. Parapet Cap Flashing: Use where indicated on Drawings.

3.6 DRAINAGE MAT INSTALLATION

A. Drainage Mat: Apply wrinkle free, continuously, with edges butted or overlapped and adhesively secured over water-resistive barrier.

3.7 INSULATION INSTALLATION

A. Board Insulation: Adhesively and mechanically attach insulation to substrate in compliance with ASTM C1397 and the following:

1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of drainage mat with adhesive once insulation is adhered to drainage mat.
3. Apply adhesive to ridges on back of channeled insulation by notched-trowel method in a manner that results in full adhesive contact over the entire surface of ridges, leaving channels free of adhesive once insulation is adhered to substrate.
4. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
5. Allow adhered insulation to remain undisturbed for not less than 24 hours, before installing mechanical fasteners, beginning rasping and sanding insulation or applying base coat and reinforcing mesh.
6. Mechanically attach insulation to substrate. Install top surface of fastener heads flush with plane of insulation. Install fasteners into or through substrates with the following minimum penetration:

    a. Steel Framing: 5/16 inch.
    b. Concrete and Masonry: 1 inch.

7. Apply insulation over substrates in courses with long edges of boards oriented horizontally.
8. Begin first course of insulation from a level base line and work upward.
9. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
10. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings.

    a. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4 inches from vertical joints in sheathing.
    b. Mechanical Attachment: Offset joints of insulation from horizontal joints in sheathing.

11. Apply channeled insulation with drainage channels aligned vertically.
12. Interlock ends at internal and external corners.

13. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
14. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
15. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation raspings or sandings.
16. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch.
17. Install foam build-outs and attach to sheathing.
18. Interrupt insulation for expansion joints where indicated.
19. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
20. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.
21. After installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings.
22. Treat exposed edges of insulation as follows:

    a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
    c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.

23. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier.

B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. At expansion joints in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
3. At floor lines in multilevel wood-framed construction.
4. Where wall height or building shape changes.
5. Where EIFS manufacturer requires joints in long continuous elevations.

3.8 BASE-COAT INSTALLATION

A. Waterproof Adhesive/Base Coat: To exposed surfaces of insulation, apply in minimum thickness recommended in writing by EIFS manufacturer over where indicated on Drawings.

B. Base Coat: Apply to exposed surfaces of insulation in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.

C. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

D. Double-Layer Reinforcing-Mesh Application: Where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C1397 and EIFS manufacturer's written instructions in same manner as first application. Do not apply until first base coat has cured.

E. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch-wide, strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.

1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches wide.
2. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

F. Foam Build-Outs: Fully embed reinforcing mesh in base coat.

G. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

3.9 FINISH-COAT INSTALLATION

A. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.

B. Finish Coat: Apply over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

1. Embed aggregate in finish coat according to EIFS manufacturer's written instructions to produce a uniform applied-aggregate finish of color and texture matching approved sample.

C. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. As stipulated in Ch. 17 of the IBC.
2. According to ICC-ES AC24 and ICC-ES AC235.

B. ICC Evaluation Service, LLC

1. ICC-ES AC24: Interim Criteria for Exterior Insulation and Finish
2. ICC-ES AC219: Acceptance Criteria for Exterior Insulation and Finish System
3. ICC-ES AC235: Acceptance Criteria for EIFS Clad Drainage Wall Assemblies

C. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

D. EIFS Tests and Inspections: According to ASTM E2359, ICC-ES AC24, and ICC-ES AC219.

E. EIFS will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.11 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION

SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vapor permeable, fluid applied air barriers.

1.2 DEFINITIONS

A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air Barrier Assembly: The collection of air barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

A. Product Data: Technical data for each type of product including manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.

B. Shop Drawings: Submit plans and details for air barrier assemblies.

1. Show locations and extent of air barrier materials, accessories, and assemblies specific to conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for Installer.

B. Product Certificates: From air barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

C. Product Test Reports: Submit report for each air barrier assembly for tests performed by a qualified testing agency.

D. Field quality control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum 5 years documented experience that employs installers and supervisors who are trained and approved by manufacturer.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA certified installers and supervisors.

B. Source Limitations: Obtain primary air-barrier materials and air barrier accessories from single source from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air barrier manufacturer.

1. Protect substrates from environmental conditions that affect air barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air Barrier Performance: Air barrier assembly and seals with adjacent construction shall be capable of performing as continuous air barrier and as a liquid water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations , tie ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.

2.3 HIGH BUILD AIR BARRIERS, VAPOR PERMEABLE

A. High Build, Vapor Permeable Air Barrier: Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils (0.9 mm) or thicker over smooth, void free substrates.

1. Synthetic Polymer Type:

a. Products: Subject to compliance with requirements, provide one of the following:

1) Carlisle Coatings & Waterproofing Inc; Fire Resist Barritech VP
2) GCP Applied Technologies Inc.; Perm-A-Barrier VP or Perm-A-Barrier VPL- LT.
3) Henry Company; Air-Bloc 17MR or Air-Bloc 33MR.
4) Tremco Incorporated; ExoAir 230.
5) Wall Guardian; FW100A.

2. Physical and Performance Properties:

a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s by sq. m of surface area at 75-Pa) pressure difference; ASTM E2178.
b. Vapor Permeance: Minimum 10 perms (580 ng/Pa by s by sq. m); ASTM E96/E96M, Desiccant Method, Procedure A.
c. Ultimate Elongation: Minimum 200 percent; ASTM D412, Die C.
d. Adhesion to Substrate: Minimum 16 lbf/sq. in. (110 kPa) when tested according to ASTM D4541.
e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
f. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.

2.4 MEDIUM BUILD AIR BARRIERS, VAPOR PERMEABLE

A. Medium Build, Vapor Permeable Air Barrier: Synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 17 to 30 mils (0.4 to 0.8 mm) over smooth, void free substrates.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Carlisle Coatings & Waterproofing Inc; Barrithane VP.
    b. DuPont de Nemours, Inc.; DuPont Tyvek Fluid Applied WB.
    c. GE Construction Sealants; GE Elemax 2600 AWB.
    d. Sto Corp.; Sto AirSeal.
    e. W.R. Meadows, Inc; Air-Shield LMP.

2. Physical and Performance Properties:

    a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s by sq. m of surface area at 75-Pa) pressure difference; ASTM E2178.
    b. Vapor Permeance: Minimum 10 perms (580 ng/Pa by s by sq. m); ASTM E96/E96M, Desiccant Method, Procedure A.
    c. Ultimate Elongation: Minimum 250 percent; ASTM D412, Die C.
    d. Adhesion to Substrate: Minimum 16 lbf/sq. in. (110 kPa) when tested according to ASTM D4541.
    e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
    f. UV Resistance: Can be exposed to sunlight for 90 days according to manufacturer's written instructions.

2.5 ACCESSORY MATERIALS

A. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and accessory materials recommended in writing by air barrier manufacturer to produce a complete air barrier assembly and compatible with primary air barrier material and adjacent construction to which they may seal.

B. Primer: Liquid waterborne primer recommended for substrate by air barrier material manufacturer.

C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, 0.0187 inch (0.5 mm) thick, and Series 300 stainless steel fasteners.

D. Engineered Transition Assembly (ETA): Pre-engineered assembly of extruded aluminum adapters and cured, extruded silicone, sized to fit opening widths and glazing pockets, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding silicone extrusions to substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Tremco Incorporated; ETA Proglaze

E. Preformed Silicone Extrusion: System consisting of cured low modulus silicone extrusion, sized to fit opening widths, with single component, neutral curing, Class 100/50 (low modulus) silicone sealant for bonding extrusions to substrates.

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. Pecora Corporation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements and conditions affecting performance of the work.

1. Verify substrates are sound and free of oil, grease, dirt, excess mortar, or contaminants.
2. Verify substrates have cured and aged for minimum time recommended in writing by air barrier manufacturer.
3. Verify that masonry joints are flush and filled with mortar.

B. Proceed with installation after correcting unsatisfactory conditions.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust free, and dry substrate for air barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and voids in concrete or masonry substrates with patching material.

D. Remove excess mortar from masonry ties, shelf angles, and obstructions.

E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

F. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

G. Bridge isolation joints, expansion joints, and, discontinuous wall to wall, deck to wall, and deck to deck joints with air barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

A. Install accessory materials according to air barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air barrier material continuously to roofing membrane air barrier, concrete below grade structures, floor to floor construction, exterior glazing and window systems, glazed curtain wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

1. Wall Openings: Prime concealed, perimeter frame surfaces of window systems, glazed curtain-wall systems, storefront systems, exterior louvers, and exterior door framing. Apply engineered transition assembly (ETA) so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.

    a. Engineered Transition Assembly (ETA): Set in full bed of silicone sealant applied to walls, frame, and membrane.

C. At end of each day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier material with foam sealant.

F. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic or sealant.

G. Seal top of through wall flashings to air barrier with an additional 6 inch (150 mm) wide, transition strip.

H. Seal exposed edges of detailing tapes and strips at seams, cuts, penetrations, fasteners, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic or sealant.

I. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.4 PRIMARY AIR BARRIER MATERIAL INSTALLATION

A. Apply air barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions and details. Apply air barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by air barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B. High Build Air Barriers: Apply continuous unbroken air barrier material to substrates according to the following thickness. Apply air barrier material in full contact around protrusions such as masonry ties.

1. Vapor Permeable, High Build Air Barrier: Total dry film thickness recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils (0.9 mm), applied in one or more equal coats. Apply additional material as needed to achieve void and pinhole free surface, but do not exceed thickness on which required vapor permeability is based.

C. Medium Build Air Barriers: Apply continuous unbroken air barrier material to substrates according to the specified thickness. Apply an increased thickness of air barrier material in full contact around protrusions such as masonry ties.

1. Vapor Permeable, Medium Build Air Barrier: Total dry film thickness recommended in writing by manufacturer to comply with performance requirements, but not less than 17 mils, applied in one or more equal coats. Apply additional material as needed to achieve void and pinhole free surface, but do not exceed thickness on which required vapor permeability is based.

D. Do not cover air barrier until it has been tested and inspected by testing agency.

E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Inspections: Air barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Air barrier dry film thickness.
3. Continuous structural support of air barrier system has been provided.
4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
5. Site conditions for application temperature and dryness of substrates have been maintained.
6. Maximum exposure time of materials to UV deterioration has not been exceeded.
7. Surfaces have been primed, if applicable.
8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
9. Termination mastic has been applied on cut edges.
10. Strips and transition strips have been firmly adhered to substrate.
11. Compatible materials have been used.
12. Transitions at changes in direction and structural support at gaps have been provided.
13. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
14. All penetrations have been sealed.

C. Tests: Determined by testing agency from among the following tests:

1. Air Leakage Location Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, chamber pressurization or depressurization with smoke tracers.
2. Air Leakage Volume Testing: Air barrier assemblies will be tested for air leakage rate according to ASTM E779.
3. Adhesion Testing: Air barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.

D. Air barriers are considered defective if they do not pass tests and inspections.

1. Apply additional air barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air barrier components for retesting as specified above.

E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full thickness, air barrier application after repairing and preparing the overexposed materials according to air barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION

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SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silyl-terminated polymer joint sealants at joints in sheathing, air barriers, masonry, cladding panels, openings, and at dynamic conditions.
2. Silicone joint sealants at joints in sheathing, air barriers, masonry, cladding panels, openings, and at dynamic conditions.
3. Latex joint sealants at static joints in gypsum board substrates.

B. Related Sections

1. See Section 08 80 00 “Glazing” for silicone sealants related to glazing and weatherproofing systems.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product data.

B. Samples: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-sealant schedule.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Test Reports: Submit test reports from sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

B. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

C. Field Quality-Control Submittals:

1. Field-Adhesion-Test Reports: For each sealant application tested.

D. Sample warranties.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Authorized representative who is trained and approved by manufacturer.
2. Testing Agency: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint sealant manufacturer for testing indicated, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the work.
6. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field Adhesion Testing: Before installing sealants, field test adhesion to joint substrates:

1. Locate test joints where indicated or as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.

4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 degrees F (5 degrees C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 POLYMER JOINT SEALANTS

A. Silyl-terminated Polymer (STPE or STPU), M or S, NS, 50, NT: Single or Multi-component, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use joint sealant; ASTM C920, Type M or S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

    a. Sika; SikaHyflex-150LM or MasterSeal NP-150
    b. Tremco; Dymonic-FC
    c. Pecora Corporation; Dynatrol I-XL Hybrid.

2. Application: Typical exterior and interior non-traffic horizontal and vertical joints not in contact with silicone-based air barriers or sealants.

B. Self-leveling Sealant: One or two part polyurethane or silyl-terminated polyurethane sealant, ASTM C920 Type M or S, Grade P, Class 25, Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

    a. Sika; Sikaflex-1C SL
    b. Tremco; Vulkem 45SSL
    c. Pecora Corporation; Dynatrol II-SG or Urexpan NR-201 STPU Hybrid.

2. Application: Exterior and interior horizontal, traffic-bearing joints.

C. Silicone: Single component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic use, neutral curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT; Uses M, G, A, O.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Dow Corning Corporation; 791.
    b. GE Construction Sealants; SCS 2000 SilPruf.
    c. Pecora Corporation. PCS.

d. Sika Corporation; Sikasil WS 295 and WS 295 FPS.
e. Comparable product by Tremco.

2. Application: Exterior and interior non-traffic horizontal and vertical joints not in contact with STPE-based air barriers or sealants.

2.3 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Pecora Corporation; AC-20.
b. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk.
c. Tremco Incorporated; Tremflex 834.

2.4 MILDEW RESISTANT JOINT SEALANTS

A. Mildew Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone: Mildew resistant, fungicidal, single component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic use, acid curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT; Use A, G, and O.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dow Corning Corporation; 786-M White.
b. GE Construction Sealants; Sanitary SCS1700.
c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 100 WF.
d. 898 by Pecora.
e. Sikasil GP by Sika.

2. Application: Mildew resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

a. Joint Locations:

1) Joints between plumbing fixtures and adjoining walls, floors, and counters.

b. Hard tile joints, wet locations:

1) Control and expansion joints.
2) At changes in substrates.
3) At inside corners (wall-to-wall and wall-to-floor).

c. Other joints as indicated on Drawings.

2.5 BUTYL JOINT SEALANTS

A. Butyl Rubber Based Joint Sealants: ASTM C1311.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Bostik, Inc.; Chem-Calk 300.
b. Pecora Corporation; BC-158.

2. Joint Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated on Drawings.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Construction Foam Products; a division of Nomaco, Inc.
b. Master Builders Solutions; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin) as approved in writing by joint-sealant manufacturer for joint application indicated, and for size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances

capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Sealant Tape: Compressible adhesive cohesive tape of crosslinked butyl polyisobutylene rubber that accommodates variations and movement, sized as necessary to allow for joint movement of plus/minus 25 percent.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. 440 by Tremco.
b. Extru-Seal by Pecora.
c. PTI-606 by Protective Treatments, Inc., Division of Prosoco.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.
c. Unglazed surfaces of ceramic tile.
d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Etch concrete, masonry and plaster joint surfaces to remove excess alkalinity. Etch with 5 percent solution of muriatic acid. Neutralize with dilute ammonia solution. Rinse thoroughly with water and allow to dry.

5. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

6. Steel Surfaces: Scrape and wire brush to remove loose mill scale. Remove dirt, oil or grease by solvent cleaning. Wipe surfaces with lintless paper towels.
7. Aluminum Surfaces: Remove temporary protective coatings.

    a. When masking tape is used for a protective cover, remove tape prior to applying sealant.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents approved by sealant manufacturer that do not discolor sealants or adjacent surfaces and provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field Adhesion Testing: Field test joint sealant adhesion to joint substrates:

1. Extent of Testing: Test completed and cured sealant joints:

a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

a. Whether sealants filled joint cavities and are free of voids.
b. Whether sealant dimensions and configurations comply with specified requirements.
c. Whether sealants in joints connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field adhesion hand-pull test criteria.

4. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations,

whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory.

C. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Hollow-metal work.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

D. Samples: For each type or exposed finish submit 3 by 5 inch sample using finish system on substrate to be used on Project for selection and verification.

E. Door Schedule: Use same reference designations as listed in Contract Documents for openings, doors, frames, hardware, fire-ratings, glazed openings, and other aspects of the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Qualifications-Manufacturer: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.

B. Regulatory Requirements.

1. 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.
2. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
3. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide manufacturer's certification that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.
4. 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.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.6 SEQUENCING AND SCHEDULING

A. Coordination:

1. Coordinate of door opening construction with door hardware installation and anchor placement.
2. Coordinate grout fill of metal frames in masonry construction.

3. Coordinate installation of glass and glazing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amweld International, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Deansteel.
5. Kewaunee
6. Mesker Door Inc.
7. Pioneer Industries, Inc.
8. Rocky Mountain Metals, Inc.
9. Steelcraft; an Allegion company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Frame Anchors: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M, hot-dip galvanized according to ASTM A153/A153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

G. Grout: ASTM C476, except with a maximum slump of 4 inches, as measured according to ASTM C143/C143M.

H. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread

and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 INTERIOR HOLLOW METAL DOORS AND FRAMES

A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches.
    c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch.
    d. Edge Construction: Model 1, Seamless.
    e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, or mineral-board at manufacturer's discretion.
    f. Fire-rated Doors: Listed and labeled by approved testing agency.

3. Frames:

    a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
    b. Construction: Full profile welded.
    c. Exposed Finish: Prime.
    d. Fire-rated Frames: listed and labeled by approved testing agency.

2.4 EXTERIOR HOLLOW METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches.
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 (ZF120) coating.
    d. Edge Construction: Model 1, Seamless.

e. Core: Manufacturer's standard polyurethane or polyisocyanurate at manufacturer's discretion.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 (ZF120) coating.
b. Construction: Full profile welded.
c. Exposed Finish: Prime.

2.5 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.7 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Fire Door Cores: As required to provide fire-protection ratings indicated.
2. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
3. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
4. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted at CMU openings. Do not grout openings in gypsum board partitions.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.

4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

c. Compression Type: Not less than two anchors in each frame.
d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 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 NAAMM-HMMA 840 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. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

g. Field apply corrosion-resistant coating to backs of frames that will be in contact with grout or plaster containing anti-freezing agents.

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.
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 Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.

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 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. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

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.

3.4 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. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid core doors and transom panels with wood veneer faces.
2. Fire rated wood doors.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Integration of Security System: The integration of a security system into the flush wood door is required. Make provisions for and coordinate components and installation.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data including core materials and construction, details edge construction, face type and characteristics, trim for openings, and factory finishing.

1. Submit laboratory test report results of hinge loading, cycle/slam, stile edge screw withdrawals, and stile edge split resistance for fire rated doors.

B. Shop Drawings: Indicate location, size, fire protection rating, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Elevations, dimensions, and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware, lite cutouts, and glazing thicknesses.
3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
4. Dimensions and locations of blocking for hardware attachment.
5. Dimensions and locations of mortises and holes for hardware.
6. Dimensions and locations of cutouts.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and finish requirements.
10. Fire protection ratings for fire rated doors.

C. Samples:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species

and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished work.

2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.

    a. Provide Samples for each species of veneer and solid lumber required.
    b. Provide Samples for each color, texture, and pattern of plastic laminate required.
    c. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.

3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, smoke and draft control door assemblies, and temperature rise rated door assemblies.

B. Qualification Data: Submit data for door inspector.

1. Fire Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
3. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.

C. Field quality control reports.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents: Submit for fire rated doors, a list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

A. Fire Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

C. Source Limitations: Obtain flush wood doors from single manufacturer.

D. Preinstallation Conference: Conduct conference at site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Store wood doors on a flat level surface in a dry, well ventilated, place. Keep wood doors a minimum of 3-1/2 inches off floor surface and protected by a protective covering under the bottom door and over the top door. Cover to protect wood doors from dirt, water and abuse but allow for air circulation under and around the stack. Do not store wood doors in direct sunlight.

C. Package doors individually in heavy duty cardboard cartons prior to shipment from factory. Mark each door on top and bottom rail with opening number used on Shop Drawings using temporary, removable, or concealed markings.

D. Handle wood doors with clean gloves. Lift and carry wood doors when moving around the site, do not drag wood doors across one another.

E. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, wet work is complete, and HVAC system is operating and maintaining temperature between 60 degrees F and 90 degrees F (16 degrees C and 32 degrees C) and relative humidity between 25 percent and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Written warranty signed by manufacturer in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42 inch by 84 inch (1067 mm by 2134 mm) section.

c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch (0.25 mm in a 76.2 mm) span.

2. Warranty shall include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Quality Standard: Comply with the applicable provisions and recommendations of AWI Architectural Woodwork Quality Standards 2nd edition and AWI Architectural Woodwork Standard Suite; where standards and specifications conflict the more stringent shall be required.

B. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency for fire protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F (250 degrees C) above ambient after 30 minutes of standard fire test exposure.
3. Cores: Provide core specified or mineral core as needed to provide fire protection rating indicated.
4. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
5. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

C. Smoke and Draft Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784 and installed in compliance with NFPA 105.

D. Screw Holding and Cycle/Slam Capabilities for Stave Core, Structural Composite Lumber, Particleboard Core, and Mineral Core (Rated) Doors: Extra heavy duty performance to eliminate the use of through bolts for closers and to improve screw holding capabilities for hardware items (No. 12 Type A fully threaded wood screws

penetrating door minimum 1-1/2 inches). Comply with ASTM D1037 for screw withdrawal and ASTM D143 modified for splitting.

1. Minimum Vertical Edge Test Rating (Nonrated Stave Core or Particle Board Core):

    a. Split Resistance: Minimum 525 lbs per NWWDA TM-5.
    b. Hinge Loading Resistance: Minimum 930 lbs per NWWDA TM-8.
    c. Screw Holding Capacity: Minimum 1000 lbs per NWWDA TM-10.

2. Minimum Vertical Edge Test Rating (Rated Mineral Core):

    a. Split Resistance: WDMA I.S.1A.

        1) 45 and 60 Minute: Minimum 1400 lbs.
        2) 90 Minute: Minimum 1075 lbs.

    b. Cycle Slam: WDMA TM-7; 1,000,000.
    c. Hinge Loading Resistance: WDMA TM-8.

        1) 45 and 60 Minute: Minimum 740 lbs.
        2) 90 Minute: Minimum 660 lbs.

    d. Screw Holding Capacity: WMDA TM-10.

        1) 45 and 60 Minute: Minimum 1300 lbs.
        2) 90 Minute: Minimum 775 lbs.

E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with applicable requirements.

1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.2 FLUSH WOOD DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Marshfield-Algoma; Masonite Architectural.
2. Oshkosh Door Company.
3. VT Industries Inc./Eggers Industries.

B. Solid Core Flush Wood Veneer Faced Doors for Transparent Finish:

1. Interior Doors:

a. Performance Grade:

1) ANSI/WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.

b. Architectural Woodwork Standards Grade: Custom.
c. Construction: Five plies, hot pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.
d. Faces: Single ply wood veneer not less than 1/50 inch (0.508 mm) thick.

1) Species, Cut, and Match: As scheduled on Drawings or as selected by Architect.

e. Exposed Vertical and Top Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
f. Fire Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with requirements for exposed vertical edges.

1) Vertical Edge Construction: Provide edge construction with intumescent seals concealed by outer stile meeting or exceeding the specified direct screw withdrawal, split resistance, cycle slam, and hinge loading criteria. Comply with specified requirements for exposed edges.

a) Split Resistance: Not less than 696 pounds when tested in accordance with WDMA TM-5; or, not less than 1305 pounds when tested in accordance with ASTM D143.
b) Cycle/Slam: Not less than 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with the requirements of WDMA TM-7; or, not less than 502,000 cycles when tested in accordance with ANSI A151.1.
c) Direct Screw Withdrawal: Not less than 700 pounds when tested in accordance with WDMA TM-10; or, not less than 877 pounds when tested in accordance with ASTM D1037 using #12 by 1-1/4 steel screws, threaded to the head with either A or AB wood threads.
d) Hinge Loading: Not less than 684 pounds average when tested in accordance with WDMA TM-8.

2) Fire Rated Pairs of Doors: Provide fire retardant stiles listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

g. Mineral Core Doors: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.

1) Screw Holding Capability: 550 lbf (2440 N) in accordance with WDMA T.M. 10.

h. Core for Nonfire Rated Doors:

1) WDMA I.S. 10 structural composite lumber.

a) Screw Withdrawal, Door Face: 550 lbf (2440 N).
b) Screw Withdrawal, Vertical Door Edge: 550 lbf (2440 N).

i. Core for Fire Rated Doors: Necessary to achieve fire protection rating indicated on Drawings.

1) Blocking for Mineral Core Doors: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated on Drawings as necessary to eliminate through bolting hardware.

a) 5 inch (125 mm) top rail blocking.
b) 5 inch (125-mm) bottom rail blocking, in doors indicated to have protection plates.
c) 5 inch (125 mm) midrail blocking, in doors indicated to have armor plates.
d) 4-1/2 inch by 10 inch (114 mm by 250 mm) lock blocks, in doors indicated to have exit devices.

2.3 LIGHT FRAMES

A. Metal Frames for Light Openings in Fire Rated and Non-Fire-Rated Doors: Frame formed of 0.048 inch (1.2 mm) thick, cold rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire protection rating indicated on Drawings.

B. Wood Veneered Beads for Light Openings in Fire Rated Doors: Wood veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire protection rating indicated.

2.4 FABRICATION

A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 and accessibility regulations. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. For doors scheduled to receive electrified locksets, provide factory installed raceway and wiring to accommodate specified hardware.
3. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full width, solid lumber , rabbeted, meeting rails. Provide factory installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00.

2.5 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. Architectural Woodwork Standards Grade: Premium.
2. Finish: AWI Architectural Woodwork Standards System 9, UV curable, acrylated epoxy, polyester, or urethane, System 10, UV curable, water based, or System 11, catalyzed polyurethane.
3. Staining, Effect, and Sheet: Selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation after correcting unsatisfactory conditions.

3.2 INSTALLATION

A. Hardware: Refer to Section 08 71 00.

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3.2 mm in 2400 mm).
2. Anchor frames to anchors or blocking built in or directly attached to substrates.

    a. Secure with countersunk, concealed fasteners and blind nailing.
    b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

        1) For factory finished items, use filler matching finish of items being installed.

3. Install fire rated doors according to NFPA 80.
4. Install smoke and draft control doors according to NFPA 105.

C. Job Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Machine doors for hardware.
2. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
3. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.

    a. Comply with NFPA 80 for fire rated doors.

4. Bevel nonfire rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
5. Bevel fire rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Provide inspection of installed Work through AWI's Quality Certification Program, certifying that wood doors and frames, including installation, comply with requirements of AWI Architectural Woodwork Standards 2nd Edition and AWI Quality Standard Suite for the specified grade.
2. Fire Rated Door Inspections: Inspect each fire rated door in accordance with NFPA 80, Section 5.2.
3. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hardware for fire-rated doors.

B. Electrically operated and controlled hardware.

C. Lock cylinders for doors with balance of hardware specified in other sections.

D. Thresholds.

E. Weatherstripping and gasketing.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.

C. BHMA A156.1 - Standard for Butts and Hinges 2021.

D. BHMA A156.3 - Exit Devices 2020.

E. BHMA A156.4 - Door Controls - Closers 2019.

F. BHMA A156.5 - Cylinders and Input Devices for Locks 2020.

G. BHMA A156.6 - Standard for Architectural Door Trim 2021.

H. BHMA A156.7 - Template Hinge Dimensions 2016.

I. BHMA A156.16 - Auxiliary Hardware 2018.

J. BHMA A156.21 - Thresholds 2019.

K. BHMA A156.22 - Standard for Gasketing 2021.

L. BHMA A156.28 - Recommended Practices For Mechanical Keying Systems 2018.

M. BHMA A156.115 - Hardware Preparation In Steel Doors And Steel Frames 2016.

N. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames 2006.

O. DHI (H&S) - Sequence and Format for the Hardware Schedule 2019.

P. DHI (KSN) - Keying Systems and Nomenclature 2019.

Q. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames 2004.

R. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors 1993; also in WDHS-1/WDHS-5 Series, 1996.

S. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

T. ITS (DIR) - Directory of Listed Products current edition.

U. Miami (APD) - Approved Products Directory; Miami-Dade County Current Edition.

V. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

W. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.

X. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.

Y. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.

Z. UL (DIR) - Online Certifications Directory Current Edition.

AA. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

BB. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.

C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by affected installers and the following:

1. Architect.
2. Installer's Architectural Hardware Consultant (AHC).

3. Hardware Installer.
4. Owner's Security Consultant.

D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

E. Keying Requirements Meeting:

1. Attendance Required:
2. Agenda:

   a. Establish keying requirements.
   b. Verify locksets and locking hardware are functionally correct for project requirements.
   c. Verify that keying and programming complies with project requirements.
   d. Establish keying submittal schedule and update requirements.

3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
5. Deliver established keying requirements to manufacturers.

1.4 SUBMITTALS

A. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

B. Shop Drawings - Door Hardware Schedule: A detailed listing that includes each item of hardware to be installed on each door.

1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
2. Comply with DHI (H&S) using door numbering scheme and hardware set numbers as indicated in Contract Documents.

   a. Submit in vertical format.

3. Include complete description for each door listed.

C. Shop Drawings - Electrified Door Hardware: Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:

1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).

2. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
3. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.

D. Samples for Verification (if requested):

1. Submit minimum size of 2 by 4 inch (51 by 102 mm) for sheet samples, and minimum length of 4 inch (102 mm) for other products.
2. Submit one (1) sample of hinge, latchset, lockset, closer, illustrating style, color and finish.
3. Include product description with samples.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Supplier's qualification statement.

I. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

J. Keying Schedule:

1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

K. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

L. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

M. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.7 WARRANTY

A. Manufacturer Warranty: Provide manufacturer warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

1. Closers: 25 years, minimum.
2. Exit Devices: Three years, minimum.
3. Locksets and Cylinders: Three years, minimum.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Locks: Provide a lock for each door, unless it's indicated that lock is not required.

1. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's Series. As indicated in hardware sets.
2. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.
3. Strikes:

    a. Finish: To match lock or latch.
    b. Curved-Lip Strikes: Provide as standard, with extended lip to protect frame, unless otherwise indicated.
    c. Center Strike At Pairs of Doors: 7/8 inch (22.2 mm) lip.

D. Closers:

1. Provide door closer on each exterior door, unless otherwise indicated.
2. Provide door closer on each fire-rated and smoke-rated door.

3. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.

E. Drip Guards: Provide at head of outswinging exterior doors unless protected by roof or canopy directly overhead.

F. Weatherstripping and Gasketing:

1. Provide door bottom sweep as indicated in hardware set, unless otherwise indicated.

G. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.

H. See Section 28 10 00 for additional access control system requirements.

I. Fasteners:

1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.

a. Aluminum fasteners are not permitted.
b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.

2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.

a. Self-drilling (Tek) type screws are not permitted.

3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
4. Provide wall grip inserts for hollow wall construction.
5. Fire-Resistance-Rated Applications: Comply with NFPA 80.

a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.2 PERFORMANCE REQUIREMENTS

A. Provide door hardware products that comply with the following requirements:

1. Applicable provisions of federal, state, and local codes.
2. Accessibility: ADA Standards and ICC A117.1.

3. Fire-Resistance-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
4. Hardware on Fire-Resistance-Rated Doors: Listed and classified by UL as suitable for application indicated.
5. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
6. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
7. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

2.3 HINGES

A. Manufacturers: Conventional butt hinges.

1. BEST
2. McKinney

B. Properties:

1. Butt Hinges: As applicable to each item specified.

a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
c. Template screw hole locations.
d. Bearing assembly installed after plating.
e. Bearings: Exposed fully hardened bearings.
f. Bearing Shells: Shapes consistent with barrels.
g. Pins: Easily seated, non-rising pins.

1) Fully plate hinge pins.
2) Non-Removable Pins: Slotted stainless steel screws.

h. UL 10C listed for fire-resistance-rated doors.

C. Sizes: See Door Hardware Schedule.

1. Hinge Widths: As required to clear surrounding trim.
2. Sufficient size to allow 180 degree swing of door.

D. Finishes: See Door Hardware Schedule.

1. Fully polish hinges, front, back, and barrel.

E. Grades:

1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.

F. Material: Base metal as indicated for each item by BHMA material and finish designation.

G. Types:

1. Butt Hinges: Include full mortise hinges.

H. Options: As applicable to each item specified.

I. Quantities:

1. Butt Hinges: Three (3) hinges per leaves up to 90 inches (2286 mm) in height. Add one (1) for each additional 30 inches (762 mm) in height or fraction thereof.

a. Hinge weight and size unless otherwise indicated in hardware sets:

1) For doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
2) For doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
3) For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
4) For doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.

J. Applications: At swinging doors.

1. Provide non-removable pins at out-swinging doors with locking hardware and all exterior doors.

K. Products:

1. Butt Hinges:

a. Ball Bearing, Five (5) Knuckle.

2.4 BOLTS

A. Manufacturers:

1. Trimco.
2. Rockwood.

B. Properties:

1. Flush Bolts:

a. Manual Flush Bolts: Manually latching upon closing of door leaf.

1) Bolt Throw: 3/4 inch (19 mm), minimum.

b. Automatic Flush Bolts: Automatically latching upon closing of door leaf.

1) Bolt Throw: 3/4 inch (19 mm), minimum.

2. Dustproof Strikes: For bolting into floor, provide except at metal thresholds.

C. Options:

D. Products:

1. Manual flush bolts 555.
2. Automatic flush bolts 2842/2942.

2.5 MULLIONS

A. Manufacturers:

1. Sargent

B. Properties:

1. Rectangular shape 3 inches (76 mm) by 2 inches (51 mm) tubes with minimum 1/8 inch (3.2 mm) wall thickness.
2. Furnished by the same manufacturer as exit devices.
3. Spacers: Provide as required for proper installation, based on frame profile and dimensions.

C. Grades: Complying with BHMA A156.3.

D. Materials: Manufacturer's standard for items specified.

1. Top and Bottom Brackets: Investment-cast steel.

E. Options:

1. Furnish Keyed Removable "KR" feature and corresponding cylinders as specified.

a. Mullions capable of being installed without physical key present.
b. Physical key required to operate.

F. Applications: As indicated on drawings and in Door Hardware Schedule.

G. Products:

1. L980 Series.

2.6 MORTISE LOCKS

A. Manufacturers:

1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Substitutions: Not permitted.

B. Properties:

1. Mechanical Locks: Manufacturer's standard.

a. Fitting modified ANSI A115.1 door preparation.
b. Door Thickness Coordination Fitting 1-3/4 inch (44 mm) to 2-1/4 inch (57 mm) thick doors.
c. Latch: Solid, one-piece, anti-friction, self-lubricating stainless steel.

1) Latchbolt Throw: 3/4 inch (19 mm), minimum.

d. Auxiliary Deadlatch: One piece stainless steel, permanently lubricated.
e. Backset: 2-3/4 inch (70 mm).
f. Lever Trim:

1) Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
2) Strength: Locksets outside locked lever designed to withstand minimum 1,400 inch-lbs (158.2 Nm) of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
3) Spindle: Designed to prevent forced entry from attacking of lever.
4) Independent spring mechanism for each lever.

a) Trim to be self-aligning and thru-bolted.

5) Handles: Made of forged or cast brass, bronze, or stainless steel construction. Levers that contain a hollow cavity are not acceptable.
6) Levers to operate a roller bearing spindle hub mechanism.

C. Finishes: See Door Hardware Schedule.

1. Core Faces: Match finish of lockset.

D. Grades:

E. Options:

1. Provide locksets made in a manufacturing facility to compliant with ISO 9001-Quality Management and ISO 14001-Environmental Management.

F. Products: Mortise locks, including standard and electrified types.

1. 40H.
2. 40HW.

2.7 EXIT DEVICES

A. Manufacturers:

1. Sargent
2. Substitutions: Not permitted.

B. Properties:

1. Touchpads: 'T" style metal touchpads and rail assemblies with matching chassis covers end caps.
2. Latch Bolts: Stainless steel deadlocking with 3/4 inch (19 mm) projection using latch bolt.
3. Lever Design: Match project standard lockset trims.
4. Cylinder: Include where cylinder dogging or locking trim is indicated.
5. Strike as recommended by manufacturer for application indicated.
6. Sound dampening on touch bar.
7. Dogging:

    a. Non-Fire-Resistance-Rated Devices: cylinder dogging.
    b. Fire-Resistance-Rated Devices: Manual dogging not permitted.

8. Touch bar assembly on wide style exit devices to have a 1/4 inch (6.3 mm) clearance to allow for vision frames.
9. All exposed exit device components to be of architectural metals and "true" architectural finishes.
10. Handing: Field-reversible.
11. Fasteners on Back Side of Device Channel: Concealed - exposed fasteners not allowed.
12. Vertical Latch Assemblies' Operation: Gravity, without use of springs.

C. Grades: Complying with BHMA A156.3, Grade 1.

1. Provide exit devices tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.

D. Performance Requirements:

1. Exterior Door Exit Devices in Tornado Hurricane-Strength Wind Areas:

a. Devices included in Texas Approved Products Directory).

E. Options:

1. Electrified Devices:
2. Electrified Device Voltage: 24 VAC.

F. Products:

1. 8800 Series

2.8 LOCK CYLINDERS

A. Manufacturers:

1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Substitutions: Not permitted.

B. Properties:

1. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.

a. Provide cylinders from same manufacturer as locking device.
b. Provide cams and/or tailpieces as required for locking devices.
c. Provide cylinders with appropriate format interchangeable cores where indicated.

C. Grades:

1. Standard Security Cylinders: Comply with BHMA A156.5.

D. Material:

E. Types: As applicable to each item specified.

F. Applications: At locations indicated in hardware sets, and as follows

1. As required for items with locking devices provided by other sections, including at elevator controls and cabinets.

a. When provisions for lock cylinders are referenced elsewhere in the Project Manual to this Section, provide compatible type of lock cylinder, keyed to building keying system, unless otherwise indicated.

G. Products:

1. Rim/mortise 12E/1E.

2.9 KEYS AND CORES

A. Manufacturers:

1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Substitutions: Not permitted.

B. Properties: Complying with guidelines of BHMA A156.28.

1. Provide small format interchangeable core.
2. Provide Patented CORMAX keys and cores.
3. Provide keying information in compliance with DHI (KSN) standards.
4. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
5. Keying: Master keyed.
6. Include construction keying and control keying with removable core cylinders.
7. Supply keys in following quantities:

a. Master Keys: 4 each.
b. Construction Master Keys: 6 each.
c. Construction Keys: 15 each.
d. Construction Control Keys: 2 each.
e. Control Keys if New System: 2 each.

8. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
9. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
10. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
11. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and keys to remain property of hardware supplier.

C. Products:

1. Patented:

a. CORMAX.

2.10 AUXILIARY LOCKS (DEADLOCKS)

A. Manufacturers:

1. Sargent
2. Best.

B. Auxiliary Locks (Deadlocks): Comply with BHMA A156.36, Grade 1.

1. Type: Mortise.
2. Application: Mortised.
3. Backset: 2-3/4 inch (70 mm), unless otherwise indicated.
4. Provide strike that matches frame.

2.11 DOOR PULLS AND PUSH PLATES

A. Manufacturers:

1. Rockwood (offset pulls and push/pull plates)
2. Trimco (push/pull plates only)

B. Door Pulls and Push Plates: Comply with BHMA A156.6.

1. Pull Type: Offset
2. Pull Plate: Flat, with square corners with C shape bar pull.
3. Push Plate Type: Flat, with square corners, unless otherwise indicated.

a. Edges: Beveled, unless otherwise indicated.

4. Material: Aluminum, unless otherwise indicated.

2.12 COORDINATORS

A. Manufacturers:

1. Rockwood
2. Trimco

B. Properties:

1. General: Non-handed devices, with field-selectable active door leaf.
2. Active door to be field-selectable.

3. Combined Coordinators and Closers: Single devices performing both functions.

    a. System consisting of a steel cam, roller and adjustable spring incorporating a track arm coordinator assembly for controlling sequential closing of pairs of doors.

        1) Coordinator element installs on frame.
        2) Closer elements install on doors.

    b. Two separate temperature-compensating noncritical adjustment valves for controlling sweep and latch closing speeds.
    c. Adjustable hydraulic backcheck effective from approximately 65 degrees.
    d. Delayed Action: Range effective from approximately 125 to 70 degrees.
    e. Maximum Opening Range: Approximately 175 degrees on pull-side opening and 120 degrees on push-side opening, project conditions permitting.
    f. Field-selectable active leaf.

C. Grades:

1. Closer and Coordinator Combinations: Comply with BHMA A156.4, Grade 1.

D. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.

1. Meet UL 10C for Positive Pressure.

E. Types:

1. Closer & Coordinator Combinations.

F. Installation:

1. Mounting: Provide necessary mounting brackets and filler bars to ensure proper installation of coordinator and related hardware.

    a. Pull Side: Mount with electrically-held single-point hold open for the inactive door from approximately 80 to 130 degrees.
    b. Push Side: Mount with electrically-held selective single-point hold open function for the active and inactive doors from approximately 80 to 120 degrees.

2. Coordination: Properly sequence installation of other door hardware affected by placement of coordinators and carry bars.

G. Products:

1. 2672

2.13 OVERHEAD STOPS AND HOLDERS

A. Manufacturers:

1. Sargent
2. DORMA

B. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.

1. Provide stop for every swinging door, as specified in hardware sets.

2.14 CLOSERS

A. Manufacturers:

1. Sargent
2. Substitutions – Not Permitted

B. Properties:

1. Surface Mounted Closers: Manufacturer's standard.

a. Construction: R14 high silicon aluminum alloy.
b. Maximum Projection from Face of Door: 2-7/16 inches (62 mm).
c. Mechanism: Separate tamper-resistant adjusting valves for closing and latching speeds.

1) Include advanced backcheck feature.
2) Include delayed action feature.

d. Hydraulic Fluid: All-weather type.
e. Arm Assembly: Standard for product specified.

1) Include hold-open, integral stop, or spring-loaded stop feature, as specified in Door Hardware Schedule.
2) Parallel arm to be a heavy-duty rigid arm.
3) Where "IS" or "S-IS" arms are specified in hardware sets, if manufacturer does not offer this arm provide a regular arm mount closer in conjunction with a heavy-duty overhead stop equal to a dormakaba 900 Series.

f. Covers:

1) Type: Standard for product selected.

a) Full.

2) Material: Plastic.
3) Finish: Painted.

C. Grades:

1. Closers: Comply with BHMA A156.4, Grade 1.

a. Underwriters Laboratories Compliance:

1) Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.

a) UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.

D. Types:

1. Rack-and-pinion, surface-mounted. 1-1/2 inches (38 mm) minimum bore.

E. Options:

F. Installation:

1. Mounting: Includes surface mounted installations.
2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
3. At outswinging exterior doors, mount closer on interior side of door.
4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.

G. Products:

1. Surface Mounted:

a. 1431 Series

2.15 PROTECTION PLATES

A. Manufacturers:

1. Rockwood
2. Trimco

B. Properties:

1. Plates:

a. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.

1) Size: 10 inches (254 mm) high by 2 inch (51 mm) less door width (LDW) on push side of door except as noted otherwise in the hardware set.

b. Edges: Beveled, on four (4) unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: As indicated for each item by BHMA material and finish designation.

1. Metal Properties: Stainless steel.

a. Metal, Standard Duty: Thickness 0.050 inch (1.27 mm), minimum.

E. Installation:

1. Fasteners: Countersunk screw fasteners

F. Products:

1. K1050.

2.16 STOPS AND HOLDERS

A. Manufacturers:

1. Rockwood
2. Trimco

B. General: Provide overhead stop/holder when wall or floor stop is not feasible.

C. Properties:

D. Grades:

1. Door Holders, Wall Bumpers, and Floor Stops: Comply with BHMA A156.16 and Resilient Material Retention Test as described in this standard.

E. Material: Base metal as indicated for each item by BHMA material and finish designation.

F. Installation:

1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

G. Products:

1. Wall Bumpers 406
2. Floor Stops 462

2.17 THRESHOLDS

A. Manufacturers:

1. Pemko
2. National Guard Products

B. Properties:

1. Threshold Surface: Fluted horizontal grooves across full width.

C. Grades: Thresholds: Comply with BHMA A156.21.

D. Products:

1. 171 A, 1715 A (others as specified)

2.18 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:

1. Pemko
2. National Guard Products, Inc

B. Properties:

1. Weatherstripping Air Leakage Performance: Not exceeding 0.3 cfm/sq ft of door opening at 0.3 inches of water pressure differential for single doors, and 0.5 cfm/sq ft door area at 0.3 inches of water pressure differential for double doors for gasketing other than smoke control, as tested according to ASTM E283/E283M; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
2. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame with self- adhesive.

C. Grades: Comply with BHMA A156.22.

D. Products:

1. Weatherstripping: See Door Hardware Schedule.

2. Smoke Seals: See Door Hardware Schedule.
3. Meeting Stile Seals: See Door Hardware Schedule.
4. Door Bottom Seals:

    a. Door Sweeps: See Door Hardware Schedule.

2.19 ASTRAGALS

A. Manufacturers:

1. National Guard Products.
2. Pemko.

B. Astragals: Comply with BHMA A156.22.

1. Provide adhesive edge mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.

2.20 MISCELLANEOUS ITEMS

A. Manufacturers:

B. Properties:

1. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.

    a. Single Door: Provide three on strike jamb of frame.
    b. Pair of Doors: Provide two on head of frame, one for each door at latch side.
    c. Material: Rubber, gray color.

2. Silencers are not specified in hardware sets. To be supplied with HM frame supplier.

C. Products:

1. Silencers.

2.21 ELECTRIFIED HARDWARE

A. Manufacturers:

1. Sargent
2. Securitron
3. BEST (power transfer only)

B. Properties:

1. Power Supply Units: Manufacturer's standard.

a. Enclosures: Lockable NEMA Type 1, with hinged cover and knockouts.
b. Power: 24 VAC, 10 Amp; field-selectable.
c. Emergency Release Terminals: Designed to release devices upon activation of fire alarm system.
d. Auxiliary contacts for remote signaling.
e. User-selectable time delay from 0 to 4 minutes.
f. Fire Alarm System Interface: Standard.

1) Fire alarm terminal with green LED indicating power is available.

g. Output Distribution Board with indicator LEDs.
h. On/Off LED power indicator.

2. Power Transfers: Manufacturer's standard.

C. Products:

1. Power Supplies:

a. BPS-24-X (Size for opening requirements)

2. Power Transfers:

a. EL-CEPT
b. EPT-12C

2.22 FINISHES

A. Finishes: Identified in Hardware Sets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Correct all defects prior to proceeding with installation.

C. Verify that electric power is available to power operated devices and of correct characteristics.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware using the manufacturer’s fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

C. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

D. Install hardware for smoke and draft control doors in accordance with NFPA 105.

E. Use templates provided by hardware item manufacturer.

F. Do not install surface mounted items until application of finishes to substrate are fully completed.

G. Wash down masonry walls and complete painting or staining of doors and frames.

H. Complete finish flooring prior to installation of thresholds.

I. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal, anchor thresholds with stainless steel countersunk screws.

3.3 CLEANING

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.4 PROTECTION

A. Protect finished Work under provisions of Section 01 73 00 - Execution.

B. Do not permit adjacent work to damage hardware or finish.

3.5 HARDWARE SCHEDULE

A. Manufacturer List:

1. BES BEST
2. NGP National Guard Products

3. SAR Sargent
4. TRI Trimco

B. Option List:

1. 16: Cylinder Lockdown Feature in Rail
2. 70: Small Format Interchangeable
3. B4E Heavy: Heavy Bevel Edges
4. CSK: Counter Sunk Holes

C. Finish List:

1. 26D: Satin Chrome
2. 626: Satin Chrome
3. 630 Satin Stainless Steel
4. A: Aluminum Anodized
5. B: Brown
6. EN: Aluminum Powder Coat
7. Gray: Gray Rubber
8. US32D: Satin Stainless Steel

D. Cain HS Sets:

Set #1
Doors: D122

6	Hinge	FBB179 45X45	26D	BES
1	Mullion	980 L 70	A	SAR
1	Exit Device	88 13 16 70 ETJ	US32D	SAR
1	Exit Device	88 10 16 70	US32D	SAR
4	Interchangeable Core	1CM-7xx (by facility keyway)	626	BES
2	Door Closer	1431 P10	EN	SAR
2	Kick Plate	K0050 CSK B4E Heavy 10" X 1" LDW	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Astragal (set)	305 CN x Dr Ht		

Set #2
Doors: D113

3	Hinge	FBB179 45X45	26D	BES
1	Exit Device	88 04 16 70 PSB	US32D	SAR
2	Interchangeable Core	1CM-7xx (by facility keyway)	626	BES
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
3	Silencers	1229A	Gray	TRI

Set #3
Doors: D105, D106, D108, D116, D123, D132

3	Hinge	FBB179 45X45	26D	BES
1	Push - Pull Plate	1895 4B	630	TRI
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #4
Doors: D126

6	Hinge	FBB179 45X45	26D	BES
2	Flushbolt	3917 12	626	TRI
1	Mortise Lock	45H 7 R 3 M CORMAX	626	BES
1	Strike	3910	630	TRI
2	Door Closer	1431 UO	EN	SAR
2	Kick Plate	K0050 CSK B4E Heavy 10" X 1" LDW	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Adhesive Seal	S772 GR x Height		

Set #5
Doors: D114, D134, D136

3	Hinge	FBB179 45X45	26D	BES
1	Mortise Lock	45H 7 R 3 M CORMAX	626	BES
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #6
Doors: D120

6	Hinge	FBB179 45X45	26D	BES
2	Flushbolt	3917 12	626	TRI
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Strike	3910	630	TRI
2	Door Closer	1431 UO	EN	SAR
2	Armor Plate	KA050 36" X 1" LDW CSK B4E Heavy	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Adhesive Seal	S772 GR x Height		

Set #7
Doors: D121, D135, D112

3	Hinge	FBB179 45X45	26D	BES
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #8
Doors: D107E

3	Hinge	FBB168 5X45	26D	BES
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

E. Williams HS Sets:

Set #1
Doors: D119

6	Hinge	FBB179 45X45	26D	BES
1	Mullion	980 L 70	A	SAR
1	Exit Device	88 13 16 70 ETJ	US32D	SAR
1	Exit Device	88 10 16 70	US32D	SAR
4	Interchangeable Core	1CM-7xx (by facility keyway)	626	BES
2	Door Closer	1431 P10	EN	SAR
2	Kick Plate	K0050 CSK B4E Heavy 10" X 1" LDW	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Astragal (set)	305 CN x Dr Ht		

Set #2
Doors: D117

3	Hinge	FBB179 45X45	26D	BES
1	Exit Device	88 04 16 70 PSB	US32D	SAR
2	Interchangeable Core	1CM-7xx (by facility keyway)	626	BES
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
3	Silencers	1229A	Gray	TRI

Set #3
Doors: D101, D101A, D106, D110, D113, D115.1

3	Hinge	FBB179 45X45	26D	BES
1	Push - Pull Plate	1895 4B	630	TRI
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #4
Doors: D120

6	Hinge	FBB179 45X45	26D	BES
2	Flushbolt	3917 12	626	TRI
1	Mortise Lock	45H 7 R 3 M CORMAX	626	BES
1	Strike	3910	630	TRI
2	Door Closer	1431 UO	EN	SAR
2	Kick Plate	K0050 CSK B4E Heavy 10" X 1" LDW	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Adhesive Seal	S772 GR x Height		

Set #5
Doors: D109.1, D114

3	Hinge	FBB179 45X45	26D	BES
1	Mortise Lock	45H 7 R 3 M CORMAX	626	BES
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #6
Doors: D111

6	Hinge	FBB179 45X45	26D	BES
2	Flushbolt	3917 12	626	TRI
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Strike	3910	630	TRI
2	Door Closer	1431 UO	EN	SAR
2	Armor Plate	KA050 36" X 1" LDW CSK B4E Heavy	630	TRI
2	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP
1	Adhesive Seal	S772 GR x Height		

Set #7
Doors: D112, D107, D108, D118

3	Hinge	FBB179 45X45	26D	BES
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

Set #8
Doors: D105

3	Hinge	FBB168 5X45	26D	BES
1	Mortise Lock	45H 7 D 3 M CORMAX	626	BES
1	Door Closer	1431 UO	EN	SAR
1	Kick Plate	K0050 CSK B4E Heavy 10" X 2" LDW	630	TRI
1	Wall Stop	1270 CV	626	TRI
1	Gasketing	5050 Head & Jambs (2)	B	NGP

END OF SECTION

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SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Glazing sealants.
3. Glazing tapes.
4. Miscellaneous glazing materials.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Glass: Include structural, physical, and environmental characteristics, size limitations, special handling, or installation requirements.
2. Glazing Compounds: Include functional and environmental characteristics, and special application requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved by primary glass manufacturer.

B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors and who employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver glass to job in original containers bearing manufacturer's label indicating quality of contents of each package.

B. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

C. Do not remove labels until glass has been installed. Keep glass free from contamination by materials capable of staining glass. Do not apply marking materials to either side of glass.

1.9 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 degrees C).

2. Do not install glazing materials when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.10 WARRANTY

A. Manufacturer's Special Warranty for Heat-Soaked Tempered Glass: Manufacturer agrees to replace heat-soaked tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent (3/1000) within specified warranty period. Coverage for any other cause is excluded.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. AGC Glass Company North America, Inc.
2. Guardian Industries Corp.
3. Oldcastle BuildingEnvelope.
4. Pilkington North America.
5. Saint-Gobain.
6. Viracon, Inc.
7. Vitro Glass.

B. Source Limitations for Glass: Obtain tinted and coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall 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.

B. Safety Glazing: Where safety glazing is required, provide glazing that complies with 16 CFR 1201, Category II.

C. 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.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it shall be considered a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness: 6 mm.

D. Strength:

1. Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article.
2. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article.
3. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 FULLY TEMPERED GLASS

A. Fully Tempered Glass: ASTM C1048, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear), Kind FT (fully tempered), Condition A (uncoated).

B. Glass Types:

1. Type 2A – Clear.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. 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.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; Dow Corning 790 Silicone Building Sealant.
b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
c. Pecora Corporation; 890NST.
d. Tremco Incorporated; Spectrem 1.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; Dow Corning 795 Silicone Building Sealant.
b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf SCS200.
c. Pecora Corporation; 895NST.
d. Tremco Incorporated; Spectrem 2.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. 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.

2.7 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 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 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. Fully-Tempered Glass:

1. Fabrication Process: By horizontal (roller-hearth) process.
2. Heat Soaking: After tempering, heat soak 100 percent of fabricated glass units to European Union Standard EN14179 to eliminate inclusion related glass breakage. Statistical heat soaking shall not be permitted.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other coated glass).
5. Fabrication Tolerances:

a. Optical Distortion Tolerance: Using a LightSentry measurement system or equal, measure each pane of monolithic heat-strengthened glass against the following criteria and reject those that do not comply:

1) Roller Wave Criteria: Maximum 0.004 inches at center and 0.008 inches at edges from peak to valley.

b. Overall Bow and Warp Tolerance: Examine each pane of heat-treated glass to detect any lights which exceed half of the maximum bow and warp tolerances in any direction as listed in ASTM C1048, Table 2 and reject those that do not comply.

6. Orientation: Orient roller-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

a. If width of any glass units indicated on Drawings exceeds fabrication limits, roller-wave distortion shall be oriented in a consistent direction for the entire project.

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 those for 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 only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other 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.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

L. Tempered Glazing:

1. Do not cut, seam, nip or abrade tempered glass.
2. Set tempered glass with tong marks completely concealed or in as inconspicuous a location as possible.
3. Provide tempered glass in hazardous locations:

    a. Ingress and egress doors.
    b. Operable or inoperable panels adjacent to a door in building and within same wall plane as door whose nearest vertical edge is within 24" of door in closed position and whose bottom edge is less than 60" above floor or walking surface.
    c. Fixed panels which have glazed area in excess of 9 sq. ft. and lowest edge is less than 18" above finished floor level or walking surface within 36" of such glazing where panels are not protected with horizontal member not less than 1-1/2" in width located between 24" and 36" above walking surface.
    d. Other locations indicated, and where required by building code.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. 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.

D. 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.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. 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.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. 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.

C. 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.

1. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. 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.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. 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.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 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, despite such protection, contaminating substances do 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.

3.8 GLAZING SCHEDULE

A. Unless noted otherwise in Drawings, provide the following:

1. Interior Glazing:

a. Typical interior windows and doors: Type 2A.

END OF SECTION

SECTION 09 05 61.13

MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Water vapor reduction system on new and existing concrete slabs where necessary to obtain a minimum moisture vapor emissions rate of 75 percent maximum for moisture sensitive flooring schedule to receive floor covering.
2. Water vapor reduction system and cementitious underlayment on new and existing concrete slabs to receive tile carpet, wood, resilient flooring, or moisture sensitive flooring.

1.2 UNIT PRICES

A. Unit Price: Work of this section is affected by unit prices specified in Section 01 22 00:

1. Unit Price No. #: Topical moisture vapor emission and alkalinity control of concrete floor slabs in sheet carpeted areas and areas with resinous flooring products.

1.3 DEFINITIONS

A. MVE: Moisture vapor emission.

B. MVER: Moisture vapor emission rate.

1.4 ACTION SUBMITTALS

A. Product Data: Technical data for each type of product used in moisture vapor emission (MVE) control system.

1.5 INFORMATIONAL SUBMITTALS

A. Product Schedule: Submit schedule for identifying each floor area to receive moisture vapor emission and alkalinity control system. Use same room label and numbering designations indicated on Drawings.

1. Distinguish between those areas required to receive cementitious surfacing over moisture vapor emission and alkalinity control system and those areas where not required.

B. Qualification Data: Submit data for installer.

C. Product Test Reports:

1. Submit test reports performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
2. Preinstallation Moisture Vapor Field Test Reports: For each area receiving resilient floor covering, carpet, or wood flooring, submit test result reports for vapor and moisture testing and alkalinity and adhesion testing for new and existing concrete substrates.

D. Preconstruction Test Reports: Submit test reports for alkalinity, calcium chloride, and relative humidity of concrete slabs for each area receiving floor covering.

E. Warranty: Submit for warranty for vapor emission control coating system and certificate of underwriter’s coverage of manufacturer’s warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Entity having minimum five years documented experience in the manufacturer of MVE control system and who employs factory trained personnel available for consultation and site inspection.

1. The water vapor emission reduction system must be specifically formulated and marketed for water vapor emission reduction and alkalinity control without change of system design for a minimum period of 10 years.

B. Installer Qualifications: Entity having minimum 5 years documented experience in the installation of MVE control systems who is an authorized representative and is trained and approved by manufacturer.

C. Testing Agency Qualifications: Moisture and pH testing shall be performed by an International Concrete Repair Institute (ICRI), Certified Concrete Slab Moisture Testing Technician – Grade 1.

D. Preinstallation Testing Service: At least 28 days after placement of concrete and prior to floor covering installation, engage a qualified independent testing agency to perform the following tests on floor areas to receive moisture vapor emission and alkalinity control system:

1. Calcium chloride testing per ASTM F 1869.
2. Relative humidity testing per ASTM F 2170.
3. Alkalinity testing per ASTM F 710.

E. Preinstallation Conference: Conduct conference at site. Review methods and procedures related to installation including, but not limited to, the following:

1. Review substrate conditions, moisture and pH test results, manufacturer's installation instructions, and warranty requirements.
2. Document proceedings, including required corrective measures.

1.7 COORDINATION

A. Coordinate testing agency to test concrete slabs no sooner than one week or more than 5 weeks prior to scheduled flooring installation.

1. Apply treatment to areas with moisture vapor emission or relative humidity rates which exceed floor covering manufacturer’s written limits, as determined by ASTM F 1869 and ASTM F 2170 testing.

B. Coordinate testing with installation of floor coverings. Ensure flooring installation complies with MVE control system manufacturer’s warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Comply with MVE control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.

1. Store system components in a temperature controlled environment and protected from weather and at ambient temperature of not less than 65 degrees F (18 degrees C) and not more than 85 degrees F (29.4 degrees C) at least 48 hours before use.
2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE control system manufacturer, but not less than 65 degrees F (18 degrees C) or more than 85 degrees F (29.4 degrees C) and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
3. Install MVE control systems where concrete surface temperatures will remain a minimum of 5 degrees F (3 degrees C) higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. MVE Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:

1. MVER: Maximum 25 lb of water/1000 sq. ft. (11.34 kg of water/92.9 sq. m) when tested according to ASTM F 1869.
2. Relative Humidity: Maximum 90 percent when tested according to ASTM F 2170 using in situ probes.

B. Water-Vapor Transmission: Through MVE control system, maximum 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E 96/E 96M.

C. Tensile Bond Strength: For MVE control system, greater than 200 psi (1.38 MPa) with failure in the concrete according to ASTM D 7234.

D. Surface Alkalinity: ASTM 710, pH between 7.0 and 8.5.

2.2 CONTROL SYSTEM

A. Products: Subject to compliance with requirements, provide one of the following:

1. ARDEX Americas; ARDEX MC™ RAPID One-Coat Moisture Control System.
2. Floor Seal Technology, Inc.; MES 100 Remedial Treatment.
3. KOSTER American Corporation; VAP I 2000 UFS.
4. Schönox; HPS North America, Inc.; Schönox EPA RAPID.

B. System Description: Multicomponent or single component, fluid applied penetrants or coatings intended to seal or stabilize internal humidity by restricting excessive moisture and pH (alkalinity), and to mechanically regulate permeability and suppress the volume of moisture reaching concrete surfaces, for compliance with subsequent floor covering manufacturer's written limitations.

1. Determine application methods by site conditions, presence of subslab vapor barriers for slabs on grade, concrete mix design and contaminants, age of concrete substrate, results of ASTM F1869 calcium chloride testing, if required, and finish floor covering manufacturer's recommendations.

C. MVE and Alkalinity Control System: ASTM F 3010 qualified two component, fluid applied penetrants or coatings intended to seal or stabilize internal humidity by restricting excessive moisture and pH (alkalinity), and to mechanically regulate permeability and suppress the volume of moisture reaching concrete surfaces, for compliance with subsequent floor covering manufacturer's written limitations.

1. Physical Properties:

a. Water Vapor Transmission: ASTM E 96; Minimum 94% reduction under laboratory conditions
b. Alkali Resistance: ASTM D 1308; Pass, up to pH of 14
c. Adhesion Strength: ASTM D 4541; 500 psi (100% Concrete Adhesive Failure)
d. Relative Humidity: Resists up to 100% Relative Humidity as measured by ASTM F 2170.

2. Substrate Primer: Provide MVE control system manufacturer's concrete substrate primer if required for system indicated by substrate conditions.
3. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE control system manufacturer's primer to ensure adhesion of products to MVE control system.

D. Accessories:

1. Patching and Leveling Material: Moisture, mildew, and alkali resistant portland cement product recommended in writing by MVE control system manufacturer and with minimum of 3000 psi (20.68-MPa) compressive strength after 28 days when tested according to ASTM C 109/C 109M.
2. Crack Filling Material: Resin based material recommended in writing by MVE control system manufacturer for sealing concrete substrate crack repair.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for maximum moisture content, installation tolerances, and conditions affecting performance of the work.

B. Prepare written report listing conditions detrimental to performance.

C. Proceed with installation after correcting unsatisfactory conditions. Commencement of installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Preinstallation Testing:

1. Testing Agency: Engage a qualified testing agency to perform tests.
2. Surface Alkalinity Testing: Perform pH testing according to ASTM F 710. Install MVE control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F 1869. Install MVE control system in locations where concrete substrate MVER exceeds 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Internal Relative Humidity Test: Using in situ probes, ASTM F 2170. Install MVE control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.

4. Tensile Bond Strength Testing: For typical locations indicated to receive installation of MVE control system, install minimum 100-sq. ft. (9.29-sq. m) area of MVE control system to prepared concrete substrate and test according to ASTM D 7234.

    a. Proceed with installation where tensile bond strength is greater than 200 psi (1.38 MPa) with failure in the concrete.

B. Concrete Substrates: Prepare and clean substrates according to MVE control system manufacturer's written instructions to ensure adhesion of system to concrete.

1. Remove coatings and substances incompatible with MVE control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE control system manufacturer. Do not use solvents.
2. When required by manufacturer, provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
3. After shot blasting, repair damaged and deteriorated concrete according to MVE control system manufacturer's written instructions.
4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
5. Fill surface depressions and irregularities with patching and leveling material.
6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack filling material.
7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE control system manufacturer after surface preparation, but not less than 24 hours.
8. Remove dirt, debris, or existing sealant from cracks and joints. Treat dynamic joints with coating by applying a layer into the joint to completely coat walls of the cavity. After curing, fill joint with backer rod while leaving joint top open for sealant treatment.
9. Prior to installation of MVE control systems, broom sweep and vacuum prepared concrete.

C. Protect walls, floor openings, electrical openings, door frames, and obstructions during installation.

3.3 INSTALLATION

A. Apply MVE and alkalinity control system in accordance with ASTM F 3010 and manufacturer’s written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.

1. Install primers as required to comply with manufacturer's written instructions.

B. Do not apply MVE control system across substrate expansion, isolation, and moving joints.

C. Apply system, including component coats if any, in thickness recommended in writing by MVE control system manufacturer for MVER indicated by preinstallation testing.

D. Cure MVE control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.

E. After curing, examine MVE control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.

F. Retain Paragraph below if required for “moisture intolerant” flooring products.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform installation inspections.

B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE control system is installed without deficiencies.

1. Verify surface preparation meets requirements.
2. Verify component coats and complete MVE control system film thickness comply with manufacturer's written instructions.
3. Verify MVE control system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.

C. MVE control system will be considered defective if it does not pass inspections.

3.5 PROTECTION

A. Protect MVE control system from damage, wear, dirt, dust, and contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE control system manufacturer.

B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or compromise the MVE control system membrane.

END OF SECTION

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SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Interior gypsum board.
5. Tile backing panels.
6. Acoustical accessories at interior partitions.
7. Trim accessories.
8. Joint treatments.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Gypsum board products.
5. Acoustical accessories.
6. Trim accessories.
7. Joint treatment materials.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of gypsum board assemblies; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, supplemental framing, seismic restraints, shear diaphragms, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Indicate locations, fabrication, and installation of control and expansion joints.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For embossed, high-strength steel studs and firestop tracks from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

B. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

    a. Each level of gypsum board finish indicated for use in exposed locations.
    b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

1. Do not install interior gypsum panels and products until installation areas are enclosed and conditioned.

B. Room Temperatures: Maintain minimum 40 degrees F (4 degrees C). For adhesive attachment and finishing of gypsum board, maintain minimum 50 degrees F (10 degrees C) for 48 hours before application and continuously after until dry. Do not exceed 95 degrees F (35 degrees C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

D. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

E. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials identical to those tested in UL design assemblies indicated on Drawings according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.

1. Steel Studs and Tracks:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) CEMCO; California Expanded Metal Products Co.
2) ClarkDietrich.
3) Custom Stud.
4) MarinoWARE.
5) MBA Building Supplies.
6) Phillips Manufacturing Co.

7) SCAFCO Steel Stud Company.
8) Steel Construction Systems.
9) Telling Industries.
10) The Steel Network, Inc.

b. Minimum Base-Steel Thickness: As indicated on Drawings, in correlation with vertical unbraced span and horizontal deflection performance requirements.
c. Depth: As indicated on Drawings
d. Spacing: As indicated on Drawings.

C. Slip-Type Head Joints: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 4 inches (102 mm) minimum vertical movement.

a. Products: Subject to compliance with requirements, provide one of the following:

1) CEMCO; California Expanded Metal Products Co.; Deflex Clips.
2) ClarkDietrich; Fast Top Clip.
3) Fire Trak Corp; PosiKlip.
4) The Steel Network, Inc.; VertiClip SLD Series.

2. Single Long-Leg Track System: ASTM C645 top track with 4 inches (102 mm) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above and allowing 1-1/2 inches (38 mm) minimum vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products: Subject to compliance with requirements, provide one of the following:

1) CEMCO; California Expanded Metal Products Co.; CST Slotted Deflection Track.
2) ClarkDietrich; MaxTrak Slotted Deflection Track.
3) MarinoWARE; Slotted Track.
4) Perfect Wall, Inc.; The System Slotted Deflection Track.
5) SCAFCO Steel Stud Company; SDLT-Slotted Leg Track System.
6) Steel Construction Systems; SDLT-Slotted Leg Track System.
7) Telling Industries; Interior Slotted Track.

D. Firestop Tracks: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:

1. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 2 inches (51 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Products: Subject to compliance with requirements, provide one of the following:

        1) CEMCO; California Expanded Metal Products Co.; FAS Track.
        2) Fire Trak Corp; Fire Trak System attached to studs with Fire Trak RediKlip.
        3) MarinoWARE; FAS Track 1000.
        4) Perfect Wall, Inc.; The System Slotted Deflection Track.
        5) SCAFCO Steel Stud Company; SCAFCO Slotted Leg Track System.
        6) Steel Construction Systems; Steel-Con Slotted Leg Track System.

2. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 4 inches (102 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Products: Subject to compliance with requirements, provide one of the following:

        1) ClarkDietrich; BlazeFrame RipTRAK.
        2) Fire Trak Corp; Fire Trak System attached to studs with Fire Trak PosiKlip.

3. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 6 inches (153 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Product: Subject to compliance with requirements, provide one of the following:

        1) Fire Trak Corp; Fire Trak Shadowline attached to studs with Fire Trak PosiKlip.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Steel Thickness: 0.0359 inch (0.912 mm).

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 1-1/2 inches (38 mm).
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C645.

1. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
2. Depth: 7/8 inch (22.2 mm).

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. ClarkDietrich; RC Deluxe.
b. SCAFCO Steel Stud Company; Kwik RC.
c. Steel Construction Systems; RC 1/Serenity.

2. Configuration: Asymmetrical.

I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 3/4 inch (19 mm).
2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-steel thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 or AC308 as appropriate for the substrate.

a. Material: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.

E. Angle-Type Hangers: Angles with legs not less than 7/8-inch (22-mm) wide with a base steel thickness of 0.0538 inch (1.367 mm) and minimum 5/16-inch- (8-mm-) diameter bolted connections.

F. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 2 inches (51 mm).

G. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Tracks: ASTM C645.

a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
b. Depth: As indicated on Drawings.

3. Embossed, High-Strength Steel Studs and Tracks: ASTM C645.

a. Minimum Base-Steel Thickness: 0.0190 inch (0.483 mm).
b. Depth: As indicated on Drawings.

4. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch (22 mm) deep.

a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).

5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical.

H. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Armstrong Ceiling & Wall Solutions; Drywall Grid Systems.
b. Rockfon (Rockwool International); 640/660 Drywall Ceiling Suspension.

c. USG Corporation; Drywall Suspension System.

2.4 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.5 INTERIOR GYPSUM BOARD

A. Gypsum Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Gypsum.
   b. CertainTeed Gypsum.
   c. Georgia-Pacific Gypsum LLC.
   d. National Gypsum Company.
   e. PABCO Gypsum.
   f. USG Corporation.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.

B. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. CertainTeed Gypsum.
   b. Georgia-Pacific Gypsum LLC.
   c. National Gypsum Company.
   d. PABCO Gypsum.
   e. USG Corporation.

2. Thickness: 1/4 inch (6.4 mm).
3. Long Edges: Tapered.

C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces. Use at ceilings at toilet rooms, locker rooms, kitchens, and other wet and high humidity areas.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. American Gypsum; M-Bloc Type X with Mold & Moisture Resistance.
   b. CertainTeed Gypsum; CertainTeed M2Tech Mold and Moisture Resistant Type X Gypsum Board.
   c. National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board.
   d. PABCO Gypsum; MOLD CURB Plus.

e. USG Corporation; USG Sheetrock Brand Mold Tough Firecode X Panels.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

D. Acoustically Enhanced Gypsum Board: ASTM C1396/C1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core. Use where required to achieve STC levels shown on Drawings.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Gypsum; CertainTeed SilentFX QuickCut Type X Acoustical Gypsum Board.
b. National Gypsum Company; Gold Bond SoundBreak XP Retrofit Board.
c. PABCO Gypsum; QuietRock ES.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.

2.6 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges. For use at wet and dry walls.

1. Products: Subject to compliance with requirements, provide one of the following:

a. FinPan, Inc; Util-A-Crete Concrete Backer Board.
b. National Gypsum Company; PermaBase Cement Board.
c. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.7 ACOUSTICAL ACCESSORIES

A. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corporation; NoiseReducer.
b. Johns Manville; a Berkshire Hathaway company; Formaldehyde-free Unfaced thermal and acoustical batts.
c. Knauf Insulation; EcoBatt Insulation.
d. Owens Corning; EcoTouch Insulation.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

B. Electrical J-Box Putty Pads: Preformed, moldable putty pads formulated to maintain the performance of acoustically rated wall assemblies by sealing penetrations including common electrical outlets boxes, phone outlet boxes, electrical switches, HVAC ducts, and plumbing connections.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ATS Acoustics; ATS Acoustics Putty Pads.
b. The Soundproofing Company Inc.; Acoustical Putty Pads.
c. QuietRock; QuietPutty.

C. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.

1. Products: Subject to compliance with requirements, provide one of the following:

a. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
c. QuietRock; QuietSeal Pro.
d. Specified Technologies, Inc.; SpecSeal Smoke 'N' Sound Sealant.
e. Tremco Incorporated; Tremco Acoustical Sealant.
f. USG Corporation; SHEETROCK Acoustical Sealant.

2. Colors of Exposed Acoustical Joint Sealants: White.

2.8 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047, galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized-steel sheet.

1. Edge Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Curved-Edge Cornerbead: With notched or flexible flanges.

2. Expansion (Control) Joints:

a. Products: Subject to compliance with requirements, provide the following:

1) ClarkDietrich; #93 Zinc Control Joint (ZNCJ).

3. Fire-Rated Expansion (Control) Joints: Composite control joint with intumescent tape factory applied to back of control joint on one side.

    a. Products: Subject to compliance with requirements, provide the following:

        1) ClarkDietrich; FAS-093X Fire Rated Control Joint.

B. Base-of-Wall PVC Moisture Barrier Trim: Extruded PVC, 1/2 inch (12.7 mm) high.

1. Products: Subject to compliance with requirements, provide the following:

    a. Waterguard; Waterguard.

C. Extruded Aluminum Trim Accessories: Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5, of profiles and dimensions indicated.

1. Reveal Molding, 5/8 inch (15.9 mm) deep by 1/2 inch (12.7 mm) wide:

    a. Products: Subject to compliance with requirements, provide the following:

        1) Fry Reglet; DRM-625-50

    b. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

D. Fire-Rated Reveal Backer: 0.0359 inch (0.912 mm) thick, ASTM A653/A653M, hot-dip galvanized, ASTM C645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire-rated partitions.

1. Products: Subject to compliance with requirements, provide the following:

    a. ClarkDietrich; BlazeFrame "FSB" (Flat Strap Backer).

2.9 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Floor Track Seal: Provide the following where indicated:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

C. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

D. Steel Drill Screws For Gypsum Board: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

2.10 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

1) National Gypsum Company; Proform Quick Set 90 Setting Compound.
2) USG Corporation; Sheetrock Durabond 90 Setting-Type Joint Compound.

2. Fill Coat: For second coat, use setting-type, sandable topping compound.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

1) National Gypsum Company; Proform Quick Set 90 Setting Compound.
2) USG Corporation; Sheetrock Durabond 90 Setting-Type Joint Compound.

3. Finish Coat: For third coat, use drying-type, all-purpose compound.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

1) National Gypsum Company; Proform All Purpose Joint Compound, Ready-Mixed.

2) USG Corporation; Sheetrock Brand All Purpose Joint Compound, Ready-Mixed.

4. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

1) National Gypsum Company; Proform Lite Joint Compound, Ready-Mixed.
2) USG Corporation; Sheetrock Brand Lightweight Joint Compound, Ready-Mixed.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.11 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Premixed, vinyl-based, orange peel texture finish for spray application.

1. Basis of Design: BeadEx Brand FasTex Wall and Ceiling Spray Texture by US Gypsum Corporation.
2. Other Acceptable Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Certainteed; SAINT-GOBAIN.
b. ProForm Finishing Products, LLC provided by National Gypsum Company.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and support framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated

to terminate at suspended ceilings. Continue framing around and above ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend both jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space

second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by ASTM C754.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances:

1. Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
2. Where sprinkler heads, diffusers, and speakers are arranged in alignment, variation from exact alignment shall not vary more than 1/2-inch (13-mm) either side of centerline through various element openings.

3.6 INSTALLATION OF ACOUSTICAL ACCESSORIES

A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.

B. Install electrical J-box putty pads at partitions with high STC ratings in accordance with manufacturer's instructions.

C. Install acoustical sealant at non-fire-rated partitions in accordance with manufacturer's instructions.

3.7 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies:

1. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations.
2. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.8 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Typical.
2. Mold-Resistant Type: At framed surfaces where construction will not be fully protected from potential weather exposure at time of installation.
3. Flexible Type: Apply in double layer at curved assemblies.
4. Acoustically Enhanced Type: As indicated on Drawings.
5. High Performance, Acoustically Enhanced Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than 24 inches (600 mm) in alternate courses of panels.

b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.9 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at dry locations indicated to receive tile less than or equal to 1.4 sq. ft. (0.13 sq. m) in area or 5 lbs./sq. ft. (24.4 kg/sq. m) in weight. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at dry and wet locations indicated to receive tile including locations scheduled to receive tile greater than 1.4 sq. ft. (0.13 sq.

m) in area or 5 lbs./sq. ft. (24.4 kg/sq. m) in weight and locations indicated to receive adhered masonry or stone.

C. Where tile backing panels abut other types of panels in same plane, shim framed surfaces to produce a uniform plane across panel surfaces.

3.10 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Maintain fire ratings of assemblies at control joints. Install control joints according to ASTM C840 and as follows:

1. Partitions: Install control joints:

   a. no greater than 30 feet (9 m) on center where a partition runs in an uninterrupted straight plane;
   b. at both corners of openings in wall planes, above and below opening, where width of opening is 6 feet (1.8 m) or greater, or where ratio of width to height of wall area above or below opening exceeds 4:1;
   c. at all spliced joints of vertical studs;
   d. at other locations indicated on Drawings.

2. Ceilings: Install control joints:

   a. no greater than 30 feet (9 m) on center and with total area not to exceed 900 sq. ft. (81 sq. m);
   b. where sections of "A," "L," "O," "U," "T" and "X" shaped ceiling areas or furr-down areas intersect;
   c. at other locations indicated on Drawings.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use where indicated on Drawings.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where edge trim can only be installed after gypsum board is installed.
5. U-Bead: Use at exposed panel edges not intended to receive joint compound.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Maintain fire ratings of assemblies at aluminum trim. Install in locations indicated on Drawings.

3.11 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels:

1. Level 0: No taping, finishing, or accessories required.
2. Level 1:

    a. Joints: Tape set in joint compound.
    b. Interior Angles: Tape set in joint compound.
    c. Surface: Tool marks and ridges acceptable. Surface free of excess joint compound.

3. Level 2: Also known as "Fire Taping"

    a. Joints: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
    b. Interior Angles: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
    c. Accessories: Shall be covered to one separate coat of joint compound.
    d. Fasteners: Shall be covered by one separate coat of joint compound.
    e. Surface: Surface shall be free of excess joint compound. Tool marks and ridges acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.

4. Level 3:

    a. Joints: Taped as in Level 2, then covered with one separate coat of joint compound.
    b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
    c. Accessories: Shall be covered by two separate coats of joint compound.
    d. Fasteners: Shall be covered by two separate coats of joint compound.
    e. Surface: Joint compound shall be smooth and free of tool marks and ridges.

5. Level 4:

    a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.

b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
c. Accessories: Shall be covered by three separate coats of joint compound.
d. Fasteners: Shall be covered by three separate coats of joint compound.
e. Surface: Joint compound shall be smooth and free of tool marks and ridges.

6. Level 5:

a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
c. Accessories: Shall be covered by three separate coats of joint compound.
d. Fasteners: Shall be covered by three separate coats of joint compound.
e. Surface: A thin skin coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

E. Gypsum Board Finish Level Schedule: Finish panels to levels indicated below and according to ASTM C840:

1. Level 0: Temporary construction or where final finishes have not yet been determined. Do not use in areas where fire ratings or smoke control are required.
2. Level 1: Non-fire-rated ceiling plenum areas, concealed areas, service corridors and other areas not normally exposed to view.
3. Level 2: Provide at non-exposed locations in fire-rated walls and ceilings (fire taping, and at panels that are substrates for tile.
4. Level 3: Areas which are to receive heavy or medium, spray or troweled, texture finishes before final painting and areas where heavy grade wall coverings are to be applied as the final finish.
5. Level 4: Typical panel surfaces that will be exposed to view unless otherwise indicated.

a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

6. Level 5: At panel surfaces identified on Drawings and locations flooded with natural or artificial light and scheduled to receive semi-gloss or gloss paint finish.

a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.12 APPLICATION OF TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.13 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 30 00

TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Unglazed porcelain floor or wall tile.
3. Quarry tile.
4. Glazed or unglazed wall tile.
5. Waterproof membrane.
6. Crack isolation membrane.
7. Metal transitions.

1.2 DEFINITIONS

A. High-Performance Tile Grout: A factory-prepared grouting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.

B. Improved Modified Dry-Set Mortar (Thinset): Modified Dry-Set Mortar with a minimum bond strength of 300 pounds per square inch to impervious ceramic tile.

C. Large and Heavy Tile (LHT): Any tile material weighing 5 lbs./sq. ft. or greater, or any tile with a least horizontal dimension of 15 inches or more.

D. Modified Dry-Set Mortar for Large and Heavy Tile (LHT): Formerly "Medium Bed Mortar," is a modified dry-set mortar formulated to have a bond coat thickness between 3/32 and 1/2 inch after tile embedment, and declared as an "LHT" setting material by the manufacturer based on these characteristics.

E. Modified Dry-Set Mortar (Thinset): A factory-prepared setting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for ceramic tiles at shower enclosures.

1. Include plans, elevations, component details, and trim details.
2. Indicate materials and profiles of each item.

3. Show fittings, joinery, penetrations, fasteners, anchorages, plumbing fixtures, and other accessory items.

C. Samples:

1. Each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide samples of each color blend.

1.4 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

A. Factory-Mounted Ceramic Mosaic Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Composition: Impervious natural clay or porcelain.
3. Certification: Tile certified by the Porcelain Tile Certification Agency.
4. Module Size: As indicated by product designations on Drawings.
5. Thickness: 1/4 inch.
6. Face: As indicated by product designations on Drawings.
7. Dynamic Coefficient of Friction: For products on floor surfaces, not less than 0.42.

8. Finish: As indicated by product designations on Drawings.
9. Tile Color and Pattern: As indicated on Drawings.
10. Grout Color: As selected by Architect from manufacturer's full range.

B. Quarry Tile: Unglazed square edged quarry tile.

1. Face Size: As scheduled and shown on Drawings.
2. Thickness: As scheduled and shown on Drawings.
3. Wearing Surface: Abrasive aggregate embedded in surface.
4. Dynamic Coefficient of Friction: Not less than 0.42.
5. Tile Color and Pattern: Selected by Architect.
6. Grout Color: Selected by Architect.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes selected from standard shapes:

    a. Base: As scheduled on the Drawings.

C. Unglazed Porcelain Floor or Wall Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face: As indicated by product designations on Drawings.
4. Face Size Variation: Rectified.
5. Thickness: As indicated by product designations on Drawings, but not less than 3/8 inch.
6. Face: As indicated by product designations on Drawings.
7. Dynamic Coefficient of Friction: For products on floor surfaces, not less than 0.42.
8. Tile Color and Pattern: As indicated on Drawings.
9. Grout Color: As indicated on Drawings.

D. Glazed or Unglazed Wall Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Module Size: As indicated by product designations on Drawings.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch.
5. Face: As indicated by product designations on Drawings.
6. Finish: As indicated by product designations on Drawings.
7. Tile Color and Pattern: As indicated on Drawings.
8. Grout Color: As indicated on Drawings.

2.3 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

1. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement. Provide membrane approved by IAPMO for use in showers and shower pans

    a. Products: Subject to compliance with requirements, provide one of the following:

        1) Custom Building Products; Redgard
        2) Laticrete International, Inc; Laticrete Hydroban 9235 Waterproof Membrane.
        3) MAPEI Corporation; Mapelastic Aqua Defense

2.4 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.

1. Products: Subject to compliance with requirements, provide the following:

    a. Noble Company (The); Nobleseal CIS.

C. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Custom Building Products; Crack Buster Pro-Crack Prevention Mat Underlayment.
    b. Laticrete Blue 92
    c. MAPEI Corporation; Mapeguard 2 or Mapesonic 2.

D. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
    b. Laticrete International, Inc; Laticrete Blue 92 Anti-Fracture Membrane.
    c. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.

2.5 SETTING MATERIALS

A. Veneer Mortar for Stone ST-2:

1. Basis of Design: MVIS Veneer Mortar by Laticrete or equivalent product by one of the following:

    a. Ardex
    b. Custom Building Products
    c. Mapei

B. Modified Dry-Set Mortar (Thinset): ANSI A118.4. For use with standard tile.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ARDEX Americas.
    b. Bostik, Inc.
    c. Custom Building Products.
    d. Laticrete International, Inc.
    e. MAPEI Corporation.
    f. TEC; H.B. Fuller Construction Products Inc.

2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
3. For wall applications, provide nonsagging mortar.

C. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15 for Large and Heavy Tile (LHT): Provide product that is approved by manufacturer for application thickness of 1/2 inch.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. MegaLite; Custom Building Products.
    b. 257 Titanium; Laticrete International, Inc.
    c. UltraLite S2; MAPEI Corporation.

2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
3. For wall applications, provide nonsagging mortar.

2.6 GROUT MATERIALS

A. Pointing Mortar for Stone ST-2:

1. Basis of Design: MVIS Pointing Mortar by Laticrete or equivalent product by one of the following:

    a. Mapei
    b. Ardex

c. Custom Building Products

B. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. FL Grout; ARDEX Americas.
b. Prism Sure-Color Grout; Custom Building Products.
c. PermaColor Select; Laticrete International, Inc.
d. Ultracolor Plus FA; MAPEI Corporation.

2. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
3. Where joints size is 1/8 inch or less, use unsanded grout. Where joints are greater than 1/8 inch, use sanded grout.

C. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. WA Grout; ARDEX Americas.
b. CEG Lite; Custom Building Products.
c. SpectraLOCK ProPremium; Laticrete International, Inc.
d. Kerapoxy; MAPEI Corporation.

2.7 THRESHOLDS

A. Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

B. Marble Thresholds: ASTM C503/C 503M, with a minimum abrasion resistance of 10 according to ASTM C1353 or ASTM C241/C 241M and with honed finish.

1. Description: Uniform, fine to medium grained white stone with gray veining.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Isolation Shapes, Edge, and Trim Strips: Angle or L-shape, height to match tile and setting-bed thickness, designed specifically for application indicated; stainless-steel, ASTM A666, 300 Series exposed-edge material.

1. Products: Subject to compliance with requirements, provide products scheduled in Transition Schedule on Drawings and as follows:

    a. Outside corners: Schluter Rondec
    b. Wainscot cap: Schluter Rondec
    c. Metal nosing: Schluter Trep-E
    d. Locations specified in drawings: Schluter Jolly

C. Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Bonsal American, an Oldcastle company.
    b. Custom Building Products.
    c. Summitville Tiles, Inc.
    d. TEC; H.B. Fuller Construction Products Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as

those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Tile floors in wet areas.
    b. Tile floors consisting of tiles 8 by 8 inches or larger.
    c. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary or indicated to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

G. Joint Widths: Install tile with joint widths recommended by the manufacturer for products indicated.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints where indicated but not greater than 30 feet on center

1. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
2. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
3. Install control and expansion joints in accordance with TCNA Handbook Method No. EJ171.

J. Metal Edge Strips: Install at locations indicated. If not indicated, install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

K. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as floor has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

L. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

M. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

N. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 THINSET INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Floor Installations, Concrete Subfloor: At large and heavy tile provide minimum ½ inch thick mortar bed.

1. Slabs-On-Grade: Unless otherwise indicated, TCNA F113; thinset mortar.

    a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications and for large and heavy tile.
    b. Grout: High-performance grout.

2. Restroom and Servery Floors on Slabs-On-Grade: TCNA F113; thinset mortar.

    a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    b. Grout: Water-cleanable epoxy grout.

3. Elevated Slabs: Unless otherwise indicated, TCNA F125-Full; thinset mortar on crack isolation or waterproofing membrane.

    a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    b. Grout: High-performance grout.

4. Restroom and Servery Area Floors on Elevated Slabs: TCNA F125-Full; thinset mortar on crack isolation membrane.

    a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    b. Grout: Water-cleanable epoxy grout.

B. Stair Installations: Basis of Design products by Custom Building Products. Other acceptable manufacturers include Mapei, Laticrete, and Ardex will be acceptable pending review of proposed products and systems by Architect.

1. Bonding Primer to Adhere System to Stair Tread and Riser Substrates: Basis of Design: MBP Multi-Surface Bonding Primer by Custom Building Products
2. Bond Coat: Epoxy Mortar: Basis of Design: EBM Lite Epoxy Bonding Mortar by Custom Building Products
3. Cement Board: As specified in Section 09 21 16. Thickness: 1/4 inch. Basis of Design: Wonder Board Lite by Custom Building Products
4. Crack Suppression Membrane: Basis of Design: Crack Buster Pro self-adhering membrane by Custom Building Products
5. Improved Modified Dry-Set Mortar: Thickness: Minimum ½ inch. Basis of Design: MegaLite Ultimate Crack Suppression Mortar by Custom Building Products.
6. Tile: As scheduled
7. Grout: Color as scheduled. Basis of Design: Prism by Custom Building Products.

C. Wall Installations:

1. Dry Locations: Unless otherwise indicated, TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.

    a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    b. Grout: High-performance grout.

END OF SECTION

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SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical ceiling panels and suspension system. (ACT-1, ACT-2, ACT-3, ACT-4)
2. Perimeter trim.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data for each ceiling panel and gird component with installation instructions indicating special procedures and perimeter conditions requiring special attention conditions.

B. Shop Drawings: Submit grid layout and related dimensioning, splicing, junctions with adjacent work or ceiling finishes, interrelation of mechanical and electrical items related to system.

C. Samples: Submit 12 inches by 12 inches (300 mm by 300 mm) samples illustrating material and finish of acoustical units; submit 12 inch (300 mm) long sample of each suspension system main runner, cross runner, edge trim, and retention clips.

1. Acoustical Panels: Set of 12 inches by 12 inches (300 mm by 300 mm) Samples of each type, color, pattern, and texture.
2. Exposed Suspension System Members, Moldings, and Trim: Set of 12 inch (300 mm) long Samples of each type, finish, and color.

D. Certificate: Submit manufacturer's certification that suspension system is capable of supporting light fixtures, grilles, and acoustical panels.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.

a. Furnish layouts for cast in place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:

   a. Lighting fixtures.
   b. Diffusers.
   c. Grilles.
   d. Speakers.
   e. Sprinklers.
   f. Access panels.
   g. Perimeter moldings.

7. Show operation of hinged and sliding components covered by or adjacent to

B. Product Test Reports: Submit for each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Grid Manufacturer: Entity having minimum 5 years documented experience who specializes in manufacturing ceiling grids.
2. Acoustical Unit Manufacturer: Entity having minimum 5 years documented experience who specializes in manufacturing acoustical units.
3. Installer: Entity having minimum 5 years documented experience who employs trained and experienced installers.

B. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to site and store in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

B. Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire suppression system components (if any) and partition system (if any).

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full size panels equal to 2 percent of quantity installed.
2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold Down Clips: Equal to 2 percent of quantity installed.
4. Impact Clips: Equal to 2 percent of quantity installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Acoustical Panel Standard: Provide ceiling panels complying with ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

B. Surface Burning Characteristics: Ceiling panels with surface burning characteristics complying with IBC Chapter 8 and ASTM E 1264 for Class A materials determined by testing identical products in accordance with ASTM E 84.

2.2 ACOUSTICAL PANELS

A. Manufacturer: Subject to compliance with requirements, provide ceiling panels and grid systems by one of the following:

1. Acoustic Ceiling Panel:

a. Armstrong World Industries, Inc.
b. CertainTeed Corporation.
c. USG Interiors.

B. Acoustical Panel:

1. Nominal Size: As indicated on Finish Schedule.
2. Composition: Wet formed mineral fiber, ASTM E 1264, Class A.
3. Finish: Factory applied vinyl latex paint.
4. Color: As indicated on Finish Schedule.
5. Noise Reduction Coefficient: Within 0.05 of values indicated on Finish Schedule.
6. Edge: Square.
7. Pattern: Type III, Form 2, C, or E

2.3 METAL SUSPENSION SYSTEM

A. Manufacturer: Subject to compliance with requirements, provide ceiling panels and grid systems by one of the following:

1. Concealed and Exposed Suspension Grid:

a. Armstrong World Industries, Inc.
b. CertainTeed Corporation.
c. Hunter Douglas.
d. USG Interiors.

B. Metal Suspension System Standard: Provide direct hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

C. Standard Exposed Tee Grid: ASTM C 635, nonfire rated.

1. Structural Classification: Intermediate duty system.
2. End Condition of Cross Runners: Override (stepped) or butt edge type.
3. Face Design: Flat, flush.
4. Cap Material: Commercial quality cold rolled steel with galvanized coating.
5. Face Flange Width: 15/16 inch (23.5 mm)
6. Exposed Finish: Baked on enamel, white satin finish
7. Products: Subject to compliance with requirements, provide products of one of the following:

a. Prelude XL by Armstrong World Industries.
b. Classic Stab System by CertainTeed Corp.

c. Donn Suspension System DX by USG Interiors, Inc.

D. Rough Suspension: Galvanized steel carrying channels and hangers, sized and type to suit application and to rigidly secure complete acoustic unit ceiling system, with maximum deflection of L/360.

E. Grid Accessories: Stabilizer bars, furring clips, splices, retention clips, and edge moldings as required to complete and compliment suspended ceiling grid system.

2.4 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1 Direct Hung unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires:

1. Zinc Coated, Carbon Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Stainless Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1 Direct Hung) will be less than yield stress of wire, but not less than 0.106 inch (2.69 mm) diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04 inch (1 mm) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16 inch (8 mm) diameter bolts.

F. Hold Down Clips: Standard hold down.

G. Impact Clips: Impact clip system designed to absorb impact forces against acoustical panels.

H. Acoustical Sealant: Comply with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant.

2.5 METAL EDGE MOLDINGS AND TRIM

A. Roll Formed, Sheet Metal Edge Moldings and Trim: Type and profile necessary for edges and penetrations that comply with design requirements; formed from sheet

metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut for compliance with requirements that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

B. Exposed Grid Suspension System: Suspend ceiling hangers from building's structural members:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches (1220 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Edge Moldings: Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension system runners to be square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Acoustical Panels: Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. Where bullnose concrete block corners occur, provide preformed closers to match edge molding.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), noncumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), noncumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements including but not limited to:

1. Linoleum floor tile.
2. Resilient base.
3. Resilient accessories.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data, installation instructions, and maintenance procedures for each product specified for each type of product.

B. Shop Drawings: Submit for each type of resilient flooring. Include floor covering layouts, edges, columns, doorways, enclosing partitions, built in furniture, cabinets, and cutouts.

1. Show details of special patterns.

C. Samples: Submit full size units of each color and pattern of floor tile required showing full range of variations anticipated.

1. For heat welding bead, not less than 9 inches (230 mm) long, of each color required applied to rigid backing.
2. For resilient accessories, submit samples not less than 12 inches (300 mm) long, of each resilient accessory color and pattern specified.
3. Welded Seam Samples: For seamless installation technique indicated and for each flooring product, color, and pattern required; submit seam running lengthwise and in center of 9 inch by 9 inch (230 mm by 230 mm) Sample applied to a rigid backing and prepared by Installer.

D. Product Schedule: Submit for resilient flooring using same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for Installer.

B. Test Reports: Submit test result reports for:

1. Vapor and moisture testing.

2. Alkalinity and adhesion testing.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit data for each type of resilient flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum 5 years documented experience who employs trained or certified by manufacturer for required installation techniques and are competent in techniques required for resilient flooring and seaming method.

1. Engage an installer who employs workers trained or certified by resilient flooring manufacturer for installation techniques required.

B. Source Limitations:

1. Tile: Obtain floor products of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
2. Sheet Materials: Obtain sheet materials from same production run and of consistent quality in appearance and physical properties for each contiguous area.
3. Setting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive flooring during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).

C. Close spaces to traffic during floor installation.

D. Close spaces to traffic for 48 hours after floor installation.

E. Where demountable partitions, cabinets, and similar items are indicated for installation on top of resilient flooring, install tile before these items are installed.

F. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

G. Install flooring after other finishing operations, including painting, have been completed.

1.8 MAINTENANCE MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sheet Flooring: Minimum 10 linear feet for each 500 linear feet (150 linear m) or fraction thereof, in roll form for each different type, color, and pattern installed.
2. Base: Minimum 10 linear feet for each 500 linear feet (150 linear m) or fraction thereof for each different type and color installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Test Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
2. Smoke Density: Maximum specific optical density of 450 per ASTM E662 or NFPA 258.
3. Flame Spread: Maximum 75 per ASTM E84.
4. Smoke Developed: Maximum 450 per ASTM E84.

B. Accessibility Requirements: Comply with applicable requirements.

1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.2 MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following

1. Linoleum Floor Tile:

    a. Forbo Industries.

2. Rubber Base:

    a. AB; American Biltrite.
    b. Allstate Rubber Corp.
    c. Armstrong World Industries, Inc.
    d. Burke Mercer Flooring Products, Division of Burke Industries Inc.
    e. Flexco.
    f. Johnsonite; A Tarkett Company.
    g. Mondo Rubber International, Inc.
    h. Nora Systems, Inc.
    i. Roppe Corporation, USA.
    j. VPI, LLC, Floor Products Division.

B. Linoleum Floor Tile: ASTM F2195

1. Type: Type I, linoleum floor tile with fibrous backing.
2. Nominal Floor Tile Size: As indicated on Finish Schedule.
3. Thickness: 79 mils (2.0 mm).
4. Colors and Patterns: Selected by Architect based on color indicated on Finish Schedule.

C. Thermoplastic Rubber Base: ASTM F1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style: Style B, cove.
3. Thickness: 0.125 inch (3.2 mm).
4. Height: As indicated on Drawings.
5. Lengths: Coils in manufacturer's standard lengh.
6. Outside Corners: Preformed.
7. Inside Corners: Job formed.
8. Colors: As indicated on Finish Schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.

1. Verify levelness and flatness of concrete floor surface is within tolerances recommended by resilient tile manufacturer.
2. Verify finishes of substrates comply with specified tolerances and requirements and substrates are free of cracks, ridges, depressions, scale, and foreign deposits that interfere with adhesion of floor tile.

B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to flooring manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare horizontal and vertical surfaces according to ASTM F710.

1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and substances incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.

C. Moisture and Alkalinity Tests and Remediation: Test for moisture and alkalinity as specified in Section 09 05 61.13 "Moisture Vapor Emission Control." If test exceed manufacturer's recommendations, treat flooring per Section 09 05 61.13 "Moisture Vapor Emission Control."

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install flooring until materials are the same temperature as the installation space.

1. At least 48 hours in advance of installation, move resilient flooring and installation materials into installation.

F. Immediately before installation, sweep and vacuum clean substrates covered by resilient flooring.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe spaces, door reveals, closets, and similar openings.

B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.

C. Install flooring on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

D. Adhere flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

E. Linoleum Floor Tile: Lay out linoleum floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay floor tiles square with room axis, unless shown otherwise on Drawings.
2. Match floor tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged. Discard broken, cracked, chipped, or deformed floor tiles.
3. Unless shown otherwise on Drawings, lay floor tiles with grain direction alternating in adjacent floor tiles (basket weave pattern).
4. Full Spread Adhesive Method Installation: Install tile flooring with full spread adhesive method from established area center marks, in order for tile at opposite edges of area to be of equal width. Avoid using cut tile widths at perimeter less than four inches of tile width. Install tiles square with room axis. Lay tile material into wet adhesive, as recommended by tile manufacturer.

    a. Adhesive Material Installation: Use trowel recommended by flooring manufacturer for specific type of adhesive. Spread at rate of approximately 150 sq. ft./gal. recommended by flooring manufacturer.

F. Resilient Base: Comply with manufacturer's written instructions for installing resilient base. 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.

1. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
2. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
3. Do not stretch resilient base during installation.

4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
5. Preformed Corners: Install preformed corners before installing straight pieces.
6. Job Formed Corners:

    a. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

        1) Miter or cope corners to minimize open joints.

G. Preformed Cove Base: Comply with manufacturer's written instructions.

1. Dry fit base. Cut and fit material to required lengths, miter cut inside and outside corners.
2. Dry fit and cut metal cove cap prior to base installation.
3. Scribe glue line on walls and floor at edge of base material. Apply adhesive in full spread (100% coverage on two surfaces) for full length of base material. Apply base to wall surface straight and level.
4. Slide cove cap behind base material.
5. Hand roll base material onto wall and floor surface, and remove bumps, ripples, and fishmouths. Remove excess adhesive.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform cleaning operations immediately after completing flooring 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 flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover flooring until Substantial Completion.

E. Linoleum Flooring: After allowing drying room film (yellow film caused by linseed oil oxidation) to disappear, cover linoleum flooring until Substantial Completion.

F. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

1. Before cleaning, strip protective floor polish.
2. Reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations.

END OF SECTION

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SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and field application of paints and coatings at exterior hollow metal doors and frames and exterior surfaces not to receive high-performance or elastomeric coatings.

B. Work not requiring finish, the following items are not required to be finished under this Section.

1. Items with factory applied final finish.
2. Aluminum, brass, bronze, chromium plate, copper, nickel and stainless steel.
3. Brick, tile, plaster, and cast stone.
4. Moving parts of operating units.
5. Code required labels such as UL or equipment identification plates.

1.2 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this Section.

B. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D523 shall comply with following:

1. Flat: Below 5 units at 85 degree test angle.
2. Eggshell/Satin: 10 to 30 units at 60 degree test angle.
3. Semi-Gloss: 30 to 65 units at 60 degree test angle.
4. Gloss: Over 70 units at 20 degree test angle.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's technical information, including label analysis, instruction for handling, storage, surface preparation procedures and application recommendations for each paint system including primers and sealers.

B. Shop Drawings: Submit painting schedule including manufacturer's product name, color, and substrate proposed for painting, and method of application.

C. Samples: Provide stepped samples defining each separate coat, including block fillers and primers - of each color, texture and material to be applied on the following substrates:

1. Painted Wood: Provide two 12 inches square samples of each color and material on hardboard.
2. Ferrous Metal: Provide two 4 inches square samples of flat metal and two 8 inches long samples of solid metal for each color and finish.

D. Quality Control Submittals: Furnish certificates from manufacturer that all products supplied comply with local, state, and federal regulations controlling use of volatile organic compounds (VOC's).

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Applicator: Company specializing in performing work of this section with minimum five years commercial and three projects of similar scope documented experience.
2. Single Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

B. Regulatory Requirements: Comply with Texas Air Control Board (TACB) Regulation V and requirements of governing authorities relative to volatile organic compounds (VOC) content.

C. Field Samples:

1. Prepare 100 sq. ft. field sample panel illustrating each special coating color, texture, sheen, and finish.
2. Locate where directed by Architect.
3. Simulate finished lighting conditions for review of in-place work.
4. Accepted sample may remain as part of Work.
5. Final acceptance of colors will be from job applied samples.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in manufacturer's sealed and labeled containers. Examine to verify acceptability.

B. Container label to include manufacturer's name, type of paint, brand name, lot number and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing and reducing drying time, cleanup requirements, color designation, and application instructions.

C. Store paint materials at minimum ambient temperature between 45 degrees F and 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply exterior coatings during rain or snow, or when relative humidity is outside humidity ranges required by paint product manufacturer.
2. Dew Point: Do not apply exterior coatings unless dew point is at least 5°F above surface (to be coated) temperature, and rising.
3. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior, or as otherwise indicated by manufacturer’s Product Data Sheet.
4. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, or as otherwise indicated by manufacturer’s Product Data Sheet.

1.7 EXTRA MATERIALS

A. Provide two gallons of each color, type, and surface texture to Owner.

B. In addition to manufacturer's label, identify each container with color, type, texture, and room location.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with specified requirements manufacturers that may be incorporated into the Work include, but are not limited to, the following.

1. AkzoNobel: Devoe High Performance Coatings
2. Benjamin Moore and Co. (Moore): Coronado, Corotech, Insl-X, Lenmar, Maxum
3. Kelly-Moore Paint Co., Inc. (KM)
4. Pittsburgh Paints, PPG Industries, PPG Architectural Coatings (PPG): Glidden Professional (GP)
5. The Sherwin-Williams Company. (S-W): Kwal, Frazee, Colorwheel, Parker, General Paint

B. Substitutions: Comply with Section 01 25 00 "Substitution Procedures."

2.2 MATERIALS

A. Coatings:

1. Ready mixed, except field catalyzed coatings.
2. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified, of commercial quality.

C. Patching Materials: Latex filler.

D. Fastener Head Cover Materials: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine the substrates, adjoining constructions, and the conditions under which the work is to be installed. Do not proceed with the work until unsatisfactory conditions detrimental to the work have been corrected.
2. Verify that substrate conditions are ready to receive work as instructed by product manufacturer.
3. Test shop applied primer for compatibility with subsequent cover materials.
4. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below following maximums:

    a. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.

3.2 PREPARATION

A. General:

1. Remove or mask electrical and mechanical, plates, hardware and hardware accessories, light fixture, escutcheons, fittings, and similar items prior to preparing surfaces or finishing. Reinstall removed items by workers skilled in the trades involved.
2. Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
3. Schedule cleaning and surface preparation so that dust and other containments will not fall on wet, newly painted surfaces.
4. Seal with shellac marks which may bleed through surface finishes.
5. Provide barrier coats over incompatible primers or remove and reprime.

B. Surface Preparation:

1. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
2. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

3. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
4. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with suitable solvent or detergent and water. Prime bare steel surfaces with primer compatible with shop coat and scheduled topcoat. Prime metal items including shop primed items.
5. Uncoated Steel and Iron Surfaces: In accordance with SSPC SP-1, solvent clean to remove oil, grease, dirt, and other contaminants that may affect adhesion of primer. Remove mill scale using hand-or power-tool cleaning in accordance with SSPC SP-2, and SSPC SP-3, respectively. Where blast cleaning is deemed appropriate, prepare surface of steel and iron in accordance with SSPC SP-6, Commercial Blast Cleaning. Spot prime paint after repairs, with appropriate compatible primer.
6. Metal Doors: Seal top and bottom edges with primer.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat.

E. Sand wood and metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Observe manufacturer’s published re-coat window times for products being used.

H. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

I. Prime concealed surfaces of exterior woodwork with primer paint.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint shop prefinished items occurring at exposed exterior areas.

B. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, and except where items are prefinished.

3.5 CLEANING

A. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - EXTERIOR SURFACES

A. Ferrous Metal:

1. Finish: Semi-gloss alkyd, anticorrosive primer and two finish coats.
2. Primer:

    a. Moore: Corotech Acrylic Metal Primer, V 110, 1.6-2.0 mils dft/coat.
    b. Devoe Coatings Devguard 4160 Tank & Structural Primer, 2.0 - 2.5 mils dft/coat.
    c. KM: 1710 Kel-Guard Alkyd Rust Inhibitive Primer, 1.5 – 2.0 mils dft/coat.
    d. PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer, 1.5 – 2.0 mils dft/coat.
    e. S-W: Kem Kromik Universal Metal Primer, 3.0 – 4.0 mils dft/coat.

3. Finish Coats:

    a. Moore: Corotech Alkyd Urethane Semi Gloss, V201.,1.5 – 2.5 mils dft/coat.
    b. Devoe 4306 Devguard Rust Preventative Semi-Gloss Enamel, 1.9-2.4 mils dft/coat.
    c. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
    d. PPG Speedhide Int/Ext Urethane Modified Gloss Oil, 2.3 dft/coat.
    e. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.

B. Galvanized and Galvannealed Metal:

1. Finish: Semi-gloss alkyd, primer and two finish coats.
2. Primer:

    a. Moore: Corotech Acrylic Metal Primer V110, 1.6-2.0 mils dft.
    b. Devoe 4160 Devoe Coatings Devguard All Purpose Metal & Galvanized Primer, 1.5 – 2.0 mils dft/coat.
    c. KM: 1712 All Metal Gard White Rust-Inhibitive Primer, 1.5 – 2.0 mils dft.
    d. PPG: 6-209 Speedhide Interior/Exterior Galvanized Steel Primer, 1.5 – 2.0 mils dft/coat.
    e. S-W: Galvite HS Alkyd, 3.0 – 4.5 mils dft/coat.

3. Finish Coats:

    a. Moore: Corotech Alkyd Urethane Semi-Gloss, V201, 2.0-2.2 mils dft/coat.
    b. Devoe 4306 Devguard Rust Preventative Semi-Gloss Enamel , 1.9-2.4 mils dft/coat.
    c. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
    d. PPG: Speedhide Int/Ext Urethane Modified Gloss Oil , 2.3 dft/coat.
    e. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.

END OF SECTION

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SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and application of interior paint coating systems on interior substrates.

B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following shop- and factory-finished components:

a. Architectural woodwork and casework.
b. Metal lockers.
c. Prefinished elevator entrance doors and frames.
d. Elevator equipment.
e. Finished mechanical and electrical equipment.
f. Light fixtures.
g. Distribution cabinets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Furred areas.
b. Ceiling plenums.
c. Pipe spaces.
d. Duct shafts.
e. Elevator shafts.

3. Finished metal surfaces include the following:

a. Door hardware.
b. Aluminum.
c. Brass.
d. Bronze.
e. Chromium plate.
f. Copper.
g. Nickel.
h. Stainless steel.

4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

5. Operating parts including moving parts of operating equipment and the following:

    a. Valve and damper operators.
    b. Linkages.
    c. Sensing devices.
    d. Motor and fan shafts.

1.2 DEFINITIONS

A. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D523 shall comply with following:

1. Gloss Level 1 – Flat: Not more than five units at 60 degrees and 10 units at 85 degrees.
2. Gloss Level 2 – Low Sheen: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
3. Gloss Level 3 – Eggshell: 1 0 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
4. Gloss Level 4 – Satin: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
5. Gloss Level 5 – Semigloss: 35 to 70 units at 60 degrees.
6. Gloss Level 6 – Gloss: 70 to 85 units at 60 degrees.
7. Gloss Level 7 – High Gloss: More than 85 units at 60 degrees.

1.3 COORDINATION

A. Coordination of Work: Review other sections of the specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, for compatibility between prime and finish coats.

1.4 ACTION SUBMITTALS

A. Product Data: Technical data and product information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, surface preparation, and application for each paint and coating system.

1. For field painting of factory primed metal products and fabrications, submit technical data for each type of paint product, surface preparation requirements, and application instructions.
2. Indicate manufacturer's instructions for special surface preparation procedures and substrate conditions requiring special attention.
3. Product List: Provide inclusive list of required coating materials. Indicate each material and cross reference specific coatings, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification. Use same designations indicated in Finish Schedules.

B. Samples: Submit aged (minimum seven day old) paint samples for each type of paint system and each color and gloss of topcoat.

1. Provide stepped draw-down samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

a. Label draw-down samples with the following:

1) Paint manufacturer.
2) Manufacturer's color name, number, and sheen.
3) Paint formula employed to produce designated color and sheen.
4) Date paint was mixed.

2. Provide list of material and application for each coat of each sample. Label each sample as to location and application.
3. Submit samples on substrates for review of color and texture:

a. Concrete: Two 4 inch (50 mm) square samples for each color and finish.
b. Concrete Masonry: Two 4 by 8 inch (100 by 200 mm) samples of masonry, with mortar joint in the center, for each finish and color.
c. Ferrous and Nonferrous Metals: Two 4 inch (100 mm) square samples of flat metal and two 8 inch (200 mm) long samples of solid metal for each color and finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For applicator.

B. Quality Control Submittals: Furnish certificates from manufacturer that products supplied comply with VOC content limits and emission in accordance with local, state, and federal regulations and sustainability limit requirements.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals including but not limited to lead and mercury. Do not use solvents in paint products that contribute to air pollution.

B. Applicator Qualifications: Entity having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.

C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Single Source Responsibility: Provide block fillers, primers and other undercoat paint produced by same manufacturer as finish coats.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing and reducing drying time, cleanup requirements, color designation, and application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Do not thin or add water to waterbased paints, including waterbased alkyds.

B. Weather Conditions:

1. Apply paints when temperature of surfaces to be painted and ambient air temperatures are between 50 degrees F and 95 degrees F (10 degrees C and 35 degrees C).
2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
3. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (35 degrees C) for exterior, unless otherwise indicated by manufacturer’s Product Data Sheet.

C. Apply solvent thinned paints when temperatures of surfaces to receive paint and surrounding air are between 45 degrees F. and 95 degrees F (7 degrees F and 35 degrees C).

1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.

D. Painting may continue during inclement weather if surfaces and areas to receive paint and coatings are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

E. Provide lighting level of 80 foot-candles (860 lx) measured mid-height at substrate surface.

1.9 SURPLUS MATERIALS

A. Inquire and coordinate with Owner regarding disposition of excess and leftover paint materials. If Owner wishes to retain excess materials for maintenance and touch-up purposes, deliver excess materials to designated storage area as directed by Owner.

1. Any materials not retained by Owner shall become the property of the Contractor and shall be removed from the site.

PART 2 - PRODUCTS

A. Acceptable Manufacturers: Provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential-grade products are not permitted.

1. Benjamin Moore & Co. (BM).
2. The Pittsburgh Paints Company / PPG Paints (PPC).
3. The Sherwin-Williams Company (S-W).

2.2 PERFORMANCE REQUIREMENTS

A. Performance and Durability:

1. ASTM D16 Standard Test Method for Load Testing Refractory Shapes at High Temperatures.
2. ASTM D2486 Standard Test Method for Scrub Resistance of Interior Wall Paint.
3. ASTM D2805 Standard Test Method for Hiding Power of Paints by Reflectometry.
4. ASTM D4828 Standard Test Method for Practical Washability of Organic Coatings.

B. Chemical Components of Field Applied Interior Paints and Coatings: Provide topcoat paints and anticorrosive and antirust paints applied to ferrous metals that comply with

chemical restrictions; these requirements do not apply to paints and coatings applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.

2.3 MATERIALS

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Accessories: Linseed oil, shellac, turpentine, paint thinners, and similar materials not specifically indicated but necessary to achieve the finishes specified for commercial quality.

C. Patching Materials: Latex filler compatible with paint systems.

D. Fastener Head Cover Materials: Latex filler.

E. Colors: As indicated in Finish Schedule on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

   a. Concrete: 12 percent.
   b. Masonry (Clay and CMUs): 12 percent.
   c. Portland Cement Plaster: 12 percent.
   d. Gypsum Board: 12 percent.

2. Test cementitious substrates and plaster cement/stucco for alkalinity (pH).

C. Gypsum Board Substrates: Verify joints are properly taped and finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint or coating system consisting of primer and two top coats at a minimum.

a. When previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint or coating system. Failure of new paint system is not permitted.

2. Shop Primed Metals: Inspect shop primed metals to determine if primer is in condition to receive and is compatible with topcoats.

E. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator’s acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Coordination of Work:

1. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.
2. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
3. Repair defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
4. Seal marks which may bleed through surface finishes.
5. Touch up shop primer or previously painted surfaces prior to application of topcoats.

C. Surface Cleaning and Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition.

D. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting

1. Before applying paint or surface treatments, clean substrates of substances that impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces.
2. Remove hardware, covers, plates, and similar items in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.

    a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection.

3. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
4. Seal marks which may bleed through surface finishes with shellac.
5. Provide barrier coats over incompatible primers or remove and reprime.
6. Correct defects and clean surfaces which affect the Work.
7. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

E. Cementitious Substrates: Remove release agents, curing compounds, efflorescence, chalk, dust, dirt, grease, oils, release agents, mold, mildew, and existing paint. Roughen as necessary to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

1. Use abrasive blast cleaning methods if recommended by paint manufacturer.
2. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions.

    a. Determine alkalinity and moisture content of surfaces by performing appropriate pH testing. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct condition prior to application of paint.
    b. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
    c. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation after substrates have obtained percent relative humidity level recommended by paint manufacturer.
    d. Perform additional moisture tests when recommended by manufacturer. Proceed with installation when moisture content complies with that permitted in manufacturer's written instructions.
    e. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to thoroughly dry.

3. Clean concrete floors to receive paint or coating with a 5 percent solution of muriatic acid or etching cleaner. Flush floors with clean water to remove acid; neutralize with ammonia, rinse, allow to dry; vacuum before painting.

F. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

G. Ferrous Metals: Remove rust, loose mill scale, and shop primer. Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.

1. SSPC-SP 11.

H. Shop Primed Ferrous Metal Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop primed surfaces.

1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
2. Touch up bare areas and damaged shop applied prime coats. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

I. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces with nonpetroleum based solvents leaving surface free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

J. Aluminum Substrates: Remove surface oxidation with acid etch and solvent washing. Remove oil, grease, surface oxidation, and contaminants in accordance with SSPC SP-1 Solvent Cleaning. Apply etching primer immediately following cleaning.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

L. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

M. Mildew and Mold Removal: Remove mildew and mold by high power washing (pressure range of 1500 to 4000 psi) with solution of trisodium phosphate and bleach. If substrate is too soft for high power washing, scrub substrate with solution. Rinse with clean water and allow surface to dry.

N. Protective Coverings: Provide protections for duration of the Work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.

O. Renovated Surfaces: Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer

and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system.

1. Remove surface film preventing proper adhesion and bond.
2. Wash glossy paint with a solution of salt soda and rinse thoroughly.
3. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
4. Clean corroded iron and steel surfaces.
5. Repair and blend into portland cement plaster.
6. Prime bare surfaces.
7. Tone varnished surfaces with stain bringing to uniform color.
8. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.

P. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

Q. Pipe Covering and Insulation: Remove loose, foreign, and objectionable material before applying sealing coat.

R. Preparation of Substrates for Wallcovering: Prime and seal substrate with release coat in accordance with wallcovering manufacturer's recommendations for substrate.

1. Assure compatibility with product of wall covering manufacturer.
2. Fill indentations in substrate and prime with opaque white primer before applying release coat.
3. Apply release coat in accordance with manufacturer's recommendations.

S. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.

T. Paint and Coating Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Do not use thinners for water based paints.
4. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat. Provide sufficient differences in shade of undercoats to distinguish each separate coat.

U. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.

V. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

W. Wood and Metal Doors: Seal top and bottom edges with primer.

3.3 APPLICATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
2. Provide finish coats compatible with primers.
3. Use applicators and techniques suited for paint and substrate indicated.
4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces.

    a. Field painting of exposed surfaces include bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
    b. Areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place.
    c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
    d. Finish doors on tops, bottoms, and side edges the same as exterior faces.

6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
8. rating, or nomenclature plates.
9. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.
10. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
11. Paint entire exposed surface of window frames and sashes.
12. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
13. Sand lightly between each succeeding enamel or varnish coat.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Minimum Coating Thickness: Apply paint materials to dry film thickness indicated in pain schedule but no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

1. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.

F. Application: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
2. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.
3. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

1. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
2. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
3. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
4. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.

5. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
6. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.
7. Paint the following work where exposed to view:

    a. Equipment, including panelboards and switch gear.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping.
    d. Pipe hangers and supports.
    e. Metal conduit.
    f. Plastic conduit.
    g. Tanks that do not have factory applied final finishes.
    h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or paintable jacket material.

8. Paint the following work where exposed in occupied spaces:

    a. Equipment, including panelboards.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping.
    d. Pipe hangers and supports.
    e. Metal conduit.
    f. Plastic conduit.
    g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    h. Other items as directed by Architect.

9. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

H. Items not to Receive Paint: Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

I. Electrostatic Spray Painting: Apply coating electrostatically to finished surfaces, free from runs, sags, visible overlaps, holidays, craters, pinholes and other defects detrimental to protective and decorative qualities of coating.

1. Thickness of Coatings: 1.5 to 2.0 mils dry film thickness. Measure dry film thickness with magnetic gauge.
2. Use application techniques, equipment, materials, and preparation procedures recommended by manufacturer.

J. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.

K. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction

spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.

L. Finish Coats: Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through.

1. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.
2. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.

M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

N. Touch Up: Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated.

1. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
2. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
3. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
4. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 WASTE MANAGEMENT

A. Paint products are considered hazardous materials. Do not empty or allow excess paint to enter storm drainage systems. Comply with manufacturer's written instructions for disposal of leftover paint and paint buckets.

B. Waste Disposal: Legally dispose of metal, plastic, and product waste, including accessories and used items, by recycling or reusing waste materials.

C. Clean and recycle plastic paint containers. Do not dispose of paint containers in landfills.

D. Do not dispose of unused paints, stains, and coatings by pouring into storm drainage or sewer systems.

E. Do not allow run off water resulting from washing paint containers and applicators to seep into the ground or run into the storm drainage or sewer systems.

1. Prior to disposing, allow unused paint to dry in can before legally disposing.

F. Legally dispose of unused paint, stain, and coatings and the containers in accordance with manufacturer’s recommendations and environmental regulations.

3.6 CLEANING AND PROTECTION

A. Clean Up: At end of each day, remove rubbish, empty cans, rags, and other discarded materials from site. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

B. Protections: Protect Work of other trades against damage from paint application. Correct damage to Work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

D. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.

E. Provide Wet Paint signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related Work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT AND COATING SCHEDULE

A. Ceiling Gypsum Board:

1. Finish: Lusterless (flat) latex; primer and two finish coats.
2. Primer: No Substitutions.

    a. BM: Ultra Spec 500 Waterborne Interior Primer Sealer N534, (0 g/L VOC), 1.8 mils dry minimum.
    b. PPC: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dry minimum.
    c. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W12600 (0 G/L VOC), 1.0 mils dry minimum.

3. Finish Coats:

    a. BM: Waterborne Ceiling Paint, Flat, 0 VOC, 508, 1.4 mils dry per coat
    b. PPC: 6-4110XI Speedhide zero Interior Flat Latex (0 g/L VOC), 1.8 mils dry per coat minimum.
    c. S-W: ProMar 200 Zero VOC Interior Flat Paint B30 Series (0 G/L VOC), 1.4 mils dry per coat minimum.

B. Gypsum Board:

1. Finish: Satin latex enamel; primer and two finish coats.
2. Primer: No Substitutions.

    a. BM: Eco Spec WB Interior Latex Primer N372/F372 (<51 g/L VOC)
    b. PPC: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dry minimum.
    c. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W2600 (0 G/L VOC), 1.0 mils dry minimum.

3. Finish Coats:

    a. BM: Premium Interior Latex Eggshell W626/K626 (<51 g/L VOC)
    b. PPC: 6-411 Series Speedhide Interior Enamel Eggshell Latex (73 g/L VOC), 1.5 – 1.7 mils dry per coat.
    c. S-W: ProMar 200 Zero VOC Interior Eg-shel Paint B20 Series (0 G/L VOC), 1.7 mils dry per coat minimum.

C. Ferrous Metal - Doors, Frames:

1. Finish: Semi-gloss, waterborne light industrial coating; primer and two finish coats.
2. Primer:

    a. PPC: Pitt-Tech Plus, Int/Ext DTM Industrial Primer 90-912 (<90 g/L VOC) 2.0 – 4.0 mils dry.
    b. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B661300 Series (<100 g/L VOC) 2.0 – 3.8 mils dry.

3. Finish Coats:

    a. PPC: Pitt-Glaze WB1, Pitt-Glaze WBI Int. Semi-Goss Acrylic Epoxy 16-510 (<100 g/L VOC) 1.5 mils dry per coat minimum.
    b. S-W: Pro Industrial, Pre-Catalyzed Waterbased Epoxy Semi-Gloss K46 Series (<143 g/L VOC) 1.4 mils dry per coat minimum.

D. Ferrous Metal - Galvanized:

1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
2. Primer:

    a. BM: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dry minimum.
    b. PPC: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dry.
    c. S-W: Pro Industrial Pro-Cryl Univeral Acrylic Primer B661300 Series (<100 g/L VOC), 2.0 – 3.8 mils dry.

3. Finish Coats:

    a. BM: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (<150 g/L VOC), 1.2 mils dry per coat minimum.
    b. PPC: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dry per coat.
    c. S-W: S-W: Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.2 to 4.3 mils (0.064 to 0.102 mm) dry, per coat.

E. Ferrous Metal – Not listed above:

1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
2. Primer:

   a. BM: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dry minimum.
   b. PPC: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dry.
   c. S-W: Pro Industrial Pro-Cryl Univeral Acrylic Primer B661300 Series (<100 g/L VOC), 2.0 – 3.8 mils dry.

3. Finish Coats:

   a. BM: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (< 150 g/L), 1.2 mils dry per coat minimum.
   b. PPC: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dry per coat.
   c. S-W: Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.2 to 4.3 mils (0.064 to 0.102 mm) dry, per coat.

F. Exposed Deck Applications: Do not include walls.

1. Dry-Fall, Flat:

   a. PPC: Speedhide Super Tech WB Interior Dry-Fog Flat Latex 6-723XI, 6-725XI, 2.4 mils DRY.
   b. S-W: Pro Industrial Waterborne Acrylic Dryfall Flat, B42-2181 Series, at 6.0 mils (0.152 mm) wet, 1.9 mils (0.038 mm) dry.

G. CMU and Concrete Surfaces, Semigloss Finish:

1. Sherwin-Williams products:

   a. Primer: Loxon Concrete and Masonry Primer/Sealer LX2W50.
   b. Block Filler: Pro Industrial Heavy Duty Block Filler, B42W150.
   c. First Coat: Pro Industrial Acrylic Semi-Gloss, B66-650 Series.
   d. Second Coat: Pro Industrial Acrylic Semi-Gloss, B66-650 Series.

2. The Pittsburgh Paints Company (PPC) products:

   a. Primer: Perma-Crete Interior/Exterior Alkali Resistant Primer 4-603XI.
   b. Block Filler: Speedhide Super Tech Interior Dry-Fog Eggshell 6-151XI.
   c. First Coat: Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610 Series.
   d. Second Coat: Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610 Series.

END OF SECTION

SECTION 10 14 16

PLAQUES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Exterior room signs.

1.2 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.3 ACTION SUBMITTALS

A. Product Data: Technical data for each type of product including installation methods.

B. Shop Drawings: Submit fabrication and installation details and attachments to other work.

1. Show plaque mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
2. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each plaque at least half size.

C. Product Schedule: Submit schedule using same designations indicated on Drawings or specified.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit data for plaques to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum five years documented experience that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver signs to site in manufacturer's unopened packaging.

B. Leave protective covering on sign until completion of installation.

1.8 WARRANTY

A. Written warranty signed by manufacturer in which manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: Comply with applicable requirements.

1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.
3. Texas Accessibility Standards (TAS) 2012.

2.2 EXTERIOR ROOM SIGNS

A. Cast Room Sign: Cast metal plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. A.R.K. Ramos.
b. ACE Sign Systems, Inc.
c. Erie Landmark Company; a division of Paul W. Zimmerman Foundries.
d. Gemini Incorporated.
e. Matthews International Corporation; Bronze Division.
f. Metal Arts.
g. Metallic Arts.
h. Signs & Decal Corp.

i. Southwell Company (The).

2. Plaque Material: Cast bronze.
3. Plaque Thickness: 0.25 inch (6.35 mm).
4. Finishes:

   a. Integral Metal Finish: Mill finish raised surface with dark oxidized background.
   b. Overcoat: Baked on clear coating.

5. Background Texture: Leatherette.
6. Integrally Cast Border Style: Square single line, polished.
7. Mounting: Adhesive.
8. Text and Typeface: Accessible raised characters and Braille. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 MATERIALS

A. Bronze Castings: ASTM B584, lead-free alloy recommended by manufacturer and finisher for finish indicated.

2.4 ACCESSORIES

A. Adhesive: Recommended by plaque manufacturer.

B. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D1187/D1187M.

2.5 FABRICATION

A. Provide plaques according to requirements indicated.

1. Preassemble plaques in the shop to greatest extent possible. Disassemble plaques only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.

6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and casting marks before finishing.

2.6 FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that plaque support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 INSTALLATION

A. Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
2. Install plaques so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Plaques Used for Room Identification: Install in locations on walls as indicated on Drawings and according to accessibility standard.

C. Mounting Methods:

1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of plaque and of suitable quantity to support weight of plaque after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as plaque is applied and to prevent visibility of cured adhesive at plaque edges. Place plaque in position and push to engage adhesive. Temporarily support plaque in position until adhesive fully sets.
2. Shim Plate Mounting: Provide 1/8 inch (3 mm) thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other direct mounting methods are impractical. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach plaques to plate using specified method.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as plaques are installed.

C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

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SECTION 11 68 43

EXTERIOR SCOREBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Exterior scoreboards and controllers and game clock

1.2 RELATED SECTIONS

A. Division 26: Attachment of lights, wiring junction boxes, conduit, service, and final connections.

1.3 ACTION SUBMITTALS

A. Product Data: Submit specifications and installation instructions for each item.

B. Shop Drawings: Show installation details including support from structure, wiring, and connections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's packaging with installation, adjustment, and operating instructions.

B. Handle and store to avoid damage.

1.5 WARRANTIES

A. Provide manufacturer's limited lifetime warranty on backstops, scoreboards, and equipment from date of acceptance of completed installation.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Basis of Design, Football Scoreboard: Model FB-2018 by Daktronics with DAK Score and MX-1 Control Console for use with Owner-supplied mobile device or tablet using

Bluetooth wireless communications over 2.4 GHz wireless or wired connections; ETL listed to UL 48 and CE labeled.

1. Football scoreboard constructed from aluminum alloy 5052 for exterior use with LED displays.
2. Messages include two-digits scores each for Home/Team Name and for Guest, two-digit displays for "To Go" and for "Ball On", single digit displays for "Down", "QTR" (quarter), and T.O.L (time-outs left for each team), and four-digit display for countdown-type game clock. When time remaining is less than one minute, game clock displays time to 1/10 of a second
3. LED Digit Heights:

    a. Clock and Score: 36 inches
    b. T.O.L.: 18 inches
    c. Other digits: 24 inches

4. Vinyl Lettering on Aluminum Board Caption Heights:

    a. Home/Team Name and Guest: 15 inches
    b. T.O.L.: 12 inches
    c. Other digits: 14 inches

5. Colors, Striping, Accents, Digits, and Graphics: As directed by Architect including at scoreboard background and at LED digital readout.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify locations of scoreboards with Architect.

B. Provide controllers to Owner for secure storage.

3.2 INSTALLATION

A. Securely fasten equipment to structure plumb and level in accordance with manufacturer's instructions.

END OF SECTION

SECTION 12 11 13

PHOTO MURALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Digitally printed vinyl wall mural.

1.2 SUBMITTALS

A. Product Data: Technical data for each type of product including data for physical characteristics, durability, fade resistance, and fire test response characteristics.

B. Shop Drawings: Show location and extent of each mural indicating seam matching and termination points.

C. Samples: Submit 24 inch by 24 inch (610 mm by 5 610 mm) sample of each mural. Mark top and face or mural.

1.3 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at site.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install murals until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

1. Maintain constant temperature of minimum 60 degrees F (16 degrees C) in installation areas for a minimum of 10 days before and 10 days after installation.

B. Lighting: Do not install mural until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Test Response Characteristics: Determined by testing identical vinyl mural applied with identical adhesives to substrates according to test method indicated by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame Spread Index: 25 or less.
b. Smoke Developed Index: 450 or less.

2. Fire Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 MATERIALS

A. Digitally Printed Vinyl Mural:

1. Basis-of-Design: 3M Commercial Graphics; Textured Surfaces.
2. Material: ASTM F 793 for peelable or strippable wall coverings

a. Category: IV, Type I, Commercial Serviceability.
b. Surface:

1) Border: Satin finish.
2) Field: Leatherette texture with sprayed acrylic lacquer protective coat.

3. Mounting: Adhesive.
4. Width and Height: Indicated on Drawings.
5. Adhesive: Mildew resistant, nonstaining, strippable adhesive, for use with specific mural fabric and substrate application indicated and recommended in writing by mural manufacturer.
6. Primer/Sealer: If applicable, mildew resistant, complying with requirements and recommended in writing by primer/sealer and mural manufacturers for intended substrate.
7. Substrate Filler: Type recommended by adhesive and mural manufacturer; compatible with substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for levelness, wall plumbness, maximum moisture content, and conditions affecting performance of the work.

B. Test substrate with electronic moisture meter to verify surfaces do not exceed moisture content permitted by wallcovering manufacturer.

1. Gypsum Wallboard: 12 percent.
2. Masonry and Concrete Unit Masonry: 12 percent.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch (3 mm) in 10 feet (3 m) nor vary at rate greater than 1/16 in./ft (1.6 mm).

D. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that impair mural bond, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new concrete and concrete masonry units when tested with an electronic moisture meter.
2. Gypsum Board: Prime with primer recommended in writing by primer/sealer manufacturer and mural manufacturer.
3. Painted Surfaces: Treat areas susceptible to pigment bleeding.

D. Test painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

F. Acclimatize mural by removing from packaging in installation areas not less than 24 hours before installation.

3.3 INSTALLATION

A. Comply with mural manufacturers' written installation instructions applicable to products and applications indicated.

1. Install mural prior to installation of wall base, cabinets, hardware, or items attached to or spaced slightly from wall surface. Do not install mural more than 1/4 inch (6 mm) below top of resilient base.

B. Install mural in ordered sections to create a continuous image.

C. Install mural without lifted or curling edges and without visible shrinkage.

D. Install invisible seams vertical and plumb. Horizontal seams are not permitted.

E. Razor trim edges and seams for color uniformity, pattern/print match, and tight closure. Butt seams without overlaps or gaps between strips. Do not razor cut mural applied to gypsum board substrates.

F. Fully bond mural to substrate. Remove air bubbles, wrinkles, blisters, and defects to endure full bond to substrate.

G. Remove excess wet adhesive from seam before proceeding to panel. Wipe clean with dry cloth.

3.4 CLEANING

A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by mural manufacturer.

C. Replace panels that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

SECTION 13 34 16.13

GRANDSTANDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Permanent steel and aluminum grandstand seating.

1.2 DESIGN REQUIREMENTS

A. Loads: Comply with ICC 300, latest edition.

B. Guardrail: Stiffness, height and spacing of intermediate rails in accordance with code requirements.

C. Handicapped Requirements: Design and construct grandstands, stairs, ramps and wheelchair spaces to comply with building and handicap codes.

D. Capacity: Refer to drawings for seating layout and capacity.

1.3 SUBMITTALS

A. Shop Drawings: Indicate construction details, sizes of metal sections, thicknesses of metals, profiles, attachments, dimensions and field joints, method of structural support, built-in items; indicate welded connections, net weld length, and AWS welding symbols.

1. Delegated Design: Submit with engineered shop drawings showing compliance with specified requirements. Submittals shall bear seal of Registered Professional Engineer licensed to practice in State of Texas.

B. Samples: Submit one 18-inch seat in selected finish.

C. Test Reports: Submit mill test reports for structural steel.

D. Certificate: Submit welder's qualifications certified by qualified testing laboratory; certify installed grandstand seating will safely support design loads.

1.4 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications: Company specializing in manufacturing and installation of grandstands with minimum five years documented experience.

B. Welder Qualifications: AWS D1.1.

C. Warrantee: Provide Manufacturer/Installer warrantee against material and installation defects for two years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards: Conform to ICC 300.

B. Design Loads:

1. Live Loads:

   a. Uniform Loading, Structure: 100 PSF
   b. Uniform Loading, Seating: 120 PSF

2. Sway Loads:

   a. Perpendicular to seats: 10 PSF
   b. Parallel to Seats: 24 PSF

3. Handrail and Guardrail: 200 lbs. concentrated in any direction.
4. Wind Loads: See Structural
5. Snow Loads: See Structural

C. Accessibility Requirements: Comply with applicable requirements.

1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.
3. Texas Accessibility Standards (TAS) 2012.

2.2 GRANDSTANDS

A. Basis-of Design: Subject to requirements, provide Sturdisteel; Angle Frame Bleachers or comparable product by one of the following:

1. Southern Bleacher Company.
2. Steel Stadiums, Ltd.
3. Sturdisteel, Division of Schultz Industries Inc.

2.3 MATERIALS

A. Aluminum Extrusions: ASTM B221.

B. Aluminum Sheets: ASTM B209.

C. Steel Sections, Plates and Bars: ASTM A36.

D. Bent or Cold-Formed Steel Plates: ASTM A283, Grade C.

E. Cold-Finished Steel Bars: ASTM A108.

F. Hot-Rolled Carbon Steel Sheets and Strips: ASTM A570.

G. Cold-Rolled Carbon Steel Sheets: ASTM A366.

H. Galvanized Carbon Steel Sheets: ASTM A446, Grade A, with ASTM A525, G90 zinc coating.

I. Guardrails: Galvanized pipe or anodized aluminum sections with end plugs at ends of straight runs at sides of grandstand, entry stairs, ramps, portals, and landings.

J. Fencing: 9 gage galvanized chain link fencing, 2-inch by 2-inch mesh, secured with galvanized fittings and aluminum ties.

K. Bolts, Nuts and Washers: High-strength type, ASTM A325.

L. Welding Materials: AWS D1.1, type required for materials being welded.

M. Galvanizing: ASTM A123.

N. Expansion Anchors: FS FF-S-325, Group II, Type 4, Class 1; carbon steel, zinc plated.

O. Primer: SSPC SP-20 zinc-rich primer

P. Grandstand Deck: Closed deck.

Q. Stadium Seating:

1. Brackets: ASTM-A36 steel hot dipped galvanized or extruded aluminum alloy 6061-T6.
2. Riser Mounted: "L" brackets.
3. Planks: 32 feet long; clear anodized.
4. Tread planks, Riser Planks: Extruded aluminum alloy 6063-T6 mill finish.
5. Seat Planks, Backrests, Stanchions and Covers: Extruded aluminum alloy 6063-T6, clear anodized 204R1, Class II. Attach with 3/16-inch pop rivets.
6. Joint Sleeve Assembly: Extruded Aluminum alloy 6063-T6, mill finish.
7. Rows: Refer to drawings.
8. Length of Units: As shown or, if not shown, per Manufacturer.
9. Hold-Down Clip Assembly: Attach plank to bracket; 4-way adjust 5/16-inch by 1-1/4 carriage bolt, 5/16-inch kep nut.

2.4 CONCRETE MIX

A. 3000 psi minimum at 28 days in accordance with ASTM C94 and Work of Division 03.

2.5 FABRICATION

A. Rise and Depth Dimensions: Refer to details on Drawings.

B. Decking: 8-inch rise by 24-inch depth.

C. Seats: 1-inch by 10-inch aluminum alloy 6061-T6; wall thickness .078; mill finish.

D. Seat Support Bracket: 6-inch aluminum Z-bracket, mill finish.

E. Treads: Two 2-inch by 13-inch.

F. Risers: 1-inch by 8-inch aluminum alloy 6061-T6, mill finish.

G. Space horizontal beam design with vertical columns spaced in accordance with manufacturer's design to meet specified load conditions. Fabricate wide flange horizontal beams.

H. Traverse bays shall be free of cross bracing for total length of grandstand.

I. Stringers shall be wide flange, with angle rise and depth fabrication and spaced in accordance with manufacturer's design to meet specified load conditions.

2.6 FINISHES

A. Structural Steel: ASTM A36, hot dipped galvanized after fabrication in accordance with ASTM A123.

B. Extruded Aluminum:

1. Seat Planks, Stanchions: Aluminum alloy 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II.
2. Tread Planks and Riser Planks: Extruded aluminum alloy, 6063-T6 mill finish.
3. Joint Sleeve Assembly: Extruded aluminum alloy 6063-T6, mill finish.
4. Channel End Caps: Aluminum alloy, 6063-T6, clear anodized, 204R1, AA-M10C22A31, Class II.
5. Cast End Caps: Aluminum 319 alloy, cast finish.

C. Hold Down Clip Assemblies: Aluminum alloy 6063-T6.

D. Bolts and Nuts: Hot dipped galvanized or zinc plated.

E. Structural Hardware: Hot dipped galvanized, ASTM A307.

PART 3 - EXECUTION

3.1 ERECTION

A. Size foundation footings and space for sufficient bearing surface to support loads of grandstand structure and design live loads.

B. Erect grandstand square, level, plumb, and free from distortion or defects detrimental to appearance and performance in accordance with manufacturer's instructions.

C. Secure guardrail at angle rail risers with galvanized fasteners. Extend railing 42-inch above walkways, entrances, and center of any adjacent seat.

D. Install fencing on back and sides of grandstand.

END OF SECTION

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SECTION 13 34 16.16

PREMANUFACTURED COACHES BOX

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Premanufactured building including floor, wall, and roof framing; decking; siding, roofing; and insulation.

1.2 SUBMITTALS

A. Product Data: Furnish data on profiles, component dimensions, and fasteners; furnish manufacturer's installation and maintenance instructions.

B. Shop Drawings: Indicate assembly dimensions, location of structural members, connections, attachments, openings, and loads; indicate wall and roof system dimensions, panel layout, general construction details, anchorages, and method of anchorage; indicate welded connections with AWS welding symbols and net weld lengths.

C. Delegated Design Submittal: Submit data for coaches box and support structure, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples: Submit samples of vinyl composition tile, paneling, and plastic laminate for selection.

1.3 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications: Company specializing in manufacturing and installation of coaches box with minimum five years documented experience.

B. Welder Qualifications: AWS D1.1.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Texas and experienced in stage curtain systems, to design stage curtain systems, including comprehensive engineering analysis and attachments to building structure, using performance requirements.

B. Structural loads as indicated in Drawings and as follows:

1. Occupancy Category: III.
2. Exposure Category: C.

C. Thermal Requirements: Unless noted otherwise on Drawings:

1. Walls: R-20 minimum.
2. Floor: R-30 minimum.
3. Roof: R-38 minimum.
4. Windows: U-0.54 maximum and 0.25 SHGC maximum.

2.2 GENERAL

A. Press Box Support Structure: Independently supported but connected to rear of grandstand. Size as indicated on Drawings.

B. Basis-of-Design: Subject to requirements, provide Southern Bleacher Company; Metal Structure Press Box or comparable product by one of the following:

1. Southern Bleacher Company.
2. Reeves Steel Inc.
3. Sturdisteel, Division of Schultz Industries Inc.

C. Substitutions: Comply with Section 01 25 00 "Substitution Procedures."

2.3 MATERIALS

A. Press Box Support Structure:

1. Structural Shapes: ASTM A36, ASTM A36/A572 grade 50, ASTM A572 grade 50, ASTM A529-50, or ASTM A500 grade B.
2. Shop connections are seal welds.
3. After fabrication, all steel is hot-dipped galvanized to ASTM-A123 specifications.

B. Press Box: All materials shall be new and shall comply with ASTM specifications.

1. Floor:

a. Galvanized steel floor frame.
b. Decking: Extruded aluminum alloy 6063-T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports.

2. Exterior Wall Structure:

a. Primary Structure: 4 inch by 4 inch square tubing with minimum 0.120 inch thick walls.
b. Metal Studs: Section 05 40 00 "Cold-Formed Metal Framing."

c. Interior Finish: Minimum 1/2 inch painted gypsum with base per Division 09.
d. Exterior Finish: Minimum 0.0179-inch thick prefinished R-Panel paneling with exposed fasteners painted to match paneling. Color as selected by Architect.

3. Roof:

a. Primary Structure: 4 inch by 4 inch square tubing with minimum 0.120 inch thick walls.
b. Exterior Finish: Minimum 0.0299-inch thick prefinished R-Panel paneling with exposed fasteners painted to match paneling. Color as selected by Architect.

C. Acoustical Tile: As specified in Section 09 51 13 "Acoustical Panel Ceilings."

D. Insulation: Batt and rigid insulation per Section 07 21 00 "Thermal Insulation."

E. Sheathing: Section 06 16 00 "Sheathing."

F. Air Barrier: Section 07 27 26 "Fluid-Applied Membrane Air Barriers."

G. Interior Studs and Gypsum: Section 09 21 16 "Gypsum Board Assemblies."

H. Doors and Frames: Section 08 11 13 "Hollow Metal Doors and Frames."

I. Door Hardware: Provide products specified in Section 08 71 00 "Door Hardware." If not scheduled, provide:

1. Each Exterior Door:

a. 3 butt hinges. 626 or 630
b. Cylindrical lock with classroom function. 626
c. Head and jamb gasketing.
d. Door sweep with rain drip.
e. Threshold.

2. Each Interior Door:

a. 3 butt hinges. US26D
b. Cylindrical lock with classroom function. 626
c. 3 silencers.

J. Windows:

1. Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
2. Glazing: Clear tempered panes.
3. Finish: Electrostatically applied acrylic enamel.

2.4 ELECTRICAL MATERIALS

A. Light Fixtures: White strip with two 25 watt florescent lamps as manufactured by General Electric.

B. Electrical Boxes: Two empty double plug boxes with 3/4-inch conduit stubbed out bottom of coaches box.

C. Electrical Outlets: Eight plugs for standard use; one 110 volt outlet for heater on back wall.

D. Wiring: As required for service; 1-inch conduit stubbed out coaches box ready for service line.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify structural support as specified in Section 13 34 16.13 "Grandstands" is as recommended by manufacturer.

3.2 INSTALLATION

A. Size foundation footings and space for sufficient bearing surface to support loads of structure and design live loads.

B. Erect square, level, plumb, and free from distortion or defects detrimental to appearance and performance in accordance with manufacturer's instructions.

END OF SECTION

SECTION 22 00 00

BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01, apply to this Division. Refer to these articles in the specifications for additional information.

B. Provide all materials, equipment, labor, and transportation required to install a complete and working plumbing system. It is the intent of the drawings and specifications to provide complete installations even though each and every item necessary is not specifically mentioned or shown.

C. Bidders shall determine the contents of a complete set of Drawings and Specifications and be aware that they may be bidding from a partial set of drawings, applicable only to the various separate contracts, subcontracts, or trades as may be issued for bidding purposes only. The submission of bids shall be deemed evidence of the review and examination of all existing conditions on site and all drawings, specifications, and addenda issued for this project as no allowances will be made because of unfamiliarity with any portion of the complete set of documents or site conditions.

D. Perform all Division 22 work in strict accordance with the requirements and recommendations stated in the latest adopted version of all federal, state, and local codes, ordinances, and standards (NFPA, IPC, IECC, etc.) except when requirements are modified by the Authority Having Jurisdiction.

E. Where local codes or practices exceed or conflict with the adopted plumbing code, it shall be the Contractor's responsibility to perform the work in accordance with the local code prevailing and local interpretations thereof by the Authority Having Jurisdiction. This Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

F. Plumbing Contractor is responsible for all final connections to specified plumbing fixtures and all owner furnished equipment requiring plumbing (drain, water, gas, condensate, air).

G. This section of work comprises furnishing of all materials, equipment, tools, scaffolding, rigging, hoisting, labor, and transportation necessary for the complete installation of the plumbing systems as shown on the plans and as specified herein.

H. Contractor, subcontractor, vendors, and suppliers are required to waive subrogation against Owner and Engineer.

1.2 REFERENCES AND STANDARDS

A. All adopted State and Local Building Codes and Facility Standards.

B. All requirements of the local authority having jurisdiction.

C. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers Standards.

D. NEC - the abbreviation is the National Electrical Code (NFPA Ch 70). Where used, this shall mean the latest adopted version of the NEC.

E. NEMA - National Electrical Manufacturers Association

F. NFPA - National Fire Protection Association. Where used, this shall mean the latest adopted version of the NFPA.

G. OSHA - Occupational Safety and Health Administration Standards

H. UL - Underwriters' Laboratories

1.3 ABBREVIATIONS

A. Reference Standards are listed in Division 22 using the abbreviations listed below:
1. AFF - Above Finished Floor
2. AFG - Above Finihsed Grade
3. AHJ - Authority Having Jurisdiction
4. AHU - Air Handling Unit
5. ALT - Alternate
6. CLG - Ceiling
7. DFA - Down from above
8. EOR - Engineer of Record
9. EWC - Electric water cooler
10. EXIST / EX - Existing
11. NC - Normally closed
12. NO - Normally open
13. NTS - Not to scale
14. RTU - Roof-top unit
15. TYP - Typical

1.4 DEFINITIONS

A. Owner's Representative - Indicates the entity designated or hired to represent an owner on a project. This entity could be the owner themselves, an Architect or could be another third party hired to represent the owner. Verify who will be representing the owner on this project before bidding.

B. Contract Documents - Shall include, but not limited to Drawings, Specifications, Addenda, etc.

C. Approval - It is understood that approval must be obtained from the Owner's Representative in writing before proceeding with the proposed work. Approval by the Owner's Representative of any changes, submitted by the Contractor, will be considered as general in nature and only to aid the Contractor in expediting his work.

D. As required - Indicates that the contractor shall perform the work or provide the material as indicated in accordance with manufacturer's installation instructions and in accordance with the latest adopted version of applicable codes or regulations.

E. Contractor - Where the word(s) "contractor" or "this contractor" is used herein it refers to the contractor engaged to execute the work under this division of the specifications only, even though they may be technically described as a sub-contractor.

F. Directed - Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Owner's Representative, requested by the Owner's Representative, and similar phrases.

G. EMCS - Energy Management Control System (Building Management System / BMS), used to control mechanical systems in the building via hardware and / or software.

H. Furnish - The term furnish means to equip with what is needed, supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

I. Indicated - The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

J. Install - The term install describes operations at the Project site including setting in position, connecting or adjusting for use, the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

K. Or equal - Indicates that the contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and / or described are adequate in the judgment of the Owner's Representative.

L. Provide - Furnish and install all material and labor required for a complete installation ready for operation as required in accordance with the intent of the Contract Documents.

M. Shall - Indicates a mandatory requirement or requirements.

N. Unless otherwise noted, refer to IPC Chapter 2 for additional definitions used in these specifications.

1.5 COORDINATION

A. For additional requirements, see Division 01 - General Requirements.

B. Plumbing and mechanical services to all portions of existing buildings at the construction site not involved with the project shall remain in operation throughout construction. Provide all required temporary water, sewer, fuel gas and storm service in the base bid to all required areas to satisfy OSHA requirements.

C. All metering and temporary service charges and / or costs of utilities shall be paid by the Contractor.

D. The Drawings are not to be construed as shop drawings but indicate the extent, general locations, arrangement, etc., of piping systems and equipment. Plumbing drawings are diagrammatic and shall not be scaled for exact size. If the contractor has any questions

regarding the layout of a particular device or equipment item, he shall contact the Owner's Representative for clarification. This Contractor shall, in laying out their work, refer to other sections of the specifications and other drawings such as air conditioning, structural, plumbing, architectural, civil, etc., to eliminate conflicts and undue delays in the progress of the work. Where items are furnished by other trades and require connections by this Contractor, they shall be held responsible for providing rough-in drawings and assistance upon request.

E. In the event of interferences, piping or equipment requiring set grades or elevations shall have precedence over conduit, luminaires, outlet boxes, etc. Coordinate with all disciplines.

F. Plans, specifications, and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically stated, such supportive or required items or work as consistent with what is indicated, is reasonably inferable from what is indicated, and / or is common construction procedure or knowledge with regard to what is indicated.

G. In the event of a conflict between manufacturer's installation instructions and the drawings, the manufacturer's installation instructions shall govern.

H. Should discrepancies be found among the Contract Documents and / or an interpretation is required, and a decision or interpretation to the contractor is not rendered by the Owner's Representative, it shall be assumed the contractor has reviewed all the documents to find the most costly method or items in question which then shall be required. One document does not take precedence over another when interpreting a discrepancy.

I. Provide motor starters, controls, relays, all low-voltage wiring, conduit, and wiring related to plumbing and other equipment and devices to form a complete working system. See Division 26.

1.6 SUBMITTALS

A. The submittals required in this Division shall conform to and be submitted in accordance with the General Conditions, Instructions to Bidders, Division 01 and requirements listed in all sections of Division 22.

B. Provide submittals in PDF format. Paper submittals shall be rejected.

C. Shop drawings, manufacturer's data materials lists, etc., are required for all equipment and material where submittals are required.

D. Each submittal shall contain data relevant to the particular equipment (including options). The data shall be identified by "highlighting", arrows, underlining, etc. Do not submit pages of non-relevant information. Broad general data is not acceptable. If equipment submitted is not as specified in the Contract Documents, then the submittal shall contain specific details prominently identifying any differences in form, fit or function. If the equipment submitted is not as specified, then the Contractor shall be responsible for any additional costs necessary to install and connect the equipment.

E. Submit warranty information on all equipment specified in this division. Warranty shall start at the time of substantial completion.

F. Some products require that a color selection be coordinated with the Owner's Representative. Information regarding such products shall be submitted to the Owner's Representative for review.

G. If materials or equipment are installed before being reviewed without comment by the engineer, the contractor shall be liable for the removal and replacement of such unapproved materials and equipment, at no additional expense to the owner. Additionally, if the removal and replacement of unapproved materials or equipment necessitates the removal and replacement of other related materials or equipment, then the contractor shall be liable for the removal and replacement of the related materials and equipment at no additional expense to the owner.

H. Failure to submit items that meet the requirements of the contract documents in ample time for review shall not entitle the contractor to an extension of contract time, and no claim for extension by reason of such default shall be allowed. The contractor may be held liable for delays so occasioned.

1.7 CLOSEOUT SUBMITTALS

A. This Contractor shall accumulate during the job's progress the below list of data and shall keep it updated during construction as a set of Record Documents:
   1. All warranties, as described in this section and in each subsequent specification section.
   2. All shop drawings.
   3. Submittals.
   4. Set of operation and maintenance manuals.
   5. Each operating and maintenance manual shall apply specifically to the equipment installed. In those cases where one manual covers a general class of equipment, the contractor shall be required to identify (highlighting, underlining, etc.) those portions which apply to the installed equipment.
   6. Repair parts lists of all major items and equipment.
   7. Additional items that may be required in Divisions 00 and 01.

B. Upon submitting their request for final payment, this contractor shall turn over to the Owner's Representative, all data mentioned above in the form of a PDF file and/or physical documents per Owners directive.

C. Organize all information by specification section and put them in the O&M manual.

D. Training Documentation: Provide a letter in the closeout submittals documenting that the end user (determined by the Owner) received training as required in any section in this division. Documentation to include name of person, date, duration, and content of training.

E. The Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and uncovered existing utility piping outside the building.

F. Upon submitting his request for final payment, the contractor shall turn over to the Owners Representative, for subsequent transmittal to the Owner, a clean, neatly

marked set of reproducible plans showing "as installed" work and an electronic file with changes of materials.

1. All warranties, guarantees, and manufacturer`s directions on equipment and material covered by the Contract.
2. Approved fixture brochures.
3. Copies of reviewed shop drawings.
4. Set of operating instructions. Operating instructions shall also include recommended maintenance.
5. Any and all other data and/or plans required during construction.
6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
7. The first page, or pages, shall have the names, addresses, and telephone numbers of the following:
    a. General Contractor and all sub-contractors.
    b. Major Equipment Suppliers.

1.8 QUALIFICATIONS

A. For a product or manufacturer to be considered, all products shall be submitted ONLY from manufacturers that:
    1. Specialize in the manufacturing of the products specified for a minimum of five (5) consecutive years.
    2. Has been producing this product for at least two (2) years.

1.9 QUALITY ASSURANCE

A. Provide complete installations of all systems.

B. Furnish all items of equipment, material, and labor to complete the Contract even though each and every item necessary is not specifically mentioned or shown.

C. In case of any conflict between the specifications, plans, and ordinances, the ordinances shall govern.

D. All materials furnished under this Contract shall be new, free from defects of any kind, of the quality and design hereinafter specified, and shall conform to the standards of Underwriter`s Laboratories Inc., except for equipment which UL does not list or provide label service.

E. All plumbing equipment and fixtures shall be the same brand unless scheduled differently on plans.

F. Certification: This contractor shall be certified / licensed to install the products and equipment they are providing.

G. Regulatory Requirements: All products provided under this division shall be manufactured and listed for the intended use and environment installed.

1.10 DELIVERY, STORAGE, AND HANDLING

A. For additional requirements, see Division 01 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. For additional requirements, see Division 01 - Product Requirements: Environmental conditions affecting products on site.

C. Storage and Protection: Material shall be stored in a clean and dry location until installation.

D. Contractor shall handle in accordance with manufacturer's recommendations to avoid damaging equipment, installed devices, and finish.

E. This shall include the creation of all required temporary shelters to adequately protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

F. All apparatus shall be cribbed up from the floor or ground by the Contractor and covered with tarpaulins or other protective covering where necessary or directed.

G. Failure to comply with the above to the satisfaction of the Owner`s inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by this Contractor.

1.11 EXISTING FIELD CONDITIONS

A. The drawings are prepared from the best information available and reflect all conditions commensurate with this information. However, the contractor should visit the site prior to submitting a proposal and should verify the locations, sizes, depths, pressures, etc., of all existing utilities and familiarize themselves with working conditions, hazards, existing grades, soil conditions, obstructions, etc. If it becomes evident that existing site conditions will impair the proper operation of the utilities, the Owner's Representative shall be notified in writing.

B. All proposals shall take these existing conditions and any revisions required into consideration, and the lack of specific site information on the drawings shall not relieve the contractor of any responsibility.

C. This Contractor shall familiarize themselves with working conditions to the extent that they shall be responsible for damage to concealed piping, wiring and other equipment meant to remain, and shall repair any damage caused by their negligence at no cost to the owner.

1.12 WARRANTY

A. This Contractor shall guaranty fully all workmanship, material, equipment, systems, etc., provided by them for a period of one (1) year after substantial completion of the project, unless otherwise indicated in other specification sections. The use of building equipment for temporary service and testing does not constitute the beginning of the warranty. This guaranty means that this Contractor shall make good to the owner, at no cost, any defects that become apparent during the year following substantial completion. This guarantee is in addition to any other guaranties or warranties and is not intended to limit such other guaranties or warranties.

B. Neither the final payment nor any provisions in the Contract Documents shall relieve this Contractor, or the Contractor, of the responsibility for faulty materials or workmanship.

C. The Owner shall give notice of observed defects with reasonable promptness.

D. The contractor shall remedy any defects due thereto, and pay for any damage to other work resulting there from, which shall appear.

E. This Warranty shall not be construed to include the normal maintenance of the various components of the system covered by these specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURER`S INSTRUCTIONS

A. All equipment and devices shall be installed in accordance with these plans and specifications, manufacturer`s instructions, and applicable codes.

B. Where specifications call for installation of a product to be in accordance with manufacturer`s instructions and/or where manufacturer`s instructions are required for installation of a product, it shall be the Contractor`s responsibility to obtain the necessary applicable manufacturer`s instructions and install the product in accordance with the manufacturer`s instructions.

C. It shall be the Contractor`s responsibility to install all equipment, materials, and devices shown on the plans and as called out in these specifications even if manufacturer`s instructions are absolutely unattainable.

2.2 SUBSTITUTION OF PRODUCTS

A. Substitutions: Shall meet any Division 01 requirements in addition to the substitution requirements listed here.

B. All proposed substitutions are subject to PRIOR APPROVAL and must be received by the Engineer and / or Owner's Representative no less than ten business days prior to the schedule date for opening of bids.

C. Items noted as "No Substitutes" or "No Alternates" shall be as specified only. No substitutions will be accepted.

D. Substitution of products specified herein will be considered only when a complete list of proposed alternative equipment is submitted to the Engineer and / or Owner's Representative in writing, supported by adequate technical and cost data. This includes a complete description of the proposed substitution, drawings, catalog cut sheets, performance data, test data, or any other data or information necessary for proper evaluation.

E. Manufacturers` names are listed herein and on the plans to establish a standard of quality and design. Where a manufacturer`s name is mentioned, products of other manufacturers will be acceptable, if, in the opinion of the Engineer, the substitute material is of equivalent quality or better than that of the material specified.

F. The Contractor`s Bid represents that the bid price is based solely upon the materials and equipment described in the Bid Documents (including addenda, if any) and that he contemplates no substitutions or extras.

G. Requests for substitution are understood to mean that the Contractor:

1. Has personally investigated the proposed substitution and determined that it is equal or superior in all respects to that specified.
2. Will provide the same guarantee for the substitution that he would for that specified.
3. Will, at no cost to the Owner, replace the substitute item with the specified product if the substitute item fails to perform satisfactorily.

H. After Award of the Contract, substitutions will be considered only under one or more of the following circumstances:
1. The substitution is required for compliance with subsequent interpretations of code or insurance requirements.
2. The specified product is unavailable through no fault of the Contractor.
3. The manufacturer refuses to warranty the specified products as required.
4. Subsequent information that the specified product is unable to perform properly or to fit in the designated space.
5. In the Engineer`s sole judgment, the substitution would be in the Owner`s best interest.

I. Revisions to the plumbing system shall be under the supervision of the Engineer at a standard hourly rate charged by the Engineer and shall be paid by the Contractor originating the changes.

PART 3 EXECUTION

3.1 EXAMINATION

A. For additional requirements, see Division 01 - Administrative Requirements (Coordination and verification of existing project / site conditions before starting work).

B. Utilities, Locations, And Elevations
1. Locations and elevations of the various utilities within the scope of this work have been obtained from the City and/or other substantially reliable sources and are offered separately from the Contract documents, as a general guide only, without guarantees as to accuracy.
2. The Contractor shall examine the site, shall verify to his own satisfaction the locations, elevations, and availability of all utilities and services required, and shall adequately inform himself as to their relation to the work; the submission of bids shall be deemed evidence thereof.
3. The Contractor shall coordinate all services with the Utility Companies during construction, coordinate changes made by Utility Companies to the design of project, and coordinate with the Owner, Owners Representative, and Utility the scheduling of any shutdowns or delays that may occur in providing service.
4. The Contractor shall verify location, conduct all necessary tests, inspections, coordinate with Owner`s representatives and utilities, and check for existing underground utilities and lines before ditching.
5. The Contractor shall be responsible for repair of any cut or damaged lines or utilities he uncovers. There are lines and utilities not shown on any plans.
6. Contractor is responsible for coordination of all existing and new utilities at site. Contractor is responsible for protecting and repairing any utilities damaged by installation of pipe. All existing and new landscaping/trees to remain and to be protected unless directed otherwise by Owners Representative.

3.2 DEMOLITION AND REMODEL

A. It shall be the responsibility of this Contractor to see that all demolition and remodeling work involving his trade (including but not limited to plumbing piping, condensate lines, plumbing equipment, etc.) is accomplished in a manner and completeness to provide the appearance of new construction work.

B. Abandoned plumbing fixtures shall be removed and disposed of off-site in a legal manner.

C. Any usable equipment and/or structure damaged during demolition and remodel work shall be replaced.

D. All abandoned and/or otherwise unused piping shall be securely capped using materials of the same composition as the original piping.

E. No exposed piping and/or other materials will be permitted in the finished job.

F. Any abandoned piping which penetrates the slab in an exposed area shall be sealed and securely capped below the slab.

3.3 INSTALLATION

A. The Contractor shall obtain all permits required to commence work and, upon completion of the Work, obtain and deliver to the Owner's Representative a Certificate of Inspection by an AHJ in the project city and state. The Contractor shall pay required permit fees.

B. All work shall be done by experienced craftsmen skilled in the applicable trade.

C. All equipment shall be installed in strict compliance with manufacturer's installation instructions and properly torqued using a calibrated torque tool.

D. Unprofessional and incomplete work shall be rejected and corrected at no additional expense. The judgement of professionalism and completeness of work shall be made by the Engineer and / or Owner's Representative and shall be final.

E. Where existing utilities already exist or where renovation / addition work is to be done, maintain all utility services during construction to existing structures and / or portions of a project that are to remain in place and operational.

F. This Contractor assumes all responsibility for the safety of their personnel on the project during construction. The Contract Documents do not include materials, procedures, components, etc., required to ensure construction safety. Refer to General Conditions for additional information.

G. Contractor shall furnish and install all safety guards required. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded.

H. This Contractor shall be responsible for damage to the project caused by this Contractor's failure to recognize hazards associated with items such as lack of power, scheduling of work (tardiness), inexperienced workmen, excessive cutting, etc. This Contractor shall repair at no expense to the owner any such damage.

I. Contract Documents do not show exact location and elevations of lines. Deviate from drawings as required to conform to the general construction, provide proper grading and installation.

3.4 PREPARATION

A. Flame Spread Properties Of Materials
   1. All materials and adhesives used for plumbing and insulation shall conform to NFPA and UL life and flame spread properties of materials.
   2. The composite classifications shall not exceed 25 for a flame spread rating and 50 for a smoke developed rating as listed for the basic material, the finishes, adhesives, etc., specified for each system and shall be such when completely assembled.

B. Asbestos
   1. No asbestos or asbestos containing materials shall be permitted in this project.

C. Lead Materials
   1. No lead or lead containing materials shall be allowed in any domestic or potable water supply piping, valves, fixtures, components, equipment, or any other item.

D. Refrigerants
   1. Chlorofluorocarbons (CFCs) shall not be allowed in any equipment on this project.
   2. Comply with ASHRAE Std 15 and ASHRAE Std 34.

E. Refrigerant Recovery And Recycle
   1. Refrigerants shall not be released to the environment.
   2. Contractor shall provide recovery and recycle equipment that has been certified by the Electrical Testing Laboratories or Underwriters Laboratories.
   3. Contractor shall also provide properly trained and certified (in accordance with EPA) personnel for refrigerant work during installation, demolition, start-up, servicing, etc.

F. Cutting And Patching
   1. All Subcontractors shall notify the General Contractor sufficiently ahead of construction of any floors, walls, ceiling, roof, etc., of any openings that will be required for his work.
   2. The contractor shall see that all sleeves required for their work are set at proper times so as to avoid delay of the job.
   3. All necessary cutting of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this Contract shall be done at the Subcontractor`s expense in a neat and workmanlike manner, and as approved by the Owners Representative.
   4. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Owners Representative.
   5. Patching of openings and/or alterations shall be provided by the General Contractor.
   6. All openings in firewalls and floors, such as thimbles, shall be completely sealed after installation for a completely airtight and watertight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

7. All openings in exterior walls shall be sealed watertight.

G. Access Clearance
1. Proper access to all installed equipment shall be provided. This Contractor shall label all points of access immediately upon installation with a marker pen.
2. A minimum of 3 feet shall be maintained in front of all access points.
3. If another trade violates this space, this Contractor shall immediately notify the General Contractor to correct this condition.
4. When equipment is installed above lay-in ceiling this Contractor shall coordinate with the Ceiling Contractor to provide access without removing part of T-bar ceiling.
5. No speakers, lights, fire alarm equipment, etc. shall be installed in lay-in ceiling tiles where access is to be gained.

H. Operation Prior To Completion
1. When any piece of plumbing equipment is operable and the Contractor needs to operate the equipment, he may do so providing that he properly supervises the operation.
2. The warranty period shall, however, not commence until such time as the equipment is operated for the beneficial use of the Owner.
3. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust and complete all punch list items before final acceptance by the Owner.
4. The date of acceptance and the start of the warranty may not be the same date.

3.5 ELECTRICAL WIRING AND EQUIPMENT FOR PLUMBING SYSTEMS

A. All wiring, conduit, boxes, equipment (controls, thermostats, relays, contactors, motor starters, heaters, switches), and any other control devices or equipment required to form a complete and properly operating system, shall be the responsibility of this Contractor.

B. The Electrical Contractor shall only provide line voltage (including hook-up) to all plumbing equipment.

C. All controls and devices shall be low voltage unless otherwise noted or shown on the plans. Where line voltage controls or devices are noted, the Contractor shall provide complete wiring diagrams (approved by the Engineer) to the Electrical Contractor prior to final hook-up.

D. The Plumbing and Electrical plans are based on the equipment and devices scheduled as shown on the plans or as called for in the specifications. Should any plumbing equipment or device be changed or approved from those which are shown or noted, all electrical and/or plumbing changes shall be made at the expense of the trade or Contractor initiating the change with no expense to the Owner or their representatives.

E. All wiring provided by this Contractor shall be installed in a workmanlike manner using tie wraps, labels, anchors and etc. Loose wiring is not acceptable.

F. All conduit and boxes required in all walls for control purposes (thermostats, switches, etc.) shall be provided by electrical contractor.

G. All conduit required in attic, clear spaces, or on roof shall be by electrical Contractor.

3.6 TESTING

A. After all plumbing systems have been completed and put into operation, subject each system to an operating test under design conditions to ensure proper sequence and operation throughout the range of operation regardless of the season the Contractor shall test all plumbing equipment.

B. Perform a smoke test on all sanitary sewers and camera all lines and provide owner with a videotape.

C. Perform gas piping pressure test to comply with HB 1611 and all required City or governing body tests.

D. Make adjustments as required to ensure proper functioning of all systems.

E. Special tests on individual systems are specified under individual sections.

3.7 AS BUILT DRAWINGS

A. Upon substantial completion, Contractor shall submit as-built drawings showing all deviations between contract drawings and actual installed conditions.

B. Show location of all valves in plumbing systems. Submit to Owner.

3.8 TRAINING

A. Upon completion of the work and at a time designated by the Owner`s representative, provide a formal training session for the Owner`s operating personnel to include location, operation, and maintenance of all plumbing equipment and systems, some sections have further instructions.

B. Before proceeding with instruction, prepare a typed outline in triplicate listing the subjects that will be covered. Submit the outline for review by the Owner`s representative.

C. At the conclusion of the instruction, obtain the signatures of the attendees on each copy of the outline to signify that they have a proper understanding of the operation and maintenance of the system. Submit the signed outlines to the Owner`s representative and Engineer as a condition of final acceptance.

3.9 CONTRACTOR FINAL INSPECTION

A. It shall be the duty of this Contractor to make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance before calling upon the Owners Representative to make a final inspection.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, etc., called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Owners Representative at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc., before preparing for submission to verify that the terms check with the requirements of the specifications.

END OF SECTION

SECTION 22 00 90

PLUMBING SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Plumbing submittal procedures

B. This section applies only to the Division 22 specifications. Submittals required by other specification divisions are not included here, even though the same subcontractor may be providing work under other divisions.

1.2 RELATED SECTION

A. This section supplements Division 01 Submittal Procedures and contains additional requirements applicable to Division 22 submittals.

1.3 DEFINITIONS

A. Product Data: Illustrations, standard schedules, performance charts, instructions, and brochures furnished by the contractor, subcontractor, manufacturer, or supplier to illustrate materials or equipment or to illustrate some portion of the work. Provide a summary of scheduled items with all data in schedules.

B. Shop Drawings: Drawings, diagrams, schedules, and other data specifically prepared for the work by the contractor, subcontractor, manufacturer, or supplier to illustrate some portion of the work.

C. Equipment/Material Submittal Package: A compilation of the product data, shop drawings, and other items as required by the specifications, submitted near the start of the work. Typically, the specifications require the initial submittal package to be submitted within a certain number of days after the work starts.

D. Quality Assurance Submittal: Items submitted before and during the execution of a particular portion of the work for the purpose of guarding against defects and deficiencies.

E. Quality Control Submittal: Items submitted at the completion of a particular portion of the work for the purpose of evaluating completed activities and elements of the work for conformance with contract requirements (e.g. start-up reports).

F. Closeout Submittals: Items submitted at or near the completion of the contract.

1.4 SUBMITTALS

A. All proposed substitutions shall be submitted for PRIOR APPROVAL on each project. Requests must be received by the Engineer and / or Owner's Representative no less than ten business days prior to the bid date. Contractor shall list all deviations from the specified unit and furnish COMPLETE submittal data. Approval of a substitution shall

be in writing and shall not relieve the Contractor from compliance with the requirements of the Contract Documents.

B. The materials, workmanship, design, and arrangement of all work installed under this contract shall be subject to the review of the architect, engineer, and owner.

C. Manufacturers: Manufacturers submitted shall be as per the acceptable manufacturers listed in each specification section or referenced schedule. For additional manufacturers requiring approval, reference the Substitution of Products article in Section 22 00 00.

D. Required Submittals: Refer to the Submittals article of each individual Division 22 specification section for the required items to be submitted.

E. Contractor's Coordination Submittals: The contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the project, but such data shall remain between the contractor and his subcontractors and will not be reviewed by the engineer.

F. Electronic Submittals: E-mail or other electronic forms of submittals from the contractor are required. The procedures described in this section shall be as follows:
   1. The contractor shall supply one electronic copy of the submittal.
   2. The electronic files will either be e-mailed to the architect or posted to a project management and information exchange website, depending on the architect's requirements. The architect and contractor can distribute copies of the files as desired.
   3. The engineer will retain an electronic copy of the submittal and all responses.

G. Coordination Correspondence: The contractor may desire to verify the acceptability of a particular item prior to assembling the initial submittal package. The contractor may send material directly to the engineer for comments and feedback. This communication will be treated as normal coordination correspondence and will not be tracked or documented as a formal submittal. The engineer may or may not respond to such correspondence. If the engineer agrees, in writing, to the use of a particular item, then that same material shall be included in the initial submittal package along with a copy of the correspondence.

H. Unapproved Products: If materials or equipment are installed before being reviewed and approved by the engineer, the contractor shall be liable for the removal and replacement of such unapproved materials and equipment, at no additional expense to the owner. Additionally, if the removal and replacement of unapproved materials or equipment necessitates the removal and replacement of other related materials or equipment, then the contractor shall be liable for the removal and replacement of the related materials and equipment at no additional expense to the owner.

I. Product Data:
   1. Where the content of manufacturer submittal literature includes data not pertinent to the submittal, clearly indicate which portions of the contents are being submitted for review. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested shall be specific and identifications in catalogs, pamphlets, etc., of items submitted shall be clearly made in a contrasting ink or highlighting. Data of a general nature shall not be acceptable.

J. Shop Drawings:
1. Scale and measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item.
2. Electronic shop drawing submittals are required.
3. Shop drawings must include domestic water entry rooms with backflow prevention and all water heater rooms.

1.5 QUALITY ASSURANCE/CONTROL SUBMITTALS

A. Quality assurance and quality control submittals may be in the form of documentation or may be in the form of completed physical work that is offered for review by the engineer, architect, or owner.

B. If documentation is the subject, then submit in a manner similar to the initial submittal package.

C. If completed physical work is the subject, then the work shall not be concealed, nor shall subsequent work be performed, until the engineer's representative has reviewed the work. If the work is concealed, or if subsequent work is performed, before the engineer's representative has reviewed the work, then the contractor shall be liable for removal and replacement at no additional expense to the owner.

D. Sequencing:
1. Within 30 calendar days after the contractor has received the owner's notice to proceed, provide the complete submittal package.
2. After the engineer has reviewed the submittal package, make necessary revisions to the submittals as directed by the engineer and resubmit.
3. After the submittal has been reviewed by the engineer, proceed to purchase materials and perform the work.

E. Scheduling:
1. Failure to submit items that meet the requirements of the contract documents in ample time for review shall not entitle the contractor to an extension of contract time, and no claim for extension by reason of such default shall be allowed. The contractor may be held liable for delays so occasioned.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 SUBMITTALS

A. Make submittals of product data, shop drawings, samples, quality assurance submittals, quality control submittals, and other items in accordance with the requirements of this section, applicable sections in Division 22, and additional requirements of each individual Division 22 specification section.

B. Grouping of Submittals:
1. The submittal package shall be coordinated and included in a single submission. Multiple submissions are not acceptable except where prior written approval has

been obtained from the engineer. Partial submittals may be rejected, without being reviewed, as not complying with the provisions of the contract.

2. In the case that multiple submissions are approved, it is the responsibility of the contractor to maintain and update a submittal checklist. The contractor shall ensure that all applicable submittal sections are submitted to the Engineer. If a submittal section is not submitted, it will be considered rejected until reviewed by the Engineer.
3. If submittal sections are submitted as individual submittal files, the submittal sections will be grouped and returned as one file with one set of submittal responses.

C. Electronic Submittal Organization:
1. Electronic submittals are to be submitted as a single PDF file. Within the PDF file, each section shall be bookmarked.
2. Provide an electronic submittal cover sheet that lists at least the following:
   a. Project name
   b. Date
   c. Name and address of architect
   d. Name and address of engineer
   e. Name, address, and telephone number of prime contractor
   f. Name, address, and telephone number of HVAC contractor
   g. Name, address, and telephone number of HVAC supplier
3. Provide an electronic index sheet listing all items submitted.
4. The contractor shall call to the attention of the engineer, clouded in the submittal and noted after the index sheet, any instance in which the submittals are known to differ from the requirements of the contract documents.
5. Organize all required items by specification section. The material for each specification section shall be organized as follows:
   a. Provide an electronic section cover sheet that lists the same information as the submittal cover sheet, plus the specification number and title and the name, address, and telephone number of the vendor or vendor's representative, if applicable.
   b. Refer to the individual Division 22 specification sections for any required organization of the submittal material within each submittal section.
   c. Bookmarked sections shall be arranged by specification section number in numerical order.
   d. Submit in accordance with these procedures and procedures described in Division 01 Submittal Procedures.
   e. Submittals not organized as described here may be rejected, without being reviewed, as not complying with the provisions of the contract.

D. Response to engineer's review:
1. Review comments:
   a. Review comments of the engineer will either be shown on the returned sets to the contractor or shown on a document attached to the sets. If the comments are on an attached document, then the engineer will place a note on the submittal referring to the attached comments. In such cases, the engineer's signature will appear only on the attached document. If the attached, signed document becomes physically separated from the submittal, then the submittal will no longer be considered as being a reviewed submittal.

2. Complete rejection:
    a. If the submittal is not complete or does not meet the requirements of this specification section, then the engineer may reject the entire submittal and return the submittal without further review or comment. In such cases, the entire submittal shall be completely revised and resubmitted. The resubmittal shall be given a new submittal number and shall be documented and processed as a separate submittal from the original.
3. Held for completion:
    a. If the submittal is not complete but is only missing some minor item, the engineer may, at the engineer's sole discretion, hold the submittal rather than rejecting and returning the submittal. In such cases, the engineer will notify the architect and contractor that the submittal is being held for completion. The contractor will be given a predetermined amount of time to provide the missing item. Upon receipt of the missing item, the engineer will insert the missing item into the submittal package and proceed with the review process.
4. Partial rejection:
    a. The engineer may reject only certain portions of the submittal. In such cases, only those rejected portions or items need to be revised and resubmitted.
5. Provide as corrected:
    a. The engineer may note a required change to a submitted item, but may not consider the change serious enough to require a resubmittal. In such cases, the engineer will note that the item is to be provided as noted or corrected. In such cases, the contractor may proceed to provide the item. However, if subsequent observations reveal that the noted change was not made, then the contractor shall be liable for removal and replacement of the item at no additional cost to the owner.
6. Reviewed without comment:
    a. The contractor may proceed to provide all materials and equipment.

E. Close-out Submittals:
    1. Provide close-out submittals in accordance with the requirements of Division 01.

END OF SECTION

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SECTION 22 05 54

PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Identification required for plumbing systems.

B. Code required identification not shown on plans nor specified herein shall be provided.

1.2 RELATED SECTIONS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 01 Specifications, apply to this Section.

B. Section 22 00 00 - Basic Plumbing Requirements

1.3 SUBMITTALS

A. Provide submittal data on all items specified in this section in accordance with Specification Section 22 00 00, General Conditions, and Division 01.

B. Submit wording of nameplates with submittals.

C. Submit list of all products incorporated in this section.

1.4 REFERENCES

A. Comply with ANSI A13.1

B. USAS Code B31.8

C. NTSB-PSS-73-1

D. AGA

E. API

1.5 DESCRIPTION OF WORK

A. Provide signs for the following equipment identification:
   1. Piping
   2. Pumps
   3. Starters
   4. Valves

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Seton

B. Brady

C. Marking Services, Inc.

2.2 EQUIPMENT LABELS

A. Type:
1. Engraving-Stock, melamine plastic laminate, 3 layer.
a. Thickness:
1) Less than 25 square inches: 1/16 inch
2) 25 square inches or more: 1/8 inch

B. Color:
1. Black

C. Conform to FS L-P-287

2.3 LETTERING

A. Style:
1. Engraved standard print, unless otherwise indicated.

B. Size:
1. 3/16 inch to 1/4 inch

C. Color:
1. White letters, black background

2.4 SIGN INFORMATION

A. Plumbing Equipment:
1. Unit mark from Drawings/Owner
2. Voltage - Phase
3. Manufacturer and Model Number

2.5 NAMEPLATE FASTENERS

A. Securely attach nameplates to equipment with non-corroding stainless steel screws.

B. Non-corroding pop rivets are acceptable.

C. Stick-ons or adhesives will not be allowed.

2.6 PIPING AND CONTROL DIAGRAM SIGNS

A. Material:
1. 1/4 inch acrylic cover and backing screwed together with brass screw/bolts.
2. Size:
a. Minimum:
1) 12" x 17"
b. Maximum:
1) 24" x 36"

B. Provide a diagram in each mechanical room similar to the diagrams shown on the plans, and/or as required for the area served.

C. Provide pipe markers with the following features.
   1. Letters from 1/2" to 3-1/2":
      a. Size letters to afford readability from the appropriate viewing position.
   2. Repeated and reversed words for viewing from 360º around pipe.
   3. Self-clinging, coiled markers that snap into place around pipe and do not require any other securement.
   4. Integral directional arrows.

D. Letters on Field:
   1. Identify the specific material conveyed, e.g., "Domestic Cold Water", "Domestic Hot Water", etc.

E. Model:
   1. Less than 3/4":
      a. Tags, same as Paragraph. Piping System Devices, color codes for hazard.
   2. 3/4" up to 6":
      a. Seton Setmark SNA snap-on.
   3. Over 6":
      a. Seton Setmark STR strap-on, with stainless steel spring straps.
   4. Use Seton Ultra-Mark for outdoor use.

F. Piping System Devices (Valves, Thermometers, Pressure Gages, etc., and Pipe Less Than 3/4"):
   1. Identify with the following:
      a. Tags:
         1) Not less than 1-1/2 inch brass or aluminum tags, round, square, or octagonal.
      b. Stamp tags with minimum 1/2" high descriptive characters, 1/2" high numbers with black enamel-filled indentations.

G. Attachment:
   1. Stainless steel or solid brass jack chain; Seton JA16, or stainless steel or brass "S" hooks

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall verify room numbers with Owners Representative before nameplates are fabricated.

B. The following shall be permanently and clearly identified:
   1. Each valve and pump.

3.2 INSTALLATION

A. Install signs on non-removable panels. Attach to equipment with pop rivets or stainless steel screws.

B. Mount in an easily visible location.

C. All labeling identification shall conform to final room numbers. Coordinate with General Contractor and Owners Representative to secure construction room numbers.

D. Provide all additional signage required by local authority at no cost to the Owner.

E. Complete installation in accordance with ANSI A13.1 and manufacturer`s installation instructions and with the Drawings. Fasten each unit securely in place with stainless steel screws.

F. Equipment Labeling:
   1. Install on scheduled items of equipment, including the following:
      a. Pumps
      b. Control panels and major control components
      c. Other items of equipment
      d. Include Mark Number and descriptive name from Drawing and Specification schedules
      e. Attach with corrosion resistant, stainless steel screws or pop rivets
      f. Install 1/2" diameter adhesive marker (color to be approved by Owners Representative), and apply to T-bar below any mechanical equipment, valves, and fire dampers above lay-in ceilings.
   2. Spacing:
      a. Where pipe passes through walls, floors, and other barriers.
      b. In Tunnel Vaults and Equipment Rooms:
         1) Maximum spacing, 10 feet; closer where piping is congested, and where piping continuity is obscured from view.
      c. Piping in Tunnels:
         1) Maximum spacing 100 feet
      d. Other Places:
         1) Maximum spacing 50 feet

G. Piping System Color Coding:
   1. Designate for painter the following:
      a. Types of piping services
      b. Direction of flow
      c. Other information required for proper identification.

H. Surfaces to be Painted:
   1. Bare piping
   2. Insulation covering of insulated piping

I. Paint according to the following schedule:

System	Color
Exposed Domestic Cold Water	Blue
Waste and Vent	None
Exposed Gas Piping	Black

J. Piping System Devices (Valves, Thermometers, Pressure Gages, etc.):
   1. Identify with the following information:
      a. System
      b. Device number
      c. Device Function
   2. Device Chart:
      a. Key devices to device chart
      b. Give complete description of device function and system.

K. Key devices to drawings as follows:
   1. Floor plans
   2. Schematic drawings of piping systems

END OF SECTION

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SECTION 22 13 18

CONDENSATE PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Condensate piping for cooling units.

1.2 REFERENCES

A. ASTM B88 - Seamless Copper Tube for Water, Gas & Sanitation

B. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV)

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.3 DEFINITIONS

A. Draw-through Unit:
   1. A unit in which the cooling coil operates under a negative static pressure.

B. Blow-through Unit:
   1. A unit in which the cooling coil operates under a positive static pressure.

1.4 SUBMITTALS

A. Product Data:
   1. Provide submittal data on all equipment specified in this section in accordance with Section 22 00 00, General Conditions, and Division 01.
   2. Submit product data indicating typical catalog of information.
   3. Submit product data sheets indicating dimensions, general assembly, and ratings.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide condensate lines for all cooling units even if not shown on the plans.

B. Provide a secondary condensate drain pan and secondary condensate piping for all horizontal air handlers above ceiling, even if not shown on plans.

C. Minimum size:
   1. 1", but no smaller than the coil nipple.

2.2 PIPING

A. Type:
   1. Hard drawn type DWV or type M copper.
   2. Other type as noted on plans.

3. Conform to ASTM B306 or ASTM B88.

2.3 FITTINGS

A. Type: Cast Copper Alloy Solder Joint Drainage Fitting-DWV
   1. Conform to ASME B16.23
   2. Provide dielectric insulating couplings between ferrous and copper piping systems.

B. Type: Press-connect fittings
   1. Copper and copper alloy fittings with EPDM elastomeric sealing element.
   2. Unpressed fittings shall leak and not hold pressure.
   3. Press connect fittings may not be used on elbow at main water entry under slab. Use Silfos sweat fittings on all elbows on main water entry.

C. Approved Manufacturers:
   1. Viega ProPress
   2. Nibco
   3. Mueller Industries Streamline PRS
   4. Apollo
   5. Merit Brass

2.4 INSULATION

A. All condensate lines shall be insulated per Section 22 07 20.

2.5 CONNECTIONS

A. Type:
   1. Solid string hard solder
   2. Wire hard solder
   3. Cored solder will not be allowed.

B. Material:
   1. Solder:
      a. 95% tin and 5% antimony
   2. Flux:
      a. Non-corrosive paste type

C. Use a cast adapter when connecting soldered copper piping to screwed brass pipe.

2.6 ACCESSORIES

A. Traps:
   1. Draw-through units:
      a. Required on all units, unless noted otherwise on plans.
   2. Blow-through units:
      a. As recommended by the unit manufacturer or as shown on the plans.

B. Clean-outs

C. Unions

D. Neutralization kits for all condensing furnaces and condensing water heaters.
   1. Equal to JJM Boiler Works, Inc.

2.7 PIPE SUPPORTS

A. Hangers:
   1. 2" and Smaller Piping:
      a. May be split cast ring type with fastening device in walls and chases.
   2. Copper Piping:
      a. Copper plated ferrous hangers.
   3. All Other Above Ceiling Locations:
      a. Adjustable clevis type. Hangers to accommodate circumference of pipe and saddles.

B. Hanger Rods:
   1. Type:
      a. Minimum 3/8 inch diameter with machine threads.
   2. Minimum Steel Hanger Rod Diameter for Individually Suspended Horizontal Pipes:
      a. 2" and smaller diameter pipe:
         1) 3/8"
      b. 2-1/2" to 3 - 1/2" diameter pipe:
         1) 1/2"
      c. 4" to 5" diameter pipe:
         1) 5/8"
      d. 6" diameter pipe or larger:
         1) 3/4"

C. In wall pipe supports:
   1. Metal strut, manufactured pipe clamps

D. Approved Manufacturers:
   1. Hangers:
      a. Anvil
      b. Elcen
      c. ERICO
      d. F&S Manufacturing
      e. Fee & Mason
      f. PHD
      g. Empire Industries
      h. Gregory Strut
   2. In wall pipe support manufacturer:
      a. Holdrite or Equivalent

PART 3 - EXECUTION

3.1 INSTALLATION

A. All piping routed through exposed public areas must be routed has high as possible.

B. Traps:
   1. Install in each line serving a draw-through unit. Coordinate size and configuration with air conditioning unit manufacturer.

C. Cleanouts:

1. Install cleanouts as shown on plans.
2. Install cleanouts at changes in direction (greater than 45º) and every 50 feet in straigh runs.
3. Provide insulation caps on cleanouts for easy removal and reinstall.

D. Unions:
1. Install unions on both sides of the trap.

E. Minimum Drain Line Slope:
1. 1/8 inch per foot
2. Insulate all condensate lines inside buildings.

F. Size and install Neutralization kits per manufacturer's recommendations.

G. At all rooftop units on the roof, contractor to connect to the side outlet on the rooftop unit condensate drain pan and then route condensate drain down through roof in roof penetration per the roofing consultant's roof penetration detail. The bottom outlet on the rooftop unit condensate drain pan is unacceptable. The P-trap must be accessible on the roof.

H. Do not allow piping to pass over or through designated electrical rooms or technology spaces.

I. Testing:
1. Pressure test all sections of the condensate drainage system at a 10-foot head pressure for a 24-hour period. Repeat test until no leaks exist.

END OF SECTION

SECTION 22 33 34

ACCESS DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Access doors

1.2 SUBMITTALS

A. Provide submittal data on all items specified in this section in accordance with Specification Section 22 00 00, General Conditions, and Division 01.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acudor

B. Elmdor

C. Mifab

2.2 ACCESS DOORS

A. Locations requiring access doors:
   1. Cleanouts
   2. Equipment above hard ceilings.
   3. Other equipment requiring accessibility for operation and maintenance.

B. Type:
   1. Hinged flush-type steel framed door with straps and exposed narrow border.

C. Minimum size:
   1. 18" x 18" unless otherwise indicated.
   2. 24” x 24” for equipment above hard ceilings.
   3. Conform to architectural panel pattern for acoustical ceilings.
   4. Confirm size with Building Inspector and Engineer.

D. Construction:
   1. Hinges:
      a. Concealed continuous type.
   2. Locking Device:
      a. Flush cam type, screwdriver operated.

E. Fire Rating:
   1. Same or better fire rating than the surrounding area.

F. Access doors located in kitchens, restrooms, or areas where water is present shall be stainless steel.

2.3 FACTORY PAINTING

A. Apply prime coat of rust inhibiting paint, unless located in wet area.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer`s instructions and recommendations.

B. In suspended acoustical ceilings, provide a beaded pin or other approved means for identification and easy removal where necessary.

C. Access doors shall only be installed in areas/locations that are readily accessible.

D. Doors shall be installed in such a manner that door will open 180 degrees.

E. Access doors in walls, serving cut-off valves, trap primers, and cleanouts shall be coordinated with the architect/engineer. Top of access doors to be below bottom of wall mount lavatory apron. Access doors will not be allowed in walls above this height unless coordinated with the architect/engineer.

END OF SECTION

SECTION 22 40 01

PLUMBING FIXTURES AND FIXTURE CARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electric Drinking Fountains

1.2 REFERENCES

A. ASHRAE 90-75 - American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc. (Energy Conservation Standard in New Buildings)

B. ADA - Americans With Disabilities Act

1.3 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 22 00 00, General Conditions, and Division 01.

B. Indicate on submittal construction materials, finishes, sizes, quantities, and related hardware.

C. Product Data:
1. Plumbing fixtures
2. Carriers
3. Fixture trim

D. Certification:
1. Submit certification that complete system complies with test requirements of municipality, State, and other public authorities having jurisdiction over system.

E. Provide closeout documents as required in Division 01.

1.4 QUALITY ASSURANCE

A. Provide faucets, fittings, supply stops, and similar devices of one manufacturer.

B. Verify that the voltage is the same as scheduled on the electrical drawings. If not, change at no cost to the Owner.

C. Regulatory Requirements:
1. Comply with requirements in the following order of precedence:
   a. Codes, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
   b. Provisions specified in this section.
   c. Local Plumbing Code.

1.5 HANDLING

A. Deliver fixtures crated and in undamaged condition.

B. Replace damaged fixtures with new fixtures.

PART 2 - PRODUCTS

2.1 GENERAL

A. All plumbing fixtures shall be new and as shown on the plans.

B. Furnish plumbing fixtures with carriers shown and all necessary trimming.

C. All porcelain enameled cast iron to be acid resistant.

D. All supplies shall be IPS brass with stops.

E. All exposed finished metal parts shall be chromium plated.

F. Rough bodied parts shall be heavily nickel plated.

G. Galvanized nipples will not be permitted.

H. Traps for lavatories, sinks, etc. shall be 17 gauge three-piece chrome plated cast brass with cleanout and IPS tailpiece and chrome plated sleeve.

I. All escutcheons on supplies and waste shall be heavy cast brass set-screw type.

J. Furnish faucets and supply stops with renewable seats.

2.2 SUBSTITUTIONS

A. All proposed substitutions shall be submitted for PRIOR APPROVAL on each project. Requests must be received by the Engineer and / or Owner's Representative no less than ten business days prior to the bid date. Contractor shall list all deviations from the specified unit and furnish COMPLETE submittal data. Approval of a substitution shall be in writing and shall not relieve the Contractor from compliance with the requirements of the Contract Documents.

2.3 CARRIERS FOR WATER CLOSETS, URINALS, LAVATORIES, AND ELECTRIC WATER COOLERS

A. Electric Water Coolers:
   1. Wade 400
   2. Watts
   3. J.R. Smith
   4. Mifab
   5. Zurn
   6. Josam

2.4 ELECTRIC WATER COOLERS

A. Approved Manufacturers:
   1. Elkay

2. Halsey-Taylor
3. Oasis
4. Acorn
5. Murdock

B. All electric water coolers shall have vandal resistant bubbler and pushbutton activation mechanism.

C. All electric water coolers shall have mechanical control valves to provide operation and water flow in the event of loss of electrical power.

2.5 SUPPLIES WITH STOP

A. McGuire

B. Brass Craft

C. Zurn

2.6 P-TRAPS, TAILPIECES, CONTINUOUS WASTE

A. McGuire

B. Brass Craft

C. Elkay

D. Just

2.7 GRID DRAINS AND STRAINERS

A. McGuire

B. Elkay

C. Just

D. Zurn

E. Kolher

F. American Standard

G. Moen

PART 3 - EXECUTION

3.1 PREPARATION

A. All equipment surfaces coming in contact with walls, floors, or surfaces of other fixtures shall be ground truly flat and shall be bedded with fine dental plaster.

B. Install an approved vacuum breaker or backflow preventer on each water supply line serving a plumbing fixture which has a water supply below the rim of the fixture. Vacuum breakers shall be designed to prevent any possible backflow through them. Where these are installed in chrome plated lines, they shall be chrome plated to match.

3.2 INSTALLATION

A. Furnish and completely install all fixtures shown on plans and as specified.

B. Properly anchor all fixtures, lines, or equipment to construction.

C. Clean all plumbing fixtures before final inspection and acceptance by the Architect.

D. Install all fixtures to proper heights as shown on the plans and in the codes. Refer to Texas Accessibility Standards. Coordinate height with plans. If different from engineering plans, contact the Architect for the correct height. Do not install until written approval is issued by the Architect. If fixture cannot be installed to proper height given, contact Architect for direction. No cost changes will be allowed for changes to piping to correct the problem.

3.3 FIELD QUALITY CONTROL

A. Inspect all faucets, flush valves, stop valves, and other equipment for proper amount of water discharged. Adjust as required to meet low water consumption and ADA/Texas Accessibility Standards.

B. Correct any faucet or other equipment as directed by the Architect/Engineer.

END OF SECTION

SECTION 23 00 00

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Basic mechanical requirements necessary to provide complete installation of all Division 23 work.

1.2 WORK INCLUDED

A. This section of work comprises furnishing of all materials, equipment, tools, scaffolding, rigging, hoisting, labor, and transportation necessary for the complete installation of the mechanical systems as shown on the plans and as specified herein.

B. Bidders shall determine the contents of a complete set of drawings and specifications and be aware that they may be bidding from a partial set of drawings, applicable only to the various separate contracts, subcontracts, or trades as may be issued for bidding purposes only. The contract documents and the complete scope of work for the project are illustrated on the combined Architectural, Structural, Plumbing, Heating, Ventilating, Air Conditioning, and Electrical, and each Bidder shall thoroughly acquaint himself with all the details of the complete set of drawings and specifications before submitting his bid. All drawings and specifications form a part of the contract documents for each separate contract and shall be considered as bound therewith in the event partial sets of plans and specifications are issued for bidding only. The submission of bids shall be deemed evidence of the review and examination of all drawings, specifications, and addenda issued for this project as no allowances will be made because of unfamiliarity with any portion of the complete set of documents.

1.3 CODES AND REFERENCE STANDARDS

A. General:
1. Perform all Division 23 work in strict accordance with the requirements and recommendations stated in all the latest editions of the applicable state codes, national building codes and local ordinances.
2. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes.
3. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.
4. The date of the code or standard that is in effect on the date of issue of the contract documents except when a particular publication date is specified.
5. The Contractor shall be held responsible for verifying all local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting the deficiencies.
6. Where local codes and ordinances are not in writing or on record, but a local precedence has been set, the Owner shall pay for any additional cost incurred.

B. Applicable Codes and Standards for All Division 23 Work:

1. International Building Code
2. International Gas Code
3. International Plumbing Code
4. International Mechanical Code
5. International Energy Conservation Code
6. National Electrical Code
7. American Society of Heating, Refrigerating and Air Conditioning Engineers Standards.
8. Occupational Safety and Health Administration Standards:
   a. OSHA Standard 2207 - Construction Industry Standards
   b. OSHA 29 CFR 1926 - Regulation of Excavation
   c. All other applicable standards
9. National Fire Protection Association:
   a. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
10. Clean Air Act and Clean Air Act Amendments
11. State Codes:
    a. All other applicable codes
12. Local Municipal Codes and Ordinances

1.4 SCHEDULE OF ABBREVIATIONS

A. Reference Standards are listed in Section 23 using abbreviations listed below:
   1. AABC (NSTSB) - Associated Air Balance Council
   2. AASHTO - American Association of State Highway and Transportation Officials
   3. ADA - Americans with Disabilities Act
   4. ADC - Air Diffusion Council
   5. A/E - Architect/ Engineer
   6. AGA - American Gas Association
   7. AMCA (DIR) - Air Moving and Conditioning Association
   8. ANSI - American National Standards Institute
   9. AHRI - Air-Conditioning and Refrigeration Institute
   10. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
   11. ASME - American Society of Mechanical Engineers
   12. ASPE - American Society of Plumbing Engineers
   13. ASTM - American Society for Testing and Materials
   14. AWE - American Welding Society
   15. AWWA - American Water Works Association
   16. CGA - Compressed Gas Association
   17. CISPI - Cast Iron Soil Pipe Institute
   18. CS - Commercial Standard
   19. CSA - Canadian Standards Association
   20. DIPRA - Ductile Iron Pipe Research Association
   21. DOT - Department of Transportation
   22. DOC - Department of Commerce
   23. FCC - Federal Communications Commission
   24. FM - Factory Mutual
   25. FS - Federal Specification
   26. GSHPA - Ground Source Heat Pump Association
   27. IBC - International Building Code

28. ITL - Independent Testing Laboratories
29. NEC - National Electric Code
30. NFPA - National Fire Protection Association
31. NSF - National Sanitation Foundation
32. OSHA - Occupational Safety and Health Administration
33. PDI - Plumbing and Drainage Institute
34. SMACNA - Sheet Metal and Air Conditioning National Association
35. UBC - Uniform Building Code
36. UL - Underwriters Laboratories

1.5 QUALITY ASSURANCE

A. Provide complete installations of all systems.

B. Furnish all items of equipment, material, and labor to complete the Contract even though each and every item necessary is not specifically mentioned or shown.

C. In case of any conflict between the specifications, plans, and ordinances, the ordinances shall govern.

D. All materials furnished under this Contract shall be new, free from defects of any kind, of the quality and design hereinafter specified, and shall conform to the standards of Underwriter`s Laboratories Inc., except for equipment which U.L. does not list or provide label service.

E. All mechanical equipment and fixtures shall be the same brand unless scheduled differently on plans.

F. Contractor`s Responsibility:
1. Contractor assumes all responsibility regarding the safety of his personnel on the project during construction.
2. Erect barricades, protective fencing, and signs to prevent injury to personnel on site.
3. Make permanent connection to utilities or existing lines. Determine depth and location, and bid accordingly.
4. Relocate and repair any existing lines cut by general construction work.
5. Pay all costs in connection with metering devices.
6. Plans do not show exact location and elevations of lines, nor do they show all offsets required.
7. Deviate from plans as required to conform to the general construction and provide proper grading.
8. Maintain all utility services during construction to existing portions of job that remain.
9. Procure and pay for all necessary permits or licenses to carry out the work.
10. Obtain and pay for all the necessary certificates of approval which must be delivered to the Architect/Engineer before final acceptance of the work.
11. Periodically remove rubbish, clean or repair all surfaces marred by the work required under this contract.
12. Protect work from damage by other trades.
13. Make all tests required by law; pay all costs in connection with the testing.
14. Where job conditions require changes in indicated locations and arrangement, make such changes without extra cost to Owner.

15. Provide motor starters, controls, relays, all low-voltage wiring, conduit and wiring related to HVAC and other equipment and devices to form a complete working system.

1.6 DEFINITIONS

A. Approval:
   1. It is understood that approval must be obtained from the Architect/Engineer in writing before proceeding with the proposed work.
   2. Approval by the Architect/Engineer of any changes, submitted by the Contractor will be considered as general only to aid the Contractor in expediting his work.

B. Contractor:
   1. The Contractor engaged to execute the work included in a particular section only, even though he may be technically described as a Subcontractor to the General Contractor.
   2. If the Contractor engaged to execute said work employs Sub-Contractors to perform various portions of the work included under this Section, he shall be held responsible for the execution of same, in full conformity with Contract Document requirements.
   3. The Contractor shall cooperate at all times and shall be responsible for the satisfactory cooperation of his Subcontractors with the other Contractors on the job so that all of the various phases of the work may be properly coordinated without unnecessary delays or damage to any parts of the work of any Contractor.

C. Provide:
   1. Defined as requiring the furnishing and installing of the item or facility indicated, complete in all respects, and ready for operation unless otherwise specifically noted.

D. As Required:
   1. Indicates that the Contractor shall perform the work or provide the material as indicated in accordance with manufacturer's installation instructions; and in accordance with applicable codes or regulations; and in a workmanlike manner as defined by good local practice.

E. Or Equal:
   1. Indicates that the Contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and/or described are, in the judgment of the Architect/Engineer, adequate. Submittals for review are required where indicated.

F. Intent of Contract Documents:
   1. The specific intent of these documents is to provide to the Owner, in a thoroughly functional condition, all the various systems, equipment, etc., indicated herein. Final authority over interpretation of the "intent" shall rest with the Architect/Engineer.

1.7 WARRANTY

A. The Contractor shall warranty his work against defective materials and workmanship for a period of one year from the date of acceptance of the job.

B. Neither the final payment nor any provisions in Contract Documents shall relieve the Contractor of the responsibility for faulty materials or workmanship.

C. He shall remedy any defects due thereto, and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from date of substantial completion.

D. The Owner shall give notice of observed defects with reasonable promptness.

E. This Guarantee shall not be construed to include the normal maintenance of the various components of the system covered by these specifications.

1.8 SITE VISIT

A. Before submitting his proposal, each bidder shall examine all plans and specifications relating to the work, shall visit the site of the project and become fully informed of the extent and character of the work required.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or the amount of work to be done, it being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans or required by nature of the site of which may be fairly implied as essential to the execution and completion of any and all parts of the work.

1.9 PROJECT RECORD DOCUMENTS

A. The Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and uncovered existing utility piping outside the building.

B. Upon submitting his request for final payment, he shall turn over to the Architect/Engi, for subsequent transmittal to the Owner, a clean, neatly marked set of reproducible plans showing "as installed" work and an electronic file with changes of materials.

C. In addition to the above, the Contractor shall accumulate during the job`s progress the following data, in duplication (2 each), prepared in 3 ring binders of sufficient size, black in color, neat in appearance, and turned over to the Architect/Engineer for checking and subsequent delivery to the Owner. Electronic copies of the following are also acceptable, but they must be saved to a single flash drive or external hard drive:
   1. All warranties, guarantees, and manufacturer`s directions on equipment and material covered by the Contract.
   2. Approved fixture brochures.
   3. Copies of reviewed shop drawings.
   4. Set of operating instructions. Operating instructions shall also include recommended maintenance and seasonal changeover procedures.
   5. Any and all other data and/or plans required during construction.
   6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.

D. The first page, or pages, shall have the names, addresses, and telephone numbers of the following:
   1. General Contractor and all sub-contractors.

2. Major Equipment Suppliers.

1.10 TRAINING

A. Upon completion of the work and at a time designated by the Owner`s representative, provide a formal training session for the Owner`s operating personnel to include location, operation, and maintenance of all mechanical equipment and systems, some sections have further instructions.

B. Before proceeding with instruction, prepare a typed outline in triplicate listing the subjects that will be covered. Submit the outline for review by the Owner`s representative.

C. At the conclusion of the instruction, obtain the signatures of the attendees on each copy of the outline to signify that they have a proper understanding of the operation and maintenance of the system. Submit the signed outlines to the Owner`s representative and Engineer as a condition of final acceptance.

1.11 PLANS AND SPECIFICATIONS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 01 Specifications apply to all of Division 23.

B. The plans show diagrammatically the locations of the various lines, ducts, conduits, fixtures, and equipment and the method of connecting and controlling them.

C. It is not intended to show every connection in detail and all fittings required for a complete system.

D. The systems shall include but are not limited to the items shown on the plans.

E. Exact locations of these items shall be determined by reference to the general plans and measurements of the building and in cooperation with other contractors, and in all cases, shall be subject to the approval of the Architect/Engineer.

F. The Architect/Engineer reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

G. Contractor, subcontractor, vendors, and suppliers are required to waive subrogation against Owner and Engineer.

1.12 UTILITIES, LOCATIONS, AND ELEVATIONS

A. Locations and elevations of the various utilities within the scope of this work have been obtained from the City and/or other substantially reliable sources and are offered separately from the Contract documents, as a general guide only, without guarantees as to accuracy.

B. The Contractor shall examine the site, shall verify to his own satisfaction the locations, elevations and availability of all utilities and services required, and shall adequately inform himself as to their relation to the work; the submission of bids shall be deemed evidence thereof.

C. The Contractor shall coordinate all services with the Utility Companies during construction, coordinate changes made by Utility Companies to the design of project,

and coordinate with the Owner, Architect/E, and Utility the scheduling of any shutdowns or delays that may occur in providing service.

D. The Contractor shall verify location, conduct all necessary tests, inspections, coordinate with Owner`s representatives and utilities, and check for existing underground utilities and lines before ditching.

E. The Contractor shall be responsible for repair of any cut or damaged lines or utilities he uncovers. There are lines and utilities not shown on any plans.

1.13 SUBSTITUTION OF PRODUCTS

A. Substitution of products specified herein will be considered only when a complete list of proposed alternative equipment is submitted to the Engineer in writing, supported by adequate technical and cost data. This includes a complete description of the proposed substitution, drawings, catalog cuts, performance data, test data, or any other data or information necessary for evaluation.

B. All proposed substitutions and data must be received by the Engineer no less than seven working days prior to the scheduled date for opening of bids.

C. The Engineer will consider all such submittals and the Architect/Engineer will issue an addendum listing items which the Engineer considers acceptable. Only such items as specified or approved as acceptable will be installed on this project.

D. Manufacturers` names are listed herein and on the plans to establish a standard of quality and design. Where a manufacturer`s name is mentioned, products of other manufacturers will be acceptable, if, in the opinion of the Engineer, the substitute material is of equivalent quality or better than that of the material specified.

E. The Contractor`s Bid represents that the bid price is based solely upon the materials and equipment described in the Bid Documents (including addenda, if any) and that he contemplates no substitutions or extras.

F. Requests for substitution are understood to mean that the Contractor:
   1. Has personally investigated the proposed substitution and determined that it is equal or superior in all respects to that specified.
   2. Will provide the same guarantee for the substitution that he would for that specified.
   3. Will, at no cost to the Owner, replace the substitute item with the specified product if the substitute item fails to perform satisfactorily.
   4. After Award of the Contract, substitutions will be considered only under one or more of the following circumstances:
      a. The substitution is required for compliance with subsequent interpretations of code or insurance requirements.
      b. The specified product is unavailable through no fault of the Contractor.
      c. The manufacturer refuses to warranty the specified products as required.
      d. Subsequent information that the specified product is unable to perform properly or to fit in the designated space.
      e. In the Engineer`s sole judgment, the substitution would be in the Owner`s best interest.

5. Revisions to the mechanical system shall be under the supervision of the Engineer at a standard hourly rate charged by the Engineer and shall be paid by the Contractor originating the changes.

1.14 PROTECTION OF EQUIPMENT AND MATERIALS

A. Contractor shall continuously maintain adequate protection of both stored and installed materials and equipment. Fixtures and equipment, whether located inside or outside, shall be tightly covered with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust, moisture and abuse from other trades. Adequate air circulation shall be provided under any protective sheet to prevent condensate build up. Materials and equipment shall not be stored directly on the ground, floor or roof deck. Ductwork, piping and equipment shall not be used by other trades as supports for scaffolds or personnel. At the completion of the work, equipment, fixtures, exposed supports and piping shall be cleaned of dirt, construction debris, overspray, etc., to the satisfaction of the Architect/Engineer. Repairs made necessary by damage shall be paid for by the Contractor.

B. Contractor in performing his work shall take particular care not to damage the structure. All finished floors and step treads shall be covered to prevent any damage by workmen or their tools and equipment during the construction of the building. In addition, each Contractor shall protect any materials on the job site whether a part of this contract or the property of another Contractor.

C. Contractor shall be responsible for damage to project caused by this Contractor's failure to recognize hazards associated with items such as leaks, scheduling of work, inexperienced workmen, excessive cutting, etc.

D. Contractor shall familiarize himself with working conditions to the extent that he shall be responsible for damage to concealed piping, wiring and other equipment to remain and shall repair any damage caused by his negligence at no cost to the Owner.

E. The Contractor shall take such precautions as may be necessary to properly protect his apparatus from damage.

F. This shall include the creation of all required temporary shelters to adequately protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

G. Failure to comply with the above to the satisfaction of the Owner`s inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by this Contractor.

H. All apparatus shall be cribbed up from the floor or ground by the Contractor and covered with tarpaulins or other protective covering where necessary or directed.

I. Each contractor shall provide space for storage of materials, equipment or tools at ground level. Any storage contemplated within the building will be allowed only upon specific approval of the Architect/Engineer.

1.15 FINAL INSPECTION

A. It shall be the duty of this Contractor to make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance before calling upon the Architect/Enginee to make a final inspection.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, etc., called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc., before preparing for submission to verify that the terms check with the requirements of the specifications.

1.16 ASBESTOS

A. No asbestos or asbestos containing materials shall be permitted in this project.

1.17 CUTTING AND PATCHING

A. All Subcontractors shall notify the General Contractor sufficiently ahead of construction of any floors, walls, ceiling, roof, etc., of any openings that will be required for his work.

B. He shall see that all sleeves required for his work are set at proper times so as to avoid delay of the job.

C. All necessary cutting of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this Contract shall be done at the Subcontractor`s expense in a neat and workmanlike manner, and as approved by the Architect/Engineer.

D. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Architect/Engineer.

E. Patching of openings and/or alterations shall be provided by the General Contractor.

F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

G. All openings in exterior walls shall be sealed watertight.

1.18 MANUFACTURER`S INSTRUCTIONS

A. All equipment and devices shall be stored, protected and installed in accordance with these plans and specifications, manufacturer`s instructions, and applicable codes.

B. Where specifications call for installation of a product to be in accordance with manufacturer`s instructions and/or where manufacturer`s instructions are required for installation of a product, it shall be the contractor`s responsibility to obtain the necessary applicable manufacturer`s instructions and install the product in accordance with the manufacturer`s instructions.

C. It shall be the Contractor`s responsibility to install all equipment, materials, and devices shown on the plans and as called out in these specifications even if manufacturer`s instructions are absolutely unattainable.

D. Any such work performed that does not comply with the manufacturers' directions shall have deficiencies corrected at no cost to the Owner.

1.19 RELATED WORK

A. Whether specifically identified or not, it is the responsibility of the Mechanical Contractor to coordinate all mechanical work with all related trades.

1.20 ELECTRICAL WIRING AND EQUIPMENT FOR MECHANICAL SYSTEMS

A. All wiring, conduit, boxes, equipment (controls, thermostats, relays, contactors, motor starters, heaters, switches), and any other control devices or equipment required to form a complete and properly operating system, shall be the responsibility of the Mechanical Contractor.

B. The Electrical Contractor shall only provide line voltage (including hook-up) to all mechanical equipment.

C. All mechanical controls and devices shall be low voltage unless otherwise noted or shown on the plans. Where line voltage controls or devices are noted, the Contractor shall provide complete wiring diagrams (approved by the Engineer) to the Electrical Contractor prior to final hook-up.

D. All electrical resistance heating elements which are scheduled to be served by three-phase electrical power shall impose an equal electrical load on all phases. Electrical resistance elements which are not balanced over all three phases are not acceptable.

E. The Mechanical and Electrical plans are based on the equipment and devices scheduled as shown on the plans or as called for in the specifications. Should any mechanical equipment or device be changed or approved from those which are shown or noted, all electrical and/or mechanical changes shall be made at the expense of the trade or contractor initiating the change with no expense to the Owner, Architect, Engineer or their representatives.

F. All wiring provided by this Contractor shall be installed in a workmanlike manner using tie wraps, labels, anchors and etc. Loose wiring is not acceptable.

G. All conduit in all areas plus conduit and boxes required in all walls for control purposes (thermostats, etc.) shall be provided by electrical contractor.

1.21 DEMOLITION AND REMODEL

A. It shall be the responsibility of this Contractor to see that all demolition and remodeling work involving his trade (including but not limited to chilled and hot water piping used for space cooling and heating, condensate lines, air handlers, mechanical equipment, etc.) is accomplished in a manner and completeness to provide the appearance of new construction work.

B. Abandoned air conditioning units shall be removed and disposed of off-site in a legal manner.

C. Any usable equipment and/or structure damaged during demolition and remodel work shall be replaced.

D. All abandoned and/or otherwise unused piping shall be securely capped using materials of the same composition as the original piping.

E. No exposed piping and/or other materials will be permitted in the finished job.

F. Any abandoned piping which penetrates the slab in an exposed area shall be securely capped below the slab.

1.22 OPERATION PRIOR TO COMPLETION

A. When any piece of mechanical or electrical equipment is operable and the Contractor needs to operate the equipment, he may do so providing that he properly supervises the operation.

B. The warranty period shall, however, not commence until such time as the equipment is operated for the beneficial use of the Owner.

C. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust and complete all punch list items before final acceptance by the Owner.

D. The date of acceptance and the start of the warranty may not be the same date.

1.23 SAFETY GUARDS

A. Contractor shall furnish and install all safety guards required. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded.

1.24 FLAME SPREAD PROPERTIES OF MATERIALS

A. All materials and adhesives used for air conditioning filters, acoustical lining, and insulation shall conform to NFPA and UL life and flame spread properties of materials.

B. The composite classifications shall not exceed the flame spread rating and the smoke development rating as outlined by NFPA 255/ ASTM E-84 for the basic material, the finishes, adhesives, etc., specified for each system, and shall be such when completely assembled.

1.25 FILTER ASSEMBLIES

A. All filter housings and assemblies shall be factory built and supplied with the unit. A separate filter rack may be required and is the responsibility of the mechanical contractor to provide.

B. Access doors (panels) must be opened to change the air filters shall be labeled "Filter Access" and the number and size of required filters shall be identified.

C. No piping conduit etc. shall be installed in front of this access door.

D. Install clean filters prior to substantial completion.

E. All air handlers shall have filters installed upstream of all coils.

1.26 LEAD MATERIALS

A. No lead or lead containing materials shall be allowed in any domestic or potable water supply piping, valves, fixtures, components, equipment, or any other item.

1.27 REFRIGERANTS

A. Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) shall not be allowed in any equipment on this project.

B. Comply with ASHRAE Standards 15 and 34.

1.28 REFRIGERANT RECOVERY AND RECYCLE

A. Refrigerants shall not be released to the environment.

B. Contractor shall provide recovery and recycle equipment that has been certified by the Electrical Testing Laboratories or Underwriters Laboratories.

C. Contractor shall also provide properly trained and certified (in accordance with EPA) personnel for refrigerant work during installation, demolition, start-up, servicing, etc.

1.29 ACCESS CLEARANCE

A. Proper access to all installed equipment shall be provided. The Mechanical Contractor shall label all points of access immediately upon installation with a marker pen.

B. A minimum of 3 feet shall be maintained in front of all access points.

C. If another trade violates this space, the Mechanical Contractor shall immediately notify the General Contractor to correct this condition.

D. When equipment is installed above lay-in ceiling the Mechanical Contractor shall coordinate with the Ceiling Contractor to provide access without removing part of T-bar ceiling.

E. No speakers, lights, fire alarm equipment, etc. shall be installed in lay-in ceiling tiles where access is to be gained.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall be new and free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new.

2.2 MANUFACTURERS REQUIREMENTS

A. When a manufacturer's name appears in these specifications, it is not to be construed that the manufacturer does not have to meet the full requirements of the specifications or that his standard cataloged item will be acceptable.

PART 3 - EXECUTION

3.1 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES

A. Drawings are not to be construed as shop drawings, but indicate the extent, general location, arrangement, etc., of piping systems and equipment. This Contractor shall refer to other sections of the specifications and other drawings such as electrical, structural, architectural, etc., in order to eliminate conflicts and undue delays in the progress of the work. Where other Contractors furnish items requiring piping connections by this Contractor, they will be held responsible for providing roughing-in drawings and assistance upon request.

B. Each trade shall so harmonize its work with that of the other trades so that the work may be done in the most direct and workmanlike manner without hindering the other trades. Piping interference shall be handled by giving precedence to pipelines which require a stated grade for proper operation.

3.2 TESTING

A. After all mechanical systems have been completed and put into operation, subject each system to an operating test under design conditions to ensure proper sequence and operation throughout the range of operation regardless of the season the contractor shall test all HVAC equipment in both heating and cooling modes.

B. Each and every phase of the new air conditioning, heating, and ventilating systems shall be operated separately, or in conjunction with the other, for a period of time, to demonstrate to the satisfaction of the Architect/Engineer the ability of the equipment to meet the capacity and performance requirements while maintaining design conditions in accordance with the true intent and purpose of these specifications.

C. Previous to such performance tests, the Contractor shall have set all valves, dampers, motors, controllers, thermostats, etc., and shall have the system operating and maintaining design temperatures, humidity, and air circulation throughout all areas of the building.

D. Make adjustments as required to ensure proper functioning of all systems.

E. Special tests on individual systems are specified under individual sections.

F. See Section 23 05 93 for Testing, Adjusting, and Balancing for HVAC.

END OF SECTION

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SECTION 23 00 90

HVAC SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This section supplements Division 01 Submittal Procedures and contains additional requirements applicable to Division 23 submittals.

1.2 SECTION INCLUDES

A. This section includes, but is not limited to:
   1. HVAC submittal procedures
   2. This section applies only to the Division 23 specifications. Submittals required by other specification divisions are not included here, even though the same subcontractor may be providing work under other divisions.

1.3 DEFINITIONS

A. Product Data: Illustrations, standard schedules, performance charts, instructions, and brochures furnished by the contractor, subcontractor, manufacturer, or supplier to illustrate materials or equipment or to illustrate some portion of the work. Provide a summary of scheduled items with all data in schedules.

B. Shop Drawings: Drawings, diagrams, schedules, and other data specifically prepared for the work by the contractor, subcontractor, manufacturer, or supplier to illustrate some portion of the work.

C. Equipment/Material Submittal Package: A compilation of the product data, shop drawings, and other items as required by the specifications, submitted near the start of the work. Typically, the specifications require the initial submittal package to be submitted within a certain number of days after the work starts.

D. Quality Assurance Submittal: Items submitted before and during the execution of a particular portion of the work for the purpose of guarding against defects and deficiencies.

E. Quality Control Submittal: Items submitted at the completion of a particular portion of the work for the purpose of evaluating completed activities and elements of the work for conformance with contract requirements (e.g. start-up reports).

F. Closeout Submittals: Items submitted at or near the completion of the contract.

1.4 SUBMITTALS

A. The materials, workmanship, design, and arrangement of all work installed under this contract shall be subject to the review of the architect, engineer, and owner. Review of shop drawings and/or submittal data shall not relieve the Contractor of responsibility for deviations from the contract drawings or specifications.

B. Manufacturers: Manufacturers submitted shall be as per the acceptable manufacturers listed in each specification section or referenced schedule.

C. Required Submittals: All material, components and equipment that fall under Division 23 shall be submitted.

D. Contractor's Coordination Submittals: The contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the project, but such data shall remain between the contractor and his subcontractors and will not be reviewed by the engineer.

E. Electronic Submittals: E-mail or other electronic forms of submittals from the contractor are required. The procedures described in this section shall be as follows:
   1. The contractor shall supply one electronic copy of the submittal.
   2. The electronic files will either be e-mailed to the architect or posted to a project management and information exchange website, depending on the architect's requirements. The architect and contractor can distribute copies of the files as desired.
   3. The engineer will retain an electronic copy of the submittal and all responses.

F. Coordination Correspondence: The contractor may desire to verify the acceptability of a particular item prior to assembling the initial submittal package. The contractor may send material directly to the engineer for comments and feedback. This communication will be treated as normal coordination correspondence and will not be tracked or documented as a formal submittal. The engineer may or may not respond to such correspondence. If the engineer agrees, in writing, to the use of a particular item, then that same material shall be included in the initial submittal package along with a copy of the correspondence.

G. Unapproved Products: If materials or equipment are installed before being reviewed by the engineer, the contractor shall be liable for the removal and replacement of such unapproved materials and equipment, at no additional expense to the owner. Additionally, if the removal and replacement of rejected materials or equipment necessitates the removal and replacement of other related materials or equipment, then the contractor shall be liable for the removal and replacement of the related materials and equipment at no additional expense to the owner.

H. Product Data: Where the content of manufacturer submittal literature includes data not pertinent to the submittal, clearly indicate which portions of the contents are being submitted for review. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested shall be specific and identifications in catalogs, pamphlets, etc., of items submitted shall be clearly made in a contrasting ink or highlighting. Data of a general nature shall not be acceptable.

I. Shop Drawings:
   1. Contractor shall submit shop drawings showing all piping, ductwork and equipment shown by drawings and specification. Submit drawings on all mechanical rooms and congested areas. The drawings shall be coordinated with structural, electrical and fire sprinkler drawings. Submit prior to construction of work.
   2. Scale and measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item.
   3. Electronic shop drawing submittals are required.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 SUBMITTALS

A. Make submittals of product data, shop drawings, samples, quality assurance submittals, quality control submittals, and other items in accordance with the requirements of this section, applicable sections in Division 23, and additional requirements of each individual Division 23 specification section.

B. Grouping of Submittals:
   1. The submittal package shall be coordinated and included in a single submission. Multiple submissions are not acceptable except where prior written approval has been obtained from the engineer. Partial submittals may be rejected, without being reviewed, as not complying with the provisions of the contract.
   2. In the case that multiple submissions are approved, it is the responsibility of the contractor to maintain and update a submittal checklist. The contractor shall ensure that all applicable submittal sections are submitted to the Engineer. If a submittal section is not submitted, it will be considered rejected until reviewed by the Engineer.
   3. If submittal sections are submitted as individual submittal files, the submittal sections will be grouped and returned as one file with one set of submittal responses.

C. Electronic Submittal Organization:
   1. Electronic submittals are to be submitted as a single PDF file. Within the PDF file, each section shall be bookmarked.
   2. Provide an electronic submittal cover sheet that lists at least the following:
      a. Project name
      b. Date
      c. Name and address of architect
      d. Name and address of engineer
      e. Name, address, and telephone number of prime contractor
      f. Name, address, and telephone number of HVAC contractor
      g. Name, address, and telephone number of HVAC supplier
   3. Provide an electronic index sheet listing all items submitted.
   4. The contractor shall call to the attention of the engineer, clouded in the submittal and noted after the index sheet, any instance in which the submittals are known to differ from the requirements of the contract documents.
   5. Organize all required items by specification section. The material for each specification section shall be organized as follows:
      a. Provide an electronic section cover sheet that lists the same information as the submittal cover sheet, plus the specification number and title and the name, address, and telephone number of the vendor or vendor’s representative, if applicable.
      b. Refer to the individual Division 23 specification sections for any required organization of the submittal material within each submittal section.

c. Bookmarked sections shall be arranged by specification section number in numerical order.
d. Submit in accordance with these procedures and procedures described in Division 01 Submittal Procedures.
e. Submittals not organized as described here may be rejected, without being reviewed, as not complying with the provisions of the contract.

D. Response to engineer's review:
1. Review comments: Review comments of the engineer will either be shown on the returned sets to the contractor or shown on a document attached to the sets. If the comments are on an attached document, then the engineer will place a note on the submittal referring to the attached comments. In such cases, the engineer's signature will appear only on the attached document. If the attached, signed document becomes physically separated from the submittal, then the submittal will no longer be considered as being a reviewed submittal.
2. Complete rejection: If the submittal is not complete or does not meet the requirements of this specification section, then the engineer may reject the entire submittal and return the submittal without further review or comment. In such cases, the entire submittal shall be completely revised and resubmitted. The resubmittal shall be given a new submittal number and shall be documented and processed as a separate submittal from the original.
3. Held for completion: If the submittal is not complete, but is only missing some minor item, the engineer may, at the engineer's sole discretion, hold the submittal rather than rejecting and returning the submittal. In such cases, the engineer will notify the architect and contractor that the submittal is being held for completion. The contractor will be given a predetermined amount of time to provide the missing item. Upon receipt of the missing item, the engineer will insert the missing item into the submittal package and proceed with the review process.
4. Partial rejection: The engineer may reject only certain portions of the submittal. In such cases, only those rejected portions or items need to be revised and resubmitted.
5. Provide as noted and corrected: The engineer may note a required change to a submitted item, but may not consider the change serious enough to require a resubmittal. In such cases, the engineer will note that the item is to be provided as noted or corrected. In such cases, the contractor may proceed to provide the item. However, if subsequent observations reveal that the noted change was not made, then the contractor shall be liable for removal and replacement of the item at no additional cost to the owner.
6. Reviewed without comment: The contractor may proceed to provide all materials and equipment as submitted.

E. Close-out Submittals:
1. Provide close-out submittals and O&M's at or near completion of the contract.

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Identification required for mechanical systems.

B. Code required identification not shown on plans nor specified herein shall be provided.

1.2 RELATED SECTION

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 – HVAC Submittal Procedures

1.3 SUBMITTALS

A. Provide submittal data on all items specified in this section in accordance with Specification Section 23 00 90, General Conditions, and Division 01.

B. Submit wording of nameplates with submittals.

C. Submit a list of all products incorporated in this section.

1.4 REFERENCES

A. Comply with ANSI A13.1

B. USAS Code B31.8

C. NTSB-PSS-73-1

D. AGA

1.5 DESCRIPTION OF WORK

A. Nameplates and tags are to be provided for all mechanical equipment and piping in the project. Identification is also required for the following, but is not limited to:
   1. Air Handlers
   2. Boilers/Water Heaters
   3. Condensing Units
   4. Duct Dampers
   5. Filter Sizes for Air Handlers
   6. Fire Dampers
   7. Heat Exchangers
   8. Outside Air Units
   9. Piping
   10. Pumps
   11. Starters
   12. Supply/Exhaust Fans

13. Valves
14. Refrigerant Lines

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Seton

B. Brady

C. MSI

2.2 EQUIPMENT LABELS

A. Type: Engraving-Stock, melamine plastic laminate, 3 layer.
   1. Thickness:
      a. Less than 25 square inches: 1/16 inch
      b. 25 square inches or more: 1/8 inch

B. Color:
   1. Black

C. Conform to FS L-P-387A

2.3 LETTERING

A. Style:
   1. Engraved standard print.

B. Size:
   1. 3/16 inch to 1/4 inch

C. Color:
   1. White letters, black background

2.4 NAMEPLATE/TAG INFORMATION

A. HVAC Equipment:
   1. Unit mark from Drawings/Owner
   2. Voltage - Phase
   3. Manufacturer and Model Number
   4. Filter size

2.5 NAMEPLATE FASTENERS

A. Securely attach nameplates to equipment with non-corroding stainless steel screws.

B. In addition to name plate tags on HVAC equipment, provide and install 1/2" diameter nameplate marker (color to be approved by A/E), and apply to T-bar ceiling below any mechanical equipment and fire dampers above lay-in ceiling.

C. Non-corroding pop rivets are acceptable.

D. Stick-ons or adhesives will not be allowed.

2.6 PIPING AND CONTROL DIAGRAM SIGNS

A. Material: 1/4 inch acrylic cover and backing screwed together with brass screw/bolts.
   1. Size:
      a. Minimum: 12" x 17"
      b. Maximum: 24" x 36"

B. Provide a diagram in each mechanical room similar to the diagrams shown on the plans, and/or as required for the area served. This diagram to reflect as-built conditions.

2.7 IDENTIFICATION OF PRODUCTS

A. Provide pipe markers with the following features.
   1. Letters from 1/2" to 3-1/2"; size letters to afford readability from the appropriate viewing position.
   2. Repeated and reversed words for viewing from 360 degrees around pipe.
   3. Self-clinging, coiled markers that snap into place around pipe and do not require any other securement.
   4. Integral directional arrows.

B. Letters on Field:
   1. Identify the specific material conveyed. (i.e. "Domestic Cold Water", "Sprinkler", etc.)

C. Model:
   1. Less than 3/4":
      a. Tags: Piping System Devices, color codes for hazard.
   2. 3/4" up to 6"; snap-on.
   3. Over 6"; strap-on, with stainless steel spring straps.
   4. Use tags and/or nameplates that are scratch resistant and UV resistant for outdoor equipment and piping.

D. Piping System Devices (Valves, Thermometers, Pressure Gages, etc., and Pipe Less Than 3/4"):
   1. Identify with the following:
      a. Tags:
         1) Not less than 1-1/2 inch brass or aluminum tags, round, square, or octagonal.
      b. Stamp tags with minimum 1/2" high descriptive characters, 1/2" high numbers with black enamel-filled indentations.

E. Attachment:
   1. Stainless steel or solid brass jack chain, or stainless steel or brass "S" hooks

F. Refrigerant Lines (R454B and/or R32)
   1. Refrigerant pipe located in areas other than the room or space where the refrigerating equipment is located shall be identified. The pipe identification shall be located at intervals not exceeding 20 feet on the refrigerant piping or pipe insulation. The minimum height of lettering of the identification label shall be 1/2". The identification shall indicate the refrigerant designation and safety group classification of refrigerant used in the piping system.The identification shall also

include the following statement: “WARNING—Risk of Fire. Flammable Refrigerant.”

G. Ductwork:
1. Stenciled letters or self-adhesive labels, minimum 1" high characters.
2. Red ribbon at each balancing damper.

H. Underground Warning Tapes:
1. Provide materials that meet the codes or have the approvals listed below:
   a. Office of Pipeline Safety Regulation, USAS Code B31.8.
   b. GSA Public Building Service Guide Specification.
   c. National Transportation Safety Board Report NTSB-PSS-73-1.
   d. AGA Report 72-D-56.
   e. API Report API RP 1109.
2. Material:
   a. Plastic, continuous tape, color-coded, marked for hazard.
   b. For Non-metallic Piping System:
      1) Detectable Tape or Metallic Tape encased in plastic.
   c. Metallic Piping:
      1) Detectable Tape or Plastic Tape.
3. Color:
   a. Colored (not printed color) plastic, coded for material conveyed by piping.
4. Width:
   a. As scheduled for piping system burial depth.
5. Legend:
   a. "Caution [<>] Line Buried Below".
6. Tape Colors:

Utility	Color
Natural Gas, Oil, Dangerous Materials	Hi-Visibility Safety Yellow
Communications	Safety Alert Orange

7. Model:
   a. Metallic Piping System:
      1) Detectable Tape or Plastic Tape.
   b. Non-Metallic Piping System:
      1) Detectable Tape or Metallic Tape

I. Underground Gas Piping:
1. Attach No. 18 gauge copper tracer wire to the piping and terminate above grade at each end.

J. Pipeline Markers for Pipe Beneath Pavement and Slabs:
1. Minimum 2" round, square, or octagonal, same as specified in Subparagraph: Piping System Devices.

K. Attachment:
1. 1-1/2" screw, bolted to tag as anchor.
2. Anchor Setting Compound:
   a. Epoxy or epoxy grout, compatible with the pavement.

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall verify room numbers with Owner/Engineer before nameplates are fabricated.

B. The following shall be permanently and clearly identified:
   1. Each air handler, condensing unit, compressor, exhaust fan, and pump.
   2. Each zone duct, outside air duct, and return air duct whose duty is not immediately apparent.
   3. Each valve whose service and/or duty is not immediately apparent.
   4. Every piping system

3.2 INSTALLATION

A. Install signs on non-removable panels. Attach to equipment with pop rivets or stainless steel screws.

B. Mount in an easily visible location.

C. All labeling identification shall conform to final room numbers. Coordinate with General Contractor, A/E, and Owner to secure construction room numbers.

D. In addition to name plate tags on HVAC equipment, provide and install 1/2" diameter nameplate marker (color to be approved by A/E), and apply to T-bar ceiling below any mechanical equipment and fire dampers above lay-in ceiling.

E. Provide all additional signage required by local authority at no cost to the Owner.

F. Provide filter sizes and quantity on all air handlers.

G. Complete installation in accordance with ANSI A13.1 and manufacturer`s installation instructions and with the Drawings. Fasten each unit securely in place with stainless steel screws.

H. Equipment Labeling:
   1. Install on scheduled items of equipment, including the following:
      a. Air conditioning equipment
      b. Pumps
      c. Control panels and major control components
      d. Include Mark Number and descriptive name from Drawing and Specification schedules
      e. Attach with corrosion resistant, stainless steel screws or pop rivets

I. Piping System Color Coding:
   1. Designate for painter the following:
      a. Types of piping services
      b. Direction of flow
      c. Other information required for proper identification.

J. Surfaces to be Painted:
   1. Bare piping
   2. Insulation covering of insulated piping

K. Paint according to the following schedule:

System	Pastel Color
Condenser Water	Green
Gas Piping on Roof	Black or as required by local authority having jurisdiction

L. Piping System Devices (Valves, Thermometers, Pressure Gages, etc.):
1. Identify with the following information:
   a. System
   b. Device number
   c. Device Function

M. Device Chart:
1. Key devices to device chart
2. Give complete description of device function and system.

N. Key devices to drawings as follows:
1. Floor plans
2. Schematic drawings of piping systems

O. Underground Warning Tapes:
1. Tape Widths:

Piping Burial Depth	Tape Width
10"	2"
20"	3"
27"	6"
30"	9"
40"	12"
50" or more	18"

P. Recommended Tape Bury Depth:
1. Minimum Depth:
   a. 6".
2. Distance Between Pipe and Tape:
   a. Minimum 12".
   b. Maximum Depth: 12".
3. Tie tape to pipe where pipe leaves the ground.

Q. Pipeline Markers for Pipe Beneath Pavement and Slabs.
1. Location:
   a. Accuracy:
      1) Plus or minus 6" from piping centerline.
   b. Flat Edge Pavement and Slabs:
      1) Set within 6" of pavement or slab edge.
   c. Concrete Curbs:
      1) Set in top of curb.
   d. Spacing:
      1) Each change in direction, each edge of pavement or slab, maximum spacing of 100`.
2. Legend:

a. Same as tags plus an engraved or stamped line; set marker with line parallel to buried line.

3. Attachment:
   a. Drill hole for anchor bolt, full depth of bolt plus 1/2"; set full tag and bolt in epoxy, flush with pavement or slab.

END OF SECTION

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SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing and balancing services for the heating, ventilating, and air conditioning (HVAC) systems of this project.

B. The testing and balancing agency will be responsible for the satisfactory execution of testing and balancing of the HVAC systems.

C. The following are acceptable agencies:
1. Complete System Balance
2. Palmetto Air and Water Balance
3. Engineered Air Balance
4. PHI Service Agency, Inc.
5. Elite Test and Balance, LLC
6. ATCO EnviroAir Testing Engineers
7. Air Technology Consulting

1.2 RELATED SECTIONS

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 – HVAC Submittal Procedures

1.3 STANDARDS

A. The balancing agency shall perform the services specified herein in accordance with the Associated Air Balance Council`s National Standards, including revisions, to the date of the contract.

B. All terms in this specification shall have their meaning defined as stated in the National Standards.

C. If these specifications set forth more stringent requirements than the AABC National Standards, these specifications shall prevail.

1.4 QUALIFICATIONS OF THE BALANCING AGENCY

A. The balancing agency/firm shall be a registered member of the Associated Air Balance Council (AABC) and/or certified by the National Environmental Balancing Bureau (NEBB).

B. To perform required professional services, the balancing agency shall have a minimum of one "Test and Balance Engineer" certified by the Associated Air Balance Council and/or the National Environmental Balancing Bureau (NEBB).

C. This certified "Test and Balance Engineer" shall be responsible for supervision and certification for the total work herein specified.

D. The balancing agency shall submit records of experience in the field of air and hydronic system balancing or any other data as requested by the Owner/Engineer. The supervisory personnel for the firm shall have at least five (5) years' experience, and be a full-time employee for a minimum of six (6) months prior to the project. All employees used in this project shall be qualified technicians in this specific field.

E. The balancing agency shall furnish all necessary calibrated instrumentation to adequately perform the specified services. An inventory of all instruments and devices in possession of the balancing agency may be required by the Owner to determine the balancing agency`s performance capability.

F. The balancing agency shall have operated for a minimum of five (5) years under its current name.

1.5 DOCUMENTS

A. The General Contractor will provide the balancing agency one copy of the following documents:
   1. Project drawings (mechanical sepias if requested) and specifications.
   2. Reviewed construction revisions pertaining to the HVAC systems.
   3. Reviewed submittal data on HVAC equipment and systems to be installed by the Mechanical Subcontractor.
   4. Reviewed HVAC shop drawings.
   5. Reviewed HVAC wiring diagrams, control diagrams, and equipment brochures, as appropriate.

1.6 COORDINATION

A. It will be necessary for the balancing agency to perform its services in close coordination with the Mechanical Subcontractor.

B. The plans and specifications indicate meters, valves, dampers, and other devices for the purpose of adjusting the system to obtain optimum operating conditions. It will be the responsibility of the Mechanical Subcontractor to install these devices in a manner that will leave them accessible, readily adjustable, and complete. The balancing agency shall provide guidance if there is a questionable arrangement of a control or balancing device.

C. The General Contractor, Mechanical Contractor, Temperature Controls Subcontractor, and the suppliers of the HVAC equipment shall all cooperate with the balancing agency to provide all necessary data on the design and proper application of the system components. In addition, they shall furnish all labor and materials required to eliminate any system deficiencies.

1.7 RESPONSIBILITIES OF THE MECHANICAL CONTRACTOR

A. The Mechanical Contractor shall complete the installation and start all HVAC systems to ensure they are working properly and shall perform all other items as described hereinafter to assist the balancing agency in performing the testing and balancing of the HVAC systems.

B. Air Distribution Systems:
   1. Verify installation for conformity to design.
   2. Terminate all supply, return, and exhaust ducts, and pressure test them, for leakage, as required by specification.
   3. Ensure that all splitters, extractors, and volume and fire dampers are properly located and functional. Dampers serving requirements of minimum and maximum outside, return, relief, and exhaust air shall provide tight closure and full opening, with a smooth and free operation.
   4. Verify that all supply, return, exhaust, and transfer grilles; registers; diffusers; and high-pressure terminal units are installed and operational.
   5. Ensure that air-handling systems, units, and associated apparatus, such as heating and cooling coils, filter sections, access doors, etc., are blanked and/or sealed to eliminate excessive bypass or leakage of air.
   6. Ensure that all fans (supply, return, relief, and exhaust) are operating and free of vibration. All fans and drives shall be checked for proper fan rotation and belt tension. Overload protection shall be of proper size and rating. A record of motor current and voltage shall be made to verify that the motors do not exceed nameplate rating.
   7. Make any necessary changes to the sheaves, belts, and dampers, as required by the balancing agency, at no additional cost to the Owner.
   8. Install clean filters.

1.8 RESPONSIBILITIES OF THE TEMPERATURE CONTROLS CONTRACTOR

A. The Temperature-Controls Contractor shall allow sufficient time in the project to provide assistance and instruction to the balancing agency in the proper use and setting of control components such as, but not limited to, computers, static pressure controllers, or any other device that may need set points changed so that the testing and balancing work can be performed.

B. Furnish to the balancing agency any software and cables required to make adjustments to controls. Any unique micro-processor required to set controls shall be furnished by Temperature Controls Contractor.

C. The Temperature Controls Contractor shall complete the installation of the temperature control system, and operate and test all control systems to ensure they are functioning properly as designed. The Temperature Controls Contractor shall assist the balancing agency in testing and balancing the HVAC systems, as described hereinafter.
   1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air, and water reset, and fire and freeze stats.
   2. Verify that all controlling instruments are calibrated and set for design operating conditions.
   3. Calibrate room thermostats/sensors after installation, and before the thermostat control verification tests are performed. The balancing agency shall prove the accuracy of final settings by taking temperature readings. The readings shall be in a typical conditioned space for each separately controlled zone.

1.9 PRE-BALANCING CONFERENCE

A. Prior to beginning of the testing, adjusting, and balancing procedures, schedule and conduct a conference with the Architect/Engineer, General Contractor, Mechanical

Contractor, Electrical Contractor, and Temperature Controls Contractor. The objective of the conference is final coordination and verification of system operation and readiness for testing, adjusting, and balancing.

1.10 NOTIFICATION FOR TESTING AND BALANCING WORK TO BEGIN

A. The general contractor shall notify the balancing agency in writing when all heating, ventilating, and air conditioning systems are complete and ready for testing and balancing. The Mechanical Contractor shall attest that he has completed all items as described in "RESPONSIBILITIES OF THE MECHANICAL CONTRACTOR" Section of these specifications.

B. If upon commencing the work, the balancing agency finds that the systems are not ready, or if a dispute occurs as to the readiness of the systems, the balancing agency shall request an inspection to be made by the Mechanical Engineer. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for testing and balancing. Should the inspection reveal the notification to have been premature, the balancing agency shall be reimbursed for all costs for the inspection and work previously accomplished. Furthermore, such items that are not ready for testing and balancing shall be completed and placed in operational readiness before testing and balancing services shall again be requested.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 SCOPE

A. In accordance with Project Drawings and Specifications and as specified herein, the balancing agency shall provide all supervision, personnel, instruments, calibration equipment, and all other materials and services necessary to perform all testing and balancing of the heating, ventilating, and air conditioning systems. All test data including all pertinent calculations shall be reported on appropriate forms.

3.2 GENERAL

A. The testing and balancing of the heating, ventilating, and air conditioning systems shall be performed by an independent balancing agency approved by the Engineer. The balancing agency shall have a minimum of five years specialized experience in air and hydronic system balancing, possess calibrated instruments, certified "Test and Balance Engineers", and skilled technicians to perform all required tests. The balancing agency shall be a certified member of the Associated Air Balance Council and/or the National Environmental Balancing Bureau (NEBB).

B. The tests shall demonstrate the specified capacities and operation of all equipment and materials comprising the systems. The balancing agency shall then make available to the Owner`s representative such instruments and technicians as are required for spot checks of the system.

C. The balancing agency shall not instruct or direct the Mechanical Contractor in any of the work. Any proposed changes or revisions in the work shall be submitted to the Architect and General Contractor in writing.

D. Document Review:
   1. The Test and Balance Firm shall be responsible for reviewing the HVAC plans and specifications relating to the test and balance services for proper arrangement and adequate provisions of devices for testing, adjusting, and balancing.
   2. Test and Balance Firm shall review HVAC manufacturers' submittals data relative to balanceability.
   3. Test and Balance Firm shall review submitted HVAC automatic temperature control sequences for conformity to the specifications.

3.3 SERVICES

A. During construction, the balancing agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the heating, ventilating, and air conditioning systems.

B. The inspections shall be performed periodically as the work progresses. A minimum of two inspections are required as follows: (1) when 60 percent of the ductwork is installed; (2) when 90 percent of the equipment is installed. The balancing agency shall submit a brief written report of each inspection to the General Contractor and Engineer.

C. Upon completion of the installation and start-up of the mechanical equipment by the Mechanical Contractor, the balancing agency shall test and balance the system components to obtain optimum conditions in each conditioned space in the building.

3.4 DEFICIENCIES

A. If in the process of performing the TAB work, any deficiencies encountered shall be brought to the attention of the contractor responsible through defined procedures and entered in the punch list of deficiencies on the next daily Status Report. If correction of the deficiency is urgent, the matter shall be brought to the attention of all involved parties for quick resolution. The General Contractor shall provide and coordinate services of qualified responsible subcontractors, suppliers, and personnel as required to correct, repair, or replace any and all deficient items or conditions during the testing, adjusting, and balancing period.

B. The notification may be for single or multiple deficiencies. The work necessary to correct items on the listing shall be performed and verified in writing by the affected trade.

C. All deficiencies that prevent proper TAB work from being completed shall be corrected prior to submittal of the Final TAB Report, unless the correction of such deficiencies cannot be accomplished in a reasonable period of time, in which case the Mechanical Engineer may grant permission to submit the Final TAB Report with the deficiencies detailed in the report.

3.5 AIR SYSTEM PROCEDURES

A. The balancing agency shall perform the following testing and balancing functions in accordance with the Associated Air Balance Council`s National Standards:
   1. Fan Speeds:

a. For all two stage units, low and high fan speeds must be individually set. For all muiltistage units, every fan speed step must be individually set. When controls contractor are directly controlling fan speed, the balancing agency shall provide the fan speeds needed to control units at every stage.
b. Test and adjust fan RPM to achieve design CFM requirements.

2. Current and Voltage:
   a. Measure and record motor current and voltage.
3. Pitot-tube Traverse:
   a. Perform a Pitot-tube traverse of main supply and return ducts to obtain total CFM. If a Pitot-tube traverse is not practical, the summation of the outlets or inlets may be used. An explanation of why a traverse was not made must appear on the appropriate datasheet.
4. Outside Air:
   a. Test and adjust system minimum outside air by Pitot-tube traverse. If a Pitot-tube traverse is not practical, the percentage of outside air may be determined by calculations from the return air, outside air, and mixed air temperatures. Make allowances for heat of compression and motor heat where applicable.
5. Static Pressure:
   a. Test and record system static pressures, including suction and discharge static pressure of each fan.
6. Air Temperature:
   a. Take wet-bulb and dry-bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.
7. Zone Ducts:
   a. Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
8. Main Ducts:
   a. Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.
9. Branch Ducts:
   a. Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
10. Tolerances:
    a. Test and balance each diffuser, grille, and register to within 10 percent of design requirements.
11. Identification:
    a. Identify the location and area of each grille, diffuser, register, and terminal box. This information shall be recorded on air outlet data sheets.
12. Description:
    a. Record the size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
13. Terminal Boxes:
    a. Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements. All associated temperature controls shall be checked for proper operation and calibration. If the terminal boxes have separate settings for heating and cooling CFM, the CFM quantities for each shall be recorded on air outlet data sheets. All diffusers connected to the

terminal box shall be read in the heating and cooling modes and their readings recorded on air outlet data sheets.

14. Minimizing Drafts:
    a. Adjust all diffusers, grilles, and registers to minimize drafts in all areas.

3.6 VERIFICATION OF TEMPERATURE CONTROL

A. The balancing agency shall be assisted by the Temperature Controls Contractor in verifying the operation and calibration of all temperature control systems. The following tests shall be conducted:
   1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water reset, and fire and freeze stats.
   2. Verify that all controlling instruments are calibrated and set for design operating conditions.
   3. Verify the accuracy of the final settings by taking temperature readings. The readings shall be in a typical conditioned space for each separately controlled zone.

B. In the process of performing the TAB work, the balancing agency firm shall:
   1. Verify that all dampers, valves, and other controlled devices are operated by the intended controller.
   2. Verify that all dampers and valves are in the position indicated by the controller (open, closed, or modulating).
   3. Verify the integrity of valves and dampers in terms of tightness of close-off and of full-open position. This includes dampers in VAV terminals.
   4. Check that all valves are properly installed in the piping system in relation to direction of flow and location.
   5. Verify the proper application of all normally open and normally closed valves.
   6. Check the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts, or cold/hot walls.
   7. Check the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media.
   8. Check the sequence of operation for any control mode to ensure that it is in accordance with the Contract Documents.

C. Verify that all controller set points meet the design intent. Record observations of systems under DDC control. Record all default set points if different from operating set points.

D. Check all dampers for free and full operation, and record any obstructions.

E. Verify the operation of all interlock systems.

F. Perform all system verifications to assure the safety of the system and its components.

G. Verify that the changeover from heating to cooling mode occurs as specified.

3.7 TEST AND BALANCE REPORT

A. The test and balance report shall be complete with logs, data, and records as required herein. All logs, data, and records shall be typed on white bond paper and bound and

submitted in a single PDF file. The report shall be certified, accurate and complete by the balancing agency`s certified Test and Balance Engineer.

B. The report shall contain the following general data in a format selected by the balancing agency:
   1. Project number
   2. Contract number
   3. Project title
   4. Project location
   5. Project Architect
   6. Project Mechanical Engineer
   7. Test & Balance agency
   8. Test & Balance Engineer
   9. General Contractor
   10. Mechanical Subcontractor
   11. Dates tests were performed
   12. Certification

C. The test and balance report shall be recorded on report forms conforming to the recommended forms in the AABC National Standards. At a minimum, the report shall include:
   1. Preface:
      a. A general discussion of the system, any abnormalities, and problems encountered.
      b. A deficiency log detailing system abnormalities that do not meet these specifications.
      c. The list of instruments including type, model, manufacturer, serial number, and calibration dates.
   2. System Data:
      a. All test and balance data indicating design conditions, and actual conditions of operation for each device and/or piece of HVAC equipment.
      b. Outside Air Temperatures, dry bulb, and wet bulb.
      c. Entering Air Temperatures, dry bulb, and wet bulb.
      d. Discharge Air Temperatures, dry bulb, and wet bulb.
      e. Suction and discharge static pressures across each fan.
      f. Verification of valve positioning and static pressures across valves
      g. Entering and Leaving water temperatures across all coils.
      h. Static pressure drops across all coils and equipment (ahus. chillers, pumps, boilers, cooling towers, etc.)
   3. System Identification:
      a. In each report, the zones, supply, return, exhaust openings, and traverse points shall be numbered and/or lettered on mechanical drawings corresponding to the numbers and letters used on the report data sheets.
   4. Controls:
      a. Document verification of controls.
   5. Occupancy Inspection:
      a. Make a total of three (3) inspections within ninety (90) days after occupancy of the building, and make adjustments if required, to ensure that satisfactory conditions are being maintained throughout. Inspections to be coordinated

with Architect/Engineer and Owner and shall be documented with a supplemental report containing data and information as required.

6. Instructions to Operating Personnel:
   a. Test and Balance Firm shall instruct the operating personnel regarding the following:
      1) Systems Operation
      2) Unusual Operating Conditions.
      3) System Troubleshooting Procedures.

3.8 REPORT SUBMITTAL

A. The test and balance report are required and shall be submitted to the General Contractor for distribution to the Owner, Architect, and Mechanical Engineer. The test and balance report shall be submitted in a single, fully bound PDF file.

3.9 FINAL ACCEPTANCE

A. At the time of final inspection, the balancing agency shall recheck, in the presence of the Owner`s representative, specific and random selections of data recorded in the certified test and balance report.

B. Points and areas for recheck shall be selected by the Owner`s representative.

C. Measurements and test procedures shall be the same as the original test and balance.

D. Selections for recheck, specific plus random, shall not normally exceed 15 percent of the total number tabulated in the report, except where special air systems require a complete recheck for safety reasons.

E. If random tests demonstrate a measured flow deviation of 10 percent or more from that recorded in the certified test and balance report, the report shall automatically be rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, a new certified test and balance report submitted, and a new inspection test made, all at no additional cost to the Owner.

3.10 OPPOSITE SEASON TEST

A. Opposite season test and balance work shall be required for systems that cannot be tested and balanced due to climate or seasonal conditions. An example would be Chiller operation in the winter season, or Boiler operation in the summer season. In such case, the balancing agency shall perform an inspection of the buildings HVAC system during the opposite season from that in which the initial adjustments were made. The balancing agency shall make any necessary modifications to the initial adjustments to produce optimum system operation in compliance with the contract documents. The TAB agency shall contact the Owner’s Commissioning Agent, to coordinate such work, no less than 14 calendar days prior to any Opposite Season Testing.

B. Opposite Season Testing is not required if the Owner’s Commissioning Agent can simulate off season conditions via the building automated controls system.

END OF SECTION

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SECTION 23 07 21

REFRIGERANT PIPING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Elastomeric closed-cell structure insulation

B. Applications - All refrigerant line sets serving units

1.2 RELATED SECTIONS

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 - HVAC Submittal Procedures

C. Section 23 23 00 - Refrigerant Piping

1.3 SUBMITTALS

A. Product Data:
1. Provide submittal data on all equipment specified in this section in accordance with Section 23 00 90, General Conditions, and Division 1.
2. Submit product data indicating typical catalog of information.
3. Submit product data sheets indicating dimensions, general assembly, and ratings.
4. Submit manufacturer`s installation instructions.

1.4 SHOP DRAWINGS

A. Submit 1/4" per foot shop drawing(s) showing all piping and equipment shown by plans and specifications. The drawings shall be coordinated with structural, electrical, and fire sprinkler drawings.

1.5 REFERENCES

A. Refer to Section 23 00 00 for complete names of references identified in this section.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials

1.6 QUALITY ASSURANCE

A. Fire Endurance Rating: The composite classifications shall be listed and labeled to not exceed 25 flame spread rating and 50 smoke development rating as outlined by NFPA 255/ ASTM E84/ UL 723 for the basic material, the finishes, adhesives, etc., specified for each system, and shall be such when completely assembled.

B. Components such as adhesives, mastics, and cement must meet the same requirement.

PART 2 - PRODUCTS

2.1 PIPE INSULATION

A. Type: Closed-Cell Flexible Elastomeric Foam Pipe Insulation w/dual-tape overlap self seal lip closure.

B. Performance Criteria: Resistant to ultra-violet and biological degradation.

C. Temperature Range: -297°F to 220°F

D. Water Vapor Permeability (Dry Cup): Less than 0.02 per inch when measured by ASTM E96.

E. Thermal Conductivity: 0.24 - 0.28 BTU-IN/HR-FT2-°F.

F. All Refrigerant Line Set Insulation thickness - 1" on Interior Pipe, 1½" on Exterior Pipe

G. Manufacturer/Model:
   1. K-Flex Insul-Lock DS
   2. Aeroflex Self-Seal
   3. Armaflex Ultima

2.2 SEALANT, ADHESIVE & TAPE

A. Manufacturer/Model:
   1. K-Flex
   2. Armaflex
   3. Aeroflex

2.3 ALUMINUM METAL JACKETING/CLADDING

A. All exterior refrigerant line sets
   1. Manufacturers:
      a. Polyguard
      b. Johns Manville
      c. VentureClad
      d. RPR Products

PART 3 - EXECUTION

3.1 PIPE

A. To ensure that it will achieve its highest possible performance and serve its intended purpose, install all insulation materials and accessories in accordance with manufacturer’s published instructions (latest edition) and industry practices detailed by the North American Commercial and Industrial Insulation Standards Manual (latest edition).

B. Where straps or hangers are used, provide insulating pipe support insert and insulation shield.

C. Apply insulation to clean, dry pipes.

D. Butt insulation joints firmly together.

E. Seal butt seams with sealant. Duct tape or electrical tape will not be permitted.

F. Insulation without proper sealing of butt ends and longitudinal seams and/or not neat in appearance will be rejected by the Engineer.

G. Do not stretch insulation around elbows. All fittings must be factory-fabricated or site-fabricated from same materials as straight pipe insulation.

H. When possible, install insulation on piping prior to final connection.

I. Longitudinal joints installed after pipe is assembled are not acceptable.

J. Do not allow liquid lines to come in contact with any structural members or steel stubs. Use plastic ties to secure liquid lines to insulation on vapor line. Do not crush insulation.

3.2 FINISH

A. All exterior insulation to be protected with aluminum metal jacketing/cladding. Apply as recommended by the manufacturer, to protect the insulation on exterior of building.

3.3 VALVES, FLANGES & FITTINGS

A. Insulate all valves, flanges, and fittings in a neat manner.

3.4 REPAIRS AND REPLACEMENT

A. Replace any insulation that has ever been wet.

B. Repair any damage caused by condensation due to improper insulating.

C. Replace any insulation which is cut or torn during construction.

END OF SECTION

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SECTION 23 09 13

PROGRAMMABLE CONTROL DEVICES FOR HVAC (THERMOSTATS)

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Programmable Thermostats for use in controlling heating and/or cooling units.

B. Relative humidity sensors to control dehumidification mode.

C. CO2 sensors to control outside air damper positioning.

1.2 RELATED SECTIONS

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 - HVAC Submittal Procedures

1.3 SUBMITTALS

A. Provide submittal data on all items specified in this section in accordance with Specification Section 23 00 90, General Conditions, and Division 1.

PART 2 - PRODUCTS

2.1 TYPE

A. Programmable Commercial Thermostat

2.2 CONSTRUCTION

A. Complete with sub-bases

2.3 FEATURES

A. Seven-day flexible programming

B. Full feature touchscreen LCD

C. Automatic heat/cool changeover

D. Built-in HVAC equipment protection (with minimum on and off times)

E. Override of unoccupied program

F. Continuous unoccupied key

G. Comfort adjust feature

H. Unit with temperature, humidity, and CO2 sensors and control

I. WiFi or Bluetooth enabled thermostat that allows remote access via Tablet or Smartphone.

J. Tablet or Smartphone application must be capable of controlling and monitoring an unlimited number of thermostats.

2.4 MANUFACTURER AND MODEL

A. HVAC Manufacturer’s Thermostat

B. Distech UNITOUCH or ECY-STAT or Resense Air Display

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install new programmable thermostats in accordance with manufacturer`s instructions.

B. If HVAC Manufacturer’s thermostat is not used, it is the responsibility of the contractor to verify that all modes of cooling, heating, dehumidification, and outside air damper positioning can be properly controlled with the controls provided.

C. Programmable thermostat must “learn” appropriate warm up and cool down start times in order for space occupied setpoint to be reached at occupied start time. Unit shall not begin warm up/cool down at occupied start time.

END OF SECTION

SECTION 23 09 23A

SEQUENCE OF OPERATIONS GENERAL

PART 1 - GENERAL

1.1 NOT USED

PART 2 - PRODUCTS

2.1 NOT APPLICABLE

PART 3 - EXECUTION

3.1 CONTROL

A. MDF/IDF Rooms:
1. General:
a. The EMCS shall monitor space temperature for all MDF/IDF rooms. The EMCS shall generate an alarm should the space temperature exceed or drop below its assigned alarm limits (adj.)
2. Control Points:

Description	Type
Space Temperature (Each Room)	AI

END OF SECTION

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SECTION 23 09 23

ENERGY MANAGEMENT CONTROL SYSTEM (BACNET IP)

PART 1 - GENERAL

1.1 SUMMARY

A. System protocol shall be BACnet IP with Cat 6 cabling. Cabling outer jacketing color shall be coordinated and determined by Owner. If owner has no preference, color shall be purple.

B. LonWorks or proprietary protocol/software is not allowed. BACnet MS/TP and Modbus only acceptable for third party devices that are provided by others and being interfaced with.

C. It is the intent of this specification to describe the basic architecture and performance requirements of the Energy Management Control System (EMCS). The turn-key EMCS shall include all software including operator software, programming tools, graphics editor, all other available software programs, modules, or plug-ins offered by the DDC manufacturers, hardware, Control Units, Distributed Controllers, Unitary Controllers, Local Area Networks (LANs), sensors, modems, wiring, connectors, control devices, actuators, installation and calibration, supervision, adjustments and fine tuning necessary for a complete and fully operational system.

D. All systems shall be complete true stand-alone systems.

E. Everything shall be reprogrammed through software without change of any hardware. The owner shall have all the tools necessary to reprogram without any additional costs.

F. EMCS shall have backward and forward compatibility.

G. Systems shall be furnished and installed complete in all respects, including any and all equipment, controls, wiring, instrumentation, enclosures, labor, engineering, training, commissioning, programming, supervision, calibration, coordination with other trades, etc. No information given in (or omitted from) these specifications shall relieve the contractor of this absolute requirement. Include all associated electrical work except as noted. Work includes furnishing of all labor, superintendence, materials, tools, equipment and sources necessary for the complete installation or modification of the following systems as herein specified. It is the intent of these specifications that the Contractor shall furnish and install the systems complete in every respect and ready to operate. All equipment, miscellaneous items and accessories required for such installation and for the correct and convenient operation of the entire installation whether or not each such item or accessory is shown on the plans or mentioned in these specifications shall be furnished and installed.

H. Bidders shall take into account that projects require verification of existing conditions that are not described in these specifications. Bids shall include, at Bidder`s discretion, costs related to site verifications for renovation projects. No additional costs shall be allowed for such items.

I. Should discrepancies or ambiguities arise within these specifications, the most stringent condition with regard to cost shall govern the bid. Obtain clarification from the Engineer prior to purchasing equipment and proceeding with the work.

J. Where drawings are provided as part of or supplement to these specifications, such drawings are inherently schematic only and not intended to convey all controls, wiring, installation, details, etc. It shall be the responsibility of the EMCS contractor to verify that control approaches presented are appropriate for the HVAC systems involved, and that bids include all work described, specified, or otherwise necessary for a complete and functioning system.

K. Equipment and Software Updates/Upgrades:
   1. Equipment: All equipment, components, parts, materials, etc. provided throughout the period of Work (as governed in the Agreement) shall be fully compatible with all other equipment, etc. provided at any other time throughout the period of Work. Should updated versions of equipment be provided which are not fully compatible with earlier equipment provided, Contractor shall replace earlier equipment with the later version at no cost to Owner.
   2. Software: All software upgrades applicable to system and offered by the manufacturer/contractor for this system shall be provided at no cost to the Owner throughout the period of work. This no cost upgrade shall include installation, programming, modifications to field equipment, data base revisions, training, etc. as appropriate.

L. The Engineer shall reserve all authority regarding approval, conditional approval, or rejection of systems not fully complying with these specifications.

1.2 WORK INCLUDED

A. The EMCS shall be a totally Native BACnet IP based system, based on a distributed control system in accordance with this specification. All building controllers, application controllers, and all input/output devices shall communicate using the protocols and network standards as defined by the latest ANSI/ASHRAE Standard 135, BACnet. In other words, all controllers, including unitary controllers, shall be Native BACnet IP devices. No gateways shall be used for communication to controllers installed under this section. Gateways may be used for communication to existing systems or to systems installed under other sections.

B. Unless specified by the owner's IT team, the EMCS network should be separate from the owner's IT infrastructure, except for a single connection point for remote access (internet access provided by the owner). The EMCS contractor is responsible for providing all necessary ethernet switches and communication backbones to ensure a fully operational system.

C. The owner will provide reserved DHCP addresses and any other network configuration information necessary to each control contractor for the purpose of configuring each building controller on the owner network. The controls contractor shall coordinate the IP addressed for each building controller. It shall be the responsibility of each control contractor to coordinate with the owner for network connectivity.

D. At the end of the line for every BACnet IP communication trunk, system shall have a dedicated home run line back to building controller to have a complete loop.

E. Configure each building controller with all User Interface, Connectivity, and Embedded tools and licenses to allow for standalone operation as well as integration into a owners enterprise system. All building controllers shall also be supplied with UPS, battery backup or with SRAM Data Recovery Service with provisions for automatic restart and database backup in case of power failure. Additionally, all drivers necessary and required to function with the installed control components within the scope of work for each building shall be the responsibility of the control contractor.

F. The Energy Management Control System (EMCS) application program shall be written to communicate specifically utilizing BACnet IP protocols. Software shall include password protection, alarming, logging of historical data, full graphics including animation, full suite of field engineering tools including graphical programming and applications. Systems using operating systems other than that described above are strictly prohibited.

G. Incorporate and integrate all new building controllers, controllers, graphics and software into Owner's supervisory system and dashboard.

H. The installing contractor shall provide the new web-based software and software updates required for this project. Additionally, the installing contractor shall provide all computer related components (BAS Web server) for the new software platform to function in a peer-to-peer environment.

I. The Energy Management and Control System (EMCS) application program shall be written to communicate specifically utilizing BACnet protocols. Software shall include password protection, alarming, logging of historical data, full graphics including animation, full suite of field engineering tools including graphical programming and applications. Systems using operating systems other than that described above are strictly prohibited.

J. Building controllers shall include complete energy management software, including scheduling building control strategies and logging routines. All energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions only. Provide zone-by-zone direct digital logic control of space temperature, scheduling, runtime accumulation, equipment alarm reporting, and override timers for after-hours usage.

K. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.

L. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

M. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

N. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

O. Provide new sensors, dampers, valves, and install only new electronic actuators. No used components shall be used as any part or piece of installed system.

P. Unless otherwise specified, all products shall be of single manufacturer where possible with substitutions approved by Engineer/Owner.

Q. Provide all indicating devices, interface equipment, and other apparatus required to operate mechanical system and to perform functions specified and to operate other items specified.

R. Workmanship:
1. Contractor shall use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturers recommended methods of installation. In all respects, the workmanship shall be of the highest grade, and all construction shall be done according to the best practice of the trade. Unless otherwise noted, conduit shall be concealed and installed square to the building lines. Any work not meeting these requirements shall be replaced or rebuilt without extra expense to the Owner

1.3 SUBMITTALS

A. Drawings
1. The system supplier shall submit detailed complete, engineered drawings, control sequence, and bill of materials for approval.
2. The contractor shall supply one electronic copy of the submittal.
3. The electronic files will either be e-mailed to the architect or posted to a project management and information exchange website, depending on the architect's requirements. The architect and contractor can distribute copies of the files as desired.

B. System Documentation
1. Include the following in submittal package:
a. Data sheets for all pieces of equipment.
b. System configuration diagrams in simplified block format.
c. All input/output object listings and an alarm point summary listing.
d. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
e. Complete bill of materials, valve schedule, and damper schedule.
f. Manufacturer`s instructions and drawings for installation, maintenance, and operation of all purchased items.
g. Overall system operation and maintenance instructions including preventive maintenance and troubleshooting instructions.

C. For all system elements - operator's workstation(s), building controller(s), application controllers, routers, and repeaters, provide BACnet Protocol Implementation Conformance Statements (PICS).

D. Provide complete description and documentation of any proprietary (non-BACnet) services and/or objects used in the system.

E. A list of all functions available and a sample of function block programming that shall be part of delivered system.
1. Drawings and Manuals:

a. Upon completion of the work, the Contractor shall provide the Owner with "record" layouts for the system. Layouts shall indicate all equipment and the function of each item shall be indicated.

2. Operating instructions and as-built system flow diagrams and drawings shall be prepared, bound, and delivered to the Owner. Each sensor, relay, switch, motor, controller, indicator (when inside panel), and item of equipment, etc., shall be identified with a number or mark identical to one which shall be tagged on each item. Large items of equipment may be identified by a suitable symbol listed in a legend on the control diagram.

1.4 EMCS CONTRACTOR QUALIFICATION REQUIREMENTS

A. The Energy Management Control System Manufacturer/Contractor, to be acceptable to this project, must have had an established engineering and service office serving the Owner`s area for a minimum of five years prior to bid date of this project and be the authorized installing contractor for the manufacturer of the BACnet components. This office shall have a staff of factory trained technicians fully capable of rendering training, instruction, calibration procedures, and routine and emergency maintenance service on all system components furnished.

B. Installers shall have not less than five years' experience with electronic and pneumatic controls.

C. The entire system shall be provided by a qualified and approved Controls Manufacturer/Contractor. It shall be designed by engineers and installed by competent technicians, all of which are regularly employed by the manufacturer of the control equipment. The Manufacturer/Contractor shall maintain permanent local facilities for engineering, installation, and 24-hour maintenance and service. Submit required Qualifications Form as specified. The manufacturer shall provide evidence of the ability to support and service the work in the Owner`s facilities.

D. The Bidder/Contractor shall be certified by the manufacturer of the equipment and have factory trained installers

E. Equipment and performance are intended as a standard of quality, but not as a means of excluding other approved Manufacturers/Control Contractors.

1.5 GRAPHICS

A. EMCS contractor is responsible for coordinating with owner and setting up the correct graphic templates for each building and piece of equipment. If contractor fails to do so, contractor shall make all changes needed to meet graphic template at no extra cost to owner.

B. The graphics provided shall be part of the Control Contractor's proposal. The purchase of additional licenses or graphics shall be included for a complete and working graphical interface including dashboard or control panels, trends, alarms, etc.

1.6 WARRANTY

A. The temperature control contractor shall guarantee all workmanship and material in the installed temperature regulation system for a period of one (1) year, such guarantee

dating from the date of final acceptance of the entire air conditioning system by the Architect/Engineer.

B. This warranty shall cover the repair or replacement without additional costs to the Owner of any defective materials, parts, etc. of facility workmanship.

C. During the warranty period, the temperature controls contractor shall respond to calls for warranty service within eight (8) working hours. Emergency service shall be obtainable within four (4) hours of notification by the Owner. Emergency service shall be obtainable on a 24-hour basis, seven (7) days per week.

D. The temperature control contractor`s office shall be within a 150-mile radius of the job site.

E. Warranty Access:
1. The Owner shall grant to the Contractor, reasonable access to the EMCS system during the warranty period. The owner shall provide, at no cost to the contractor, remote software access to an on-site computer or VPN access for the following functions:
   a. Access to the entire facility control system by the contractor to provide service and diagnostic support.

F. Service:
1. All service of the system shall be furnished by the Contractor, at no cost to the Owner, for a period of one (1) year, concurrent with the warranty period specified above.

PART 2 - PRODUCTS

2.1 ACCEPTABLE EMCS VENDORS

A. Alerton/Distech by Climatec

B. The Engineer and Owner shall reserve all authority regarding approval, conditional approval, or rejection of systems not fully complying with these specifications

2.2 MATERIALS

A. General: All materials and equipment used shall be standard components, of regular manufacture for this application. All systems and components shall have been thoroughly tested and proven in actual use.

B. Exceptions to the specification will qualify bid as unacceptable.

2.3 OPERATOR’S WORKSTATION

A. The new units, controllers, graphics, hardware and software shall be fully integrated to the owners front end system, supervisor and workstation. Floor plan and interactive color graphics shall be provided for the building with each zone providing color indication of the zone comfort level. In addition to the floor plan graphic, each piece of controlled equipment shall be represented by a graphic that is accessible by clicking on the zone or indicated piece of equipment. All points shall be available on the graphic.

B. Software:

1. EMS software shall be provided as an all-inclusive package. Software package shall allow the owner to have all the software modules/software tools that the controls contractor has for installation. The owner shall have the software tools to be 100% self-sufficient when it comes to programming the systems, modifying DDC and graphics, creating reports and trends, etc.

C. Software shall include the following, but not be limited to:
   1. DDC Programming tool
   2. All points binding and interoperability software to make the system truly open
   3. Graphic editing tools
   4. Energy management tools
   5. Trending tools

D. Graphics:
   1. Graphics pages shall consist of the following graphics at a minimum:
   2. Campus and/or District Map
   3. Floor plans (typical of every building for both space temperature and humidity)
   4. Animated Unit Summary Pages (one per piece of HVAC equipment)
   5. Text Summary Pages (one per piece HVAC equipment)
   6. Time Schedule Pages
   7. Run times Page
   8. Graphics Editing Mode
   9. Trendlog Page

E. General structure of workstation interaction shall be a standard client/server relationship. Server shall be used to archive data and store system database. Clients shall access server for all archived data. Each client shall include flexibility to access graphics from server or local drive.

F. Displays:
   1. Operator’s workstation shall display all data associated with project as called out on drawings and/or object type list supplied. Graphic files shall be created using digital, full color photographs of system installation, drawing files of field installation drawings and wiring diagrams from as-built drawings. Operator’s workstation shall display all data using three-dimensional graphic representations of all mechanical equipment. System shall be capable of displaying graphic file, text, and dynamic object data together on each display and shall include animation. Information shall be labeled with descriptors and shall be shown with the appropriate engineering units.
   2. All displays and programming shall be generated and customized by the local EMCS supplier and installer. Systems requiring factory programming for graphics or DDC logic are specifically prohibited.
   3. Analog objects may also be assigned to an area of a system graphic, where the color of the defined area changes based on the analog object’s value. For example, an area of a floor-plan graphic served by a single control zone would change color with respect to the temperature of the zone or its deviation from setpoint.

G. Password Protection:
   1. Provide security system that prevents unauthorized use unless operator is logged on. Access shall be limited to operator’s assigned functions when user is logged on. This includes displays as outlined above.

2. Each operator's terminal shall provide security for 200 users minimum. Each user shall have an individual User ID, User Name and Password.

H. Operator Activity Log:
1. Operator Activity Log shall be included with system that tracks all operator changes and activities. System shall track what is changed in the system, who performed this change, date and time of system activity and value of the change before and after operator activity. Operator shall be able to display all activity, sort the changes by user and also by operation.

I. Scheduling:
1. Operator's workstation shall show all information in easy-to-read daily format including calendar of this month and next. All schedules shall show actual ON/OFF times for day based on scheduling priority. Priority for scheduling shall be events, holidays, and daily with events being the highest.

J. Alarm Indication and Handling:
1. Operator's workstation shall provide audible, visual, and printed means of alarm indication. The alarm dialog box shall always become the top dialog box regardless of the application(s), currently running.

K. Trendlog Information:
1. System server shall periodically gather historically recorded data stored in the building controllers and field controllers and archive the information Archived files shall be appended with new sample data, allowing samples to be accumulated. Systems that write over archived data shall not be allowed, unless limited file size is specified. Samples may be viewed at the operator's workstation. Operator shall be able to scroll through all trended data. All trendlog information shall be displayed in standard engineering units.
2. Operator shall be able to change trend log setup information. This includes the information to be logged as well as the interval at which it is to be logged. All input, output, and value object types in the system may be logged.

L. Field Engineering Tools:
1. Operator's workstation software shall include field-engineering tools for programming all controllers supplied. All controllers shall be programmed using graphical tools that allow the user to connect function blocks on screen that provide sequencing of all control logic. Function blocks shall be represented by graphical displays that are easily identified and distinct from other types of blocks. Graphical programming that uses simple rectangles and squares is not acceptable.

2.4 WEB BROWSER CLIENTS

A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer™ or Mozilla Firefox™. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.

B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine

requirements in terms of processor speed, memory, etc., to allow the Web browser to function with the EMCS shall not be acceptable.

C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.

2.5 ENCLOSURES

A. NEMA 2 rated enclosures for inside mounting, provide with weather shield for outside mounting.

B. All controllers, power supplies, and relays shall be mounted in enclosures.

C. Enclosures may be NEMA 1 when located in a clean, dry, indoor environment. Indoor enclosures shall be NEMA 12 when installed in other than a clean environment.

D. Enclosures shall have hinged, locking doors.

E. Provide laminated plastic nameplates for all enclosures in any mechanical room or electrical room. Include location and unit served on nameplate. Laminated plastic shall be 1/8” thick sized appropriately to make label easy to read.

F. All direct digital controllers located indoors shall be installed in NEMA 1 enclosures. All direct digital controllers located outdoors shall be installed in NEMA 3R enclosures. Enclosures shall be of suitable size to accommodate all power supplies, relays, and accessories required for the application. Each enclosure shall include a perforated subpanel for direct mounting of the enclosed devices. Include matched key locks for all enclosures provided.

2.6 SENSORS, SWITCHES, CONTROLLERS, TRANSDUCERS, AND MISCELLANEOUS DEVICES

A. Temperature Sensors:
   1. All temperature sensors to be solid state electronic, factory-calibrated to within 0.5°F, totally interchangeable with housing appropriate for application. Wall sensors to be installed as indicated on drawings. Mount 48 inches above finished floor. Duct sensors to be installed such that the sensing element is in the main air stream. Immersion sensors to be installed in wells provided by control contractor, but installed by mechanical contractor. Immersion wells shall be filled with thermal compound before installation of immersion sensors. Outside air sensors shall be installed away from exhaust or relief vents, not in an outside air intake and in a location that is in the shade most of the day.

B. Wall Sensor:
   1. Temperature sensors shall have LCD screen with occupancy override and setpoint adjustment.
   2. Areas such as Administration, Gyms, Auditoriums, Cafeterias, Kitchens, Choir, Dance, Band and Corridors sensors shall have tamper proof protective covers.

C. Current Sensing Relays:

1. Provide current switches for indication of equipment status. Amperage ratings shall be adjustable with the desired setpoint to be in the top 50% of the current relay's operating range. Current sensing relays shall incorporate trip indication LED's and shall be sized for proper operation with the equipment served.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

B. Notify the owners` representative in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until all unsatisfactory conditions are resolved.

D. Each bid must include all costs associated with providing wiring, conduit, concrete trenching, and earth trenching.

3.2 INSTALLATION

A. General:
1. Install in accordance with manufacturer`s instructions.
2. Provide all miscellaneous devices, hardware, software, interconnections installation, and programming required to ensure a complete operating system in accordance with the sequences of operation and point schedules.
3. Provide a complete and operational temperature control and building automation system based on the following points and sequence of operation. The system shall be complete as to sequences and standard control practices. The determined point list is the minimum amount of points that are to be provided. If additional points are required to meet the sequence of operation, they will be provided.

B. Location and Installation of Components:
1. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum 3`-0" clear access space in front of units. Obtain approval on locations from owner's representative prior to installation.
2. Enclosures and hardware or wiring shall not block or limit accessibility to service compartments of any other equipment.
3. The work shall be coordinated fully, as it pertains to the fire protection system, fire alarm system, and electrical power system. All items shall be terminated in the DDC controllers in a predetermined order as indicated in the submittal drawings.
4. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture, and high or low temperatures.
5. Identify all equipment and panels. Provide permanently mounted tags for all panels.
6. Provide stainless steel or brass thermowells suitable for respective application and for installation under other sections - sized to suit pipe diameter without restricting flow.

C. Interlocking and Control Wiring:

1. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 26 and all national, state, and local electrical codes.
2. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.
3. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner`s representative prior to rough-in.
4. Provide auxiliary pilot duty relays on motor starters as required for control function.
5. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings. Coordinate with electrical contractor.
6. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed in conduit. All other wiring to be installed neatly and inconspicuously per local code requirements. If local code allows, control wiring above accessible ceiling spaces may be run with plenum rated cable (without conduit).

D. Installation Requirements:
1. Any panels associated with the control system shall be furnished and installed under this section of the work. Panel wiring shall be terminated by connecting to numbered terminals strips. Wire nut connections shall not be allowed. All wiring shall be color coded and shall be tagged for future identification.
2. Unless otherwise specified, all devices, panels, etc., furnished and/or installed by the Contractor shall be located where they can be calibrated and maintained from the floor without use of a ladder. These items shall be identified by means of plates made of plastic suitably engraved, embossed, or punched, plastic tape will not be acceptable. At completion of job, the Contractor shall submit record drawings of any changes made during construction. This submittal shall be a condition of final payment.
3. Any conduit on roof shall be absolute minimum and shall have prior written approval.
4. All conduit used indoor and outdoor shall be metal and shall be of type and fittings to minimize corrosion and moisture entry.

E. Cable Installation and Attachments:
1. Control System wiring and equipment installation shall be in accordance with good engineering practices as established by the TIA/EIA and the NEC. Wiring shall meet all state and local electrical codes. All wiring shall test free from all grounds and shorts. All cable shall be supported from the building structure and bundled.
2. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling. Controls cables shall not be run loose on ceiling grid or ceiling tiles. Support shall be provided by mounting appropriate fasteners which may be loaded with multiple cables. Provided that the weight load is carried by the support rod or wire, the support assembly may attach to the ceiling grid for lateral stabilization. The required support wires for the ceiling grid or light fixtures shall not be utilized. Any fastener attached to the ceiling grid shall not interfere with inserting or removing ceiling tiles. All cabling and supports must be positioned at least 12 inches above the ceiling grid.

3. Controls cables shall be run in bundles above accessible ceilings and supported from building structure. Cabling shall be loosely bundled with wire wraps randomly spaced at 30 to 48 inches on center, wire wraps shall not be tight enough to deform cabling and shall not be used to support the cabling.
4. Attachments for cabling support shall be spaced at 48 to 60 inches on center. The cable bundle shall not be allowed to sag more than 12 inches mid-span between attachments. Attachments shall be sized as follows:

Bundles up to 1/2" dia. (Ten 1/4" cables)	2" bridle ring, Caddy #4BRT32 or equivalent
Bundles up to 3/4" dia. (Sixteen 1/4" cables)	3/4" J-Hook, Caddy #CAT12 or equivalent
Bundles up to 1-5/16" dia. (Fifty 1/4" cables)	1-5/16" J-Hook, Caddy #CAT21 or equivalent
Bundles up to 2" dia. (Eighty 1/4" cables)	2" J-Hook, Caddy #CAT21 or equivalent

   Split bundles greater than 2" dia. or provide cable tray.
5. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm, 25 volt speaker cable). Multiple J-Hooks can be on the same attachment point up to the rated weight of the attachment device.
6. Controls cables shall be run in conduit stubs, where stubs are provided, from wall mounted devices to above accessible ceilings. Conduit shall be required only within walls and concealed spaces to provide access. Provide a plastic snap bushing or sleeve on the end of each conduit stub such as Thomas & Betts Catalog no. 443 - 3/4", 424 - 1", 425 - 1 1/4", 427 - 2" or equivalent.
7. Conduit, duct, or track shall be used for controls cable in exposed areas.
8. All conduit, ducts, track and raceways shall be supported from the structure at industry standard intervals for the size specified, utilizing proper anchoring devices and techniques for each type of cable used.
9. All penetrations through fire rated walls or floors shall feature a short length of metal conduit. The hole shall be neatly cut, not oversize or irregular. Seal the interior of the conduit sleeve around the cables and around the outside of the sleeve on each side of the penetration with fire-stop caulk or putty, such as Minnesota Mining & Mfg. Co. (3M) - CP 25WB+ caulk, MPS-2+ putty, or equivalent. Install according to the manufacturers` instructions.
10. All cable shall have a label on both ends utilizing self-laminating, flexible vinyl film, and non-smear nylon marking pens. Utilize Tyton Corporation Part No. RO175 Rite-On labels and Part No. FTP1 nylon marking pens or equivalent.
11. Each cable run shall include a three foot service loop with wire tie located in the ceiling above the control unit panel. This is to allow for future re-termination or repair.
12. No terminations or splices shall be installed in or above ceilings. Cable shall be continuous from one device termination to the next.
13. Mount all equipment firmly in place. Route cable in a professional, neat, and orderly installation.
14. All cabling shall be placed with regard to the environment, EMI/RFI (interference) and its effect on communication signal transmission.
15. Do not route any controls cable within two feet of any light fixture, HVAC unit service access area, electric panel, or any device containing a motor or transformer.
16. Low voltage controls cable will not be installed in the same conduit, duct or track with line voltage electrical cable.

17. Maximum pulling tension should not exceed 25 lb/ft. or manufactures recommendation, whichever is less.
18. Any pulling compounds utilized must be approved by the cable manufacturer and shall not degrade the strength or electrical characteristics of the cable.
19. Cable bends shall not exceed the manufacturers` suggested bend radius.
20. Provide for adequate ventilation in all equipment panels.
21. Provide wiremold where wiring must run exposed. Obtain advance approval from Architect and Owner before running exposed. Coordinate with Owner and Architect.
22. For all wiring, provide numbering on all terminations (both ends).
23. Label all panels, cans, enclosures, controllers and correlate with air conditioning units served. Labeling shall relate to shop drawings and equipment served. Provide wiring diagram inside each enclosure.
24. Provide a rain-tight enclosure for each rooftop unit controller.
25. Locate outdoor air sensors shielded and on northern exposure.

F. Termination practices:
   1. Strip back only as much cable jacket as required to terminate.
   2. Preserve wire twists as closely as possible to point of termination (0.5" maximum) to keep signal impairment to a minimum.
   3. Avoid twisting cable during installation.
   4. Electrical Interlocks:
      a. All electrical interlocks shall be provided as specified. All electrical interlocks shall be made by means of motor starters or shall be accomplished by separate relays. No motor power lead shall be utilized in an interlock circuit.

3.3 SERVICES

A. Field Services:
   1. Prepare and start logic control system under provisions of this section.
   2. Start-up and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
   3. Provide the capability for off-site monitoring at control contractor`s local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download. Owner shall provide phone line for this service for 1 year or as specified.
   4. Provide Owner`s Representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

B. HVAC Training:
   1. Provide application engineer to instruct owner in operation of systems and equipment.
   2. Provide system operator’s training to include (but not limited to) such items as the following: modification of data displays, alarm and status descriptors, requesting data, execution of commands, and request of logs. Provide this training to a minimum of 3 persons.
   3. Provide on-site training above as required, up to 16 hours as part of this contract.

C. Demonstration:
   1. Demonstrate complete operating system to owner`s representative.
   2. Provide certificate stating that control system has been tested and adjusted for proper operation.

D. Programming:
   1. Prior to completion of the control installation, schedule time with Owner`s designated representatives to evaluate and select programming options and requirements. Contractor shall provide engineer for such meetings and consultations on an as-needed basis. Preparation time for the conference shall be in addition to the "in conference" time, and shall be provided on an as-needed basis without additional cost to the Owner.
   2. The Contractor shall also provide additional coordination as needed with the Owner`s representative and Engineer to formulate and determine functions, reports, graphics, and alarms most desirable and suitable for the building and writing the software capability. Programming of these items shall be provided. The Contractor shall program the system using coordinated Owner provided schedules for time of day and holidays.
   3. No hardware change shall be required for program changes.

PART 4 SEQUENCE OF OPERATION

4.1 SEQUENCE OF OPERATION

A. The following are sequences of operations which will be accomplished by the EMCS. Coordinate with Owner in operating equipment to maximize comfort and economy. All points required to accomplish the sequences will be provided and connected to the EMCS.

B. All chillers, boilers, pumps, AHU’s, supply/exhaust fans and lighting circuits shall be supplied with a RIB relay with manual HOA switches. This is to allow owner to turn on and run equipment locally. The activation of the switch shall notify the Building Automation System (BAS) that the unit is in manual override. The equipment on the BAS graphic shall change color to red to alert that that equipment has been locally manually overridden.

C. Areas such as, but not limited to, Administration, Gyms, Auditoriums, Cafeterias, Kitchens, Choir, Dance, Band and Corridors sensors shall have tamper proof protective covers provided and installed.

END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Refrigerant piping for split system (including heat pumps) cooling/heating units.

1.2 RELATED SECTIONS

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 - HVAC Submittal Procedures

C. Section 23 07 21 - Refrigerant Piping Insulation

1.3 REFERENCES

A. ASTM B280 - Seamless Copper Tube for Air Conditioning & Refrigeration Service

1.4 SUBMITTALS

A. Provide submittal data on all items specified in this section in accordance with Specification Section 23 00 90, General Conditions, and Division 1.

1.5 COORDINATION

A. Coordinate the refrigerant line sizing, lengths, traps, and all other aspects of the refrigerant systems with the air conditioning unit manufacturer to ensure a completely working and reliable system.

B. Submit product data on piping materials and fittings.

C. Provide letter stating air conditioning manufacturer has reviewed refrigerant line design. Provide drawings on any lines that are longer than 80 feet.

D. If units have to be moved due to line lengths, then all associated costs will be at the Contractor`s expense.

PART 2 - PRODUCTS

2.1 PIPING

A. ACR hard drawn copper tubing, conform to ASTM B280.

B. ACR soft drawn copper tubing with long bend radius is allowed in concealed locations, such as behind walls. Above ceiling is not considered a concealed location.

2.2 FITTINGS

A. Wrought copper fittings

B. Use silver solder at connections

2.3 VALVES

A. Manufacturers:
1. Alco Controls
2. Sporlan Valve Company

2.4 ACCESSORIES

A. Provide strainer-dryer combination and liquid solenoid valves at refrigerant coil and condensing units. Provide and install distributors for multistage units that are suitable for modulating flow rates. Provide specialties such as solenoid valves, sight glasses, accumulators, and filter/dryers as required for proper system operation. Components shall be specifically designed for refrigeration service.

PART 3 - EXECUTION

3.1 MATERIAL PREPARATION

A. Cut tubing with a sharp pipe cutter.

B. Ream and thoroughly clean to remove all burrs, filings, dirt, and grease before assembly and soldering.

C. Remove oxide and discoloration prior to assembly.

3.2 SLEEVES

A. Sleeve piping as required by code.

B. All refrigerant piping passing through building envelope wall, floor and under slab shall be sleeved.

C. Refrigerant piping and sleeve shall be sealed weather tight with approved caulking material and/or foam sealant.

3.3 HANGER SUPPORTS

A. Support as required by code.

B. Do not fasten liquid and suction lines together unless there is insulation between them. Use wire ties. Duct tape not allowed.

C. Insulate all refrigerant lines from structure.

3.4 INSTALLATION

A. Route with building lines, vertical lines to be plumb, grade horizontal suction lines to compressor.

B. All brazing shall be done with 2-8 psig dry nitrogen purge.

C. Protect all valves and paint from excessive heat.

D. Keep refrigerant lines sealed from atmosphere during construction.

E. All refrigerant line sets to receive insulation.

F. No welded or mechanical joints in concealed areas, such as walls. Soft drawn copper is acceptable.

G. Follow A/C manufacturer`s instructions.

H. Refrigerant piping located in concealed locations where tubing is installed in studs, joists, rafters or similar spaces shall be protected by shield plates. Shield plates shall be a minimum of 16 gauge steel. Protective shield plates shall cover the area of the pipe plus 2 inches beyond both sides of the pipe.

3.5 REFRIGERANT PIPING SYSTEM TESTING

A. Refrigeration system components and refrigerant piping shall be tested for strength and leak tested for tightness.

B. Separate tests for isolated portions of the system are permitted, provided that all required portions are tested at least once.

C. Tests shall include both the high and low pressure sides of each system. The medium used for field pressure testing shall be one of the following inert gases; oxygen free nitrogen, helium argon or a premixed nonflammable oxygen free nitrogen with a tracer gas of hydrogen or helium. Oxygen or air is not to be used as the pressure test medium.

D. Pressurize with test gas for a minimum of 10 minutes to not less than the lowest design pressure for any system component. The design pressures for determination of test pressure shall be the pressure identified on the label nameplate of the condensing unit, compressor or other system component with a nameplate.

E. A passing test result shall have no rupture or structural failure of any system component or refrigerant piping.

END OF SECTION

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SECTION 23 81 27

SMALL CAPACITY SPLIT SYSTEM UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Split system cooling units for elevator machine rooms, electrical rooms, MDF, and IDF Rooms as noted in schedule and shown on drawings.

1.2 RELATED SECTIONS

A. Section 23 00 00 - Basic Mechanical Requirements

B. Section 23 00 90 - HVAC Submittal Procedures

C. Section 23 07 21 - Refrigerant Piping Insulation

D. Section 23 23 00 - Refrigerant Piping

1.3 REFERENCES

A. Refer to Section 23 00 00 for complete names of references identified in this section.

B. ARI 210/240 - Unitary Air-Conditioning and Air Source Heat Pump Equipment

C. ARI 270 - Sound Rating of Outdoor Equipment

D. ARI 270 - Sound Rating of Outdoor Unitary Equipment

E. ANSI/ASHRAE Std 15 - Safety Code of Mechanical Refrigeration

1.4 SUBMITTALS

A. Product Data:
   1. Provide submittal data on all equipment specified in this section in accordance with Section 23 00 90, General Conditions, and Division 1.
   2. Submittals shall include:
      a. Unit model number
      b. Refrigerant type
      c. Sound rating in accordance with ARI 270
      d. Cooling efficiency in accordance with ARI Standard 210
      e. All accessories
   3. Submit product data indicating typical catalog of information including arrangements.
   4. Submit product data sheets indicating dimensions, general assembly, and materials used in fabrication.
   5. Indicate mechanical and electrical service locations and requirements.
   6. Submit manufacturer’s refrigerant piping.
   7. Submit manufacturer`s installation instructions.

B. Shop Drawings: (adjust as required)
   1. Submit 1/4" per foot shop drawing(s) showing all piping and equipment shown by drawings and specifications. Submit drawings on all mechanical rooms. The drawings shall be coordinated with structural, electrical, and fire sprinkler drawings.

1.5 QUALITY ASSURANCE

A. UL listed and must display UL label on all units.

B. Unit performance data must be rated in accordance with ARI Standard 210/240 and must display the ARI symbol on all standard units.

C. Conform to applicable ANSI/NFPA 70 code for internal wiring of factory wired equipment.

D. Manufacturer to size refrigerant lines.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data.

B. Include manufacturer`s descriptive literature, operating instructions, installation instructions, maintenance, and repair data, including filter replacement and unit lubrication.

1.7 WARRANTY

A. Complete 1-year warranty on all equipment

B. Additional 5-year warranty provided for the compressors and heat exchangers.

C. The warranted compressor assembly consists of the starter, rotor, eccentric shaft, eccentric rods, pistons, wrist pins, suction valves, discharge valves, unloading mechanisms, oil pump, and the housing in which these parts are enclosed.

D. The warranty shall indicate model, serial number of the unit, and commencing date. The commencing date of the warranty shall be after the building has been accepted for occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Daikin

B. Trane/ Mitsubishi

C. LG

D. Carrier / Toshiba

E. Lennox / Samsung

F. JCI / Hitachi

G. Rheem

2.2 CONDENSING UNITS

A. Features:
1. A2L Refrigerant with factory installed leakage detection system and sensors
2. Hail guard/screen kit
3. Crankcase heaters
4. Timed off control
5. Low Ambient to 50°F
6. Hi/Low pressure switches
7. Over current protection
8. Filter Dryer

2.3 CONTROLS

A. Controller Features:
1. Manually activated “dry” mode. Low speed indoor fan, high speed compressor.
2. Temperature Settings/Display
3. 24 Hour Timer
4. Fan Speed Indicator
5. Mode Settings (auto, cool/dry)
6. BACnet EMCS Gateway

2.4 ALL AIR HANDLERS

A. Features:
1. Easy access to filters
2. Low voltage terminal strip
3. All blowers shall deliver a minimum of 450 cfm/ton at .5" E.S.P.
4. Filter racks to be provided in each air handler.
5. Condensate pump to be Aspen pumps Mini White

2.5 WIRING BETWEEN AIR HANDLER AND CONDENSING UNIT

A. Features:
1. Manufacturer provided wiring
2. Minimum 14 Gauge wire for power and 18 Gauge for communication
3. 600V rated cable
4. Rated for CT use
5. Sunlight- & moisture-resistant
6. Direct burial
7. RoHS compliant
8. Interlocked aluminum armor with PVC outer jacket

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with the plans, manufacturer`s instructions, and approved shop drawings.

B. Contractor to provide and install at minimum, 4” concrete housekeeping pad for each condensing unit that will sit on ground.

C. Both suction and liquid lines are to be insulated.

D. Do not install condensate pumps over any equipment panels.

E. Condensate pumps are to operate any time the unit is in the cooling mode and water is in drain pan. Follow manufacturer's instructions.

F. Install new, clean filters. Cover return air with filter media until construction is complete.

G. Provide connection to refrigeration piping system and evaporators.

H. All condensers located on the ground shall be fitted with refrigerant locking tamper resistant caps. Locking caps to use standard screwdriver or hex/allen wrench. Caps utilizing a special bit, tool or custom key is not allowed.

3.2 IDENTIFICATION

A. Provide identification per Section 23 05 53.

3.3 EQUIPMENT START-UP

A. Provide start-up.
   1. Start-up Data and Report:
      a. Follow all manufacturers' directions.

B. Measure:
   1. Outside air temperature, entering and leaving conditions of evaporators and condensers, compressor amps, indoor blower amps, gas pressure, pressure drop across evaporator coil.
      a. Operate all units in each mode.
      b. Provide report with final request for payment.

END OF SECTION

SECTION 26 00 00

ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide all materials, equipment, labor, and transportation required to install a complete and working electrical system. It is the intent of the drawings and specifications to provide complete installations even though each and every item necessary is not specifically mentioned or shown.

B. Perform all Division 26 work in strict accordance with the requirements and recommendations stated in the latest adopted version of all federal, state, and local codes, ordinances, and standards (NFPA, NEC, IECC, etc.) except when requirements are modified by the Authority Having Jurisdiction.

C. Where local codes or practices exceed or conflict with the NEC, it shall be the Contractor's responsibility to perform the work in accordance with the local code prevailing and local interpretations thereof by the Authority Having Jurisdiction. This Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

1.2 REFERENCES AND STANDARDS

A. All adopted State and Local Building Codes and Facility Standards.

B. All requirements of the local authority having jurisdiction.

1.3 DEFINITIONS

A. Owner's Representative - Indicates the entity designated or hired to represent an owner on a project. This entity could be the owner themselves, an Architect or could be another third party hired to represent the owner. Verify who will be representing the owner on this project before bidding.

B. EMCS - Energy Management Control System (Building Management System / BMS), used to control mechanical systems in the building via hardware and / or software.

C. Or equal - Indicates that the contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and / or described are adequate in the judgment of the Owner's Representative.

D. Provide - Furnish and install all material and labor required for a complete installation ready for operation as required in accordance with the intent of the Contract Documents.

E. Shall - Indicates a mandatory requirement or requirements.

F. Unless otherwise noted, refer to NEC 100 for additional definitions used in these specifications.

1.4 COORDINATION

A. Electrical service to all portions of existing buildings at the construction site not involved with the project shall remain in operation throughout construction. Provide all required temporary electrical service in the base bid to all required areas to satisfy OSHA requirements.

B. All metering and temporary electrical service charges and / or costs of utilities shall be paid by the Contractor.

C. The Drawings are not to be construed as shop drawings but indicate the extent, general locations, arrangement, etc., of conduit systems and equipment. Electrical drawings are diagrammatic and shall not be scaled for exact size. If the contractor has any questions regarding the layout of a particular device or equipment item, he shall contact the Owner's Representative for clarification. This Contractor shall, in laying out their work, refer to other sections of the specifications and other drawings such as air conditioning, structural, plumbing, architectural, civil, etc., to eliminate conflicts and undue delays in the progress of the work. Where items are furnished by other trades require connections by this Contractor, they shall be held responsible for providing rough-in drawings and assistance upon request.

D. Plans, specifications, and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically stated, such supportive or required items or work as consistent with what is indicated, is reasonably inferable from what is indicated, and / or is common construction procedure or knowledge with regard to what is indicated.

1.5 SUBMITTALS

A. The submittals required in this Division shall conform to and be submitted in accordance with the General Conditions, Instructions to Bidders, Division 1 and requirements listed in all sections of Division 26.

B. Shop drawings, manufacturer's data materials lists, etc., are required for all equipment and material where submittals are required.

C. Each submittal shall contain data relevant to the particular equipment (including options). The data shall be identified by "highlighting", arrows, underlining, etc. Do not submit pages of non-relevant information. Broad general data is not acceptable. If equipment submitted is not as specified in the Contract Documents, then the submittal shall contain specific details prominently identifying any differences in form, fit or function. If the equipment submitted is not as specified, then the Contractor shall be responsible for any additional costs necessary to install and connect the equipment. This includes, but is not limited to, increased panelboard size, circuit breaker size, disconnect size or circuit size.

D. Submit warranty information on all equipment specified in this division. Warranty shall start at the time of substantial completion, unless otherwise indicated in subsequent sections.

E. Submit dimensional layout of all electrical equipment locations, drawn to scale, with equipment locations shown. Clearances shall be in accordance with NEC and local codes. Panelboard and switchgear submittals will be rejected without dimensioned room or equipment location layouts.

F. Some products require that a color selection be coordinated with the Owner's Representative. Information regarding such products shall be submitted to the Owner's Representative for review.

G. If materials or equipment are installed before being reviewed without comment by the engineer, the contractor shall be liable for the removal and replacement of such unapproved materials and equipment, at no additional expense to the owner. Additionally, if the removal and replacement of unapproved materials or equipment necessitates the removal and replacement of other related materials or equipment, then the contractor shall be liable for the removal and replacement of the related materials and equipment at no additional expense to the owner.

H. Partial submittals for review will not be accepted.

1.6 CLOSEOUT SUBMITTALS

A. This Contractor shall accumulate during the job's progress the below list of data and shall keep it updated during construction as a set of Record Documents:
   1. Exact dimensioned locations of all new and existing switchgear, devices, luminaires, controls, all other equipment and new or existing site utilities.
   2. All warranties, as described in this section and in each subsequent specification section.
   3. All shop drawings, as-built drawings, submittals, operating manuals, maintenance manuals, repair parts lists, etc.
   4. Factory start-up and testing documentation, commissioning documentation, etc.

B. Training Documentation: Provide a letter in the closeout submittals documenting that the end user (determined by the Owner) received training as required in any section in this division. Documentation to include name of person, date, duration, and content of training.

1.7 QUALITY ASSURANCE

A. This contractor shall be certified / licensed to install the provided products and equipment.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall store and handle in accordance with manufacturer's recommendations to avoid damaging equipment, installed devices, and finish.

1.9 EXISTING FIELD CONDITIONS

A. All proposals shall take these existing conditions and any revisions required into consideration, and the lack of specific site information on the drawings shall not relieve the contractor of any responsibility.

1.10 WARRANTY

A. This Contractor shall guaranty fully all workmanship, material, equipment, systems, etc., provided by them for a period of one (1) year after substantial completion of the project, unless otherwise modified in other specification sections. The use of building equipment for temporary service and testing does not constitute the beginning of the warranty. This guaranty means that this Contractor shall make good to the owner, at no cost, any defects that become apparent during the year following substantial completion. This guaranty is in addition to any other guaranties or warranties and is not intended to limit such other guaranties or warranties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Unless otherwise noted, products shall be only from manufacturers that have been in business for at least five (5) consecutive years and have been manufacturing proposed products for at least two (2) consecutive years.

2.2 SUBSTITUTION OF PRODUCTS

A. All proposed substitutions are subject to PRIOR APPROVAL and must be received by the Engineer and / or Owner's Representative no less than ten business days prior to the schedule date for opening of bids.

B. Items noted as "No Substitutes" or "No Alternates" shall be as specified only. No substitutions will be accepted.

2.3 PERFORMANCE REQUIREMENTS

A. All materials, components, products, assemblies, equipment, etc. shall be new, free from defects, listed (by an NEC accepted listing agency), and approved / rated for the application, environment and purpose. No Exceptions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment shall be installed in strict compliance with manufacturer's installation instructions and properly torqued using a calibrated torque tool.

B. All panels, enclosures, devices, equipment and associated conduits, whether provided by this Contractor or any other, shall be flush-mounted and cleanly recessed in all finished spaces unless otherwise noted on the Drawings.

C. Unprofessional and incomplete work shall be rejected and corrected at no additional expense. The judgement of professionalism and completeness of work shall be made by the Engineer and / or Owner's Representative and shall be final.

D. All electrical connections shall be made per NEC 110.14 and torqued per manufacturer's instructions.

E. Where existing utilities already exist or where renovation / addition work is to be done, maintain all utility services during construction to existing structures and / or portions of a project that are to remain in place and operational.

F. This Contractor shall be responsible for damage to the project caused by this Contractor's failure to recognize hazards associated with items such as lack of power, scheduling of work (tardiness), inexperienced workmen, excessive cutting, etc. This Contractor shall repair at no expense to the owner any such damage.

3.2 INTERFACE WITH OTHER WORK

A. The Electrical Contractor shall coordinate the installation of the electrical system and all associated electrical connections with the General Contractor, as well as the Mechanical, Plumbing, and Communications Contractors, to ensure proper wire sizes, OCPD sizes, and a complete working system for the Owner.

B. Cooperation with trades of adjacent, related or affected materials or operations, and / or trades performing continuations of this work under subsequent contracts is considered a part of this work in order to affect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades, including under the general contractor Division 1 and Division 23.

C. The Electrical plans are based on equipment schedules shown. Should any mechanical equipment or device be submitted with different electrical properties from those properties shown, all electrical and / or mechanical changes shall be made at the expense of the trade or contractor initiating the change with no expense to the Owner's Representative, Engineer, etc.

D. Make permanent connection to new utilities or existing lines. Determine depth and location, and bid accordingly. Relocate and repair any existing lines cut by general construction work.

3.3 CONTRACTOR COORDINATION - ELECTRICAL / MECHANICAL (DIV 23)

A. Electrical Contractor to provide the following:
   1. All line voltage wiring, conduits, back boxes and hook-up to all HVAC equipment including required fused or non-fused safety switches.
   2. All boxes and conduit into accessible attic space for all thermostats and sensors. Coordinate with Mechanical Drawings for exact locations and requirements.
   3. All contactors and relays shown on the Electrical Drawings only.
   4. All conduit and back boxes for control wiring in all mechanical spaces to protect control wiring from damage. Conduit and back boxes to be required from 6” above each piece of equipment or control to a common 12” square NEMA 1 enclosure provided by Electrical Contractor and mounted directly above the EMCS / BMS controls in that space. Coordinate all required conduit paths with mechanical contractor before bidding and again before installing. Mechanical contractor to provide Electrical Contractor with conduit paths required for controls wiring on a drawing with adequate dimensions for bidding.

B. All other equipment and materials, including but not limited to, contactors and relays for mechanical equipment, motor starters (with heaters as required) / VFDs, thermostats, controls and wiring, etc. shall be provided by mechanical contractor.

3.4 CONTRACTOR COORDINATION - ELECTRICAL / PLUMBING (DIV 22)

A. Electrical Contractor to provide the following:
   1. All line voltage wiring, conduits, back boxes and hook-up to all plumbing equipment including required fused or non-fused safety switches.

B. All other equipment and materials, including but not limited to, contactors, relays, and switches required to control plumbing equipment, etc. shall be provided by plumbing contractor.

3.5 CONTRACTOR COORDINATION - ELECTRICAL / CONTROLS (DIV 23, 25)

A. Electrical Contractor to provide the following:
   1. All junction boxes (standard one or multi-gang) required for controls contractor. Coordinate with controls contractor for exact locations.
   2. Various relays, devices, wiring and other equipment for control equipment as indicated or required per details on Electrical Drawings.

B. All other equipment and materials, including but not limited to, relays, hardware, software, sensors, and control wiring, etc. shall be provided by controls contractor.

3.6 CONTRACTOR COORDINATION - ELECTRICAL / COMMUNICATIONS (DIV 27)

A. Electrical Contractor to provide the following:
   1. All receptacles and direct connection to all communications systems and equipment as shown and as required.
   2. All ground conductors and bonding to the building grounding system for all communications equipment panels and racks. See Section 26 05 26 - Grounding and Bonding, notes and details on Drawings for more information.
   3. All required standard back boxes as required for wall-mounted devices furnished by Communications Contractor.
   4. All raceway / conduit as required for accessibility of all communications systems cabling as listed below and as indicated on the rawings and details (whether furnished under a Division 01 allowance, by the Owner, Division 26 and / or Division 27).
      a. Provide raceway / conduit for cabling in above-ceiling spaces at the following locations:
         1) All wall penetrations.
         2) All HVAC duct penetrations (Per NEC 800).
         3) All cabling traveling through a plenum or other environmental air space (Per NEC 800).
      b. Provide raceway / conduit for all cabling from wall-mounted back boxes to accessible spaces per Communications Device Backboxes detail. Coordinate exact size and locations with communications contractor before installation.
      c. Provide full raceway / conduit for all cabling in exposed ceilings or when cabling is to be exposed on walls. Coordinate exact size and locations with communications contractor before installation.
   5. Installation of all special boxes and equipment cabinets furnished by Owner or Communications, Security, and Safety Contractor(s).

B. Communications Contractor to provide the following:

1. All communications systems complete with equipment, cabling, special backboxes, hardware, and all other required devices.
2. Furnish all special boxes in timely manner to the electrical contractor for installation as required.
3. All attachments for all communications cable above accessible ceilings to be supported from the building structure and bundled.

3.7 CONTRACTOR COORDINATION - ELECTRICAL / ELECTRONIC SAFETY & SECURITY (DIV 28)

A. Electrical Contractor to provide the following:
   1. All receptacles and direct connection to all security and safety equipment as shown and as required.
   2. All ground conductors and bonding to the building grounding system for all security and safety equipment panels. See Section 26 05 26 - Grounding and Bonding and details for more information.
   3. All required standard back boxes as required for wall-mounted devices furnished by security and safety contractors.
   4. All raceway / conduit as required for accessibility of all security and safety systems cabling (whether furnished under a Division 01 allowance, by the Owner, Division 26 and / or Division 28) as listed below and as indicated on the Drawings and details.
      a. Provide raceway / conduit for all cabling in above-ceiling spaces at the following locations:
         1) All wall penetrations.
         2) All HVAC duct penetrations (Per NEC 800).
         3) All cabling travelling through a plenum or other environmental air space (Per NEC 800).
      b. Provide raceway / conduit for all cabling from wall-mounted back boxes to accessible spaces per Communications Device Backboxes detail. Coordinate exact size and locations with security and safety contractor before installation.
      c. Provide full raceway / conduit for all cabling in exposed ceilings and when cabling is to be exposed on walls. Coordinate exact size and locations with security and safety contractor before installation.
   5. A dedicated circuit for the Fire Alarm Control Panel (FACP). Provide power to all Fire Safety Control Function devices as shown on the drawings. Each circuit breaker shall be labelled as "FIRE ALARM CIRCUIT" in the panel directory and labelled "FIRE ALARM" at the lockout clip on the circuit breaker.

3.8 CONTRACTOR COORDINATION - ELECTRICAL / OTHER

A. Electrical Contractor shall provide required hook-up to line voltage at all electromagnetic door holder / release, fire / smoke dampers, smoke dampers, etc. Provide required relays and wiring to fire alarm panels and coordinate with other specified work.

3.9 INSTALLATION - OTHER WORK

A. Cutting and Patching:
   1. All cutting required for the installation of sleeves, conduit, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by General Contractor. This Contractor shall not

cut any structural element or any finished work without written permission from the Owner's Representative.

B. Concrete Work:
   1. This Contractor shall provide all forming, reinforcing and concrete as indicated or required for equipment bases, transformer pads, etc. Work shall conform to the applicable portion of Division 03 - Concrete.

C. Trenching and Backfill:
   1. This Contractor shall perform all trenching, excavation, shoring, pumping and backfill required in the installation of their work. All trenches shall be maintained dry until all circuits have been satisfactorily tested and then filled in tamped 6" layers immediately after approval of tests by the Owner's Representative. All backfill shall be free of construction debris and any other foreign material which might damage any circuit runs. Stability of backfilled soil shall match adjacent undisturbed soil.

D. Flashing and Waterproofing:
   1. All building penetrations to the outside shall be flashed and counter-flashed as required to eliminate leaks. Provide link-seal fitting on all below grade conduit penetrations greater than 2".

3.10 SYSTEM STARTUP

A. All circuit and operational tests of the electrical systems shall be made by this Contractor and repeated until equipment meets or exceeds testing requirements and all electrical systems are operating properly.

END OF SECTION

SECTION 26 05 05

SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Selective demolition of electrical and lighting systems and equipment and the off-site removal of the portions of those systems and equipment not reused, in a code-compliant and lawful manner.

PART 2 - PRODUCTS

2.1 NOT APPLICABLE.

PART 3 - EXECUTION

3.1 ELECTRICAL EXAMINATION

A. Verify existing field measurements, circuiting arrangements, wiring and equipment served in areas as shown on the Drawings. Adjust all circuiting, wiring and materials to be provided as required by job conditions.

B. The Contractor accepts all existing conditions when beginning demolition, whether or not those conditions are reflected in the Contract Documents.

3.2 LIGHTING EXAMINATION

A. Emergency interior and exterior lighting: If the unswitched phase conductor needed for proper operation does not exist, provide a new unswitched phase conductor to each luminaire as needed for proper operation. The unswitched phase conductor must come from the same branch circuit that powers the luminaire.

3.3 PREPARATION

A. Provide temporary wiring and connections to maintain required existing systems that must remain operational during construction.

3.4 DEMOLITION OF EXISTING ELECTRICAL

A. Where demolition of equipment or materials is required, this Contractor shall minimize cutting and exercise all due caution to leave undamaged surfaces, material and equipment meant to remain.

B. Disconnect and remove all unused or abandoned wiring, devices, conduits, panels and distribution equipment back to source, unless otherwise specified in the drawings. Mark all unused breakers and fused switches as spares and turn them off.

C. Mark all unused breakers and fused switches as spares and turn them off.

D. When luminaires, receptacles, switches, conduits or similar are removed and the location is not reused, patch all unused floor, wall and ceiling back boxes, penetrations or similar openings to match the existing surfaces and maintain existing fire ratings.

3.5 EXTENSION / EDITING OF EXISTING ELECTRICAL

A. Where existing circuits are edited or existing equipment is partially removed, extend / repair existing circuits to ensure all devices and equipment that are not intended to be removed remain in place and are fully operational.

B. Install identification on all existing unmarked equipment to remain in accordance with Section 26 05 53 - Identification for Electrical Systems. Replace all lost nameplates, labels or markers.

3.6 RE-INSTALLATION

A. Install all relocated materials and equipment under the provisions of Divisions 01 and 26.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This section includes conductors for power circuits, including terminations and connectors.

1.2 SUBMITTALS

A. Submittals required in this section shall conform to and be submitted in accordance with the General Conditions, Division 01, and Division 26.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Conductors shall be manufactured in the United States. Acceptable manufacturers are:
   1. Alan Wire, Cerrowire, Encore Wire, General Cable, Republic Wire, and Southwire

2.2 MATERIALS

A. All feeders to be soft-drawn annealed copper.

B. All branch circuit conductors shall be soft-drawn annealed copper.

C. Aluminum is permissible ONLY where specifically indicated on the Drawings. Aluminum used shall be AA-8xxx rated and compact stranding is preferred.

2.3 MANUFACTURED UNITS

A. Manufactured Power Circuit Conductors:
   1. Conductors for shall be rated for at least 600 volts and 90°C. No exceptions.
   2. Conductor insulation shall be type THHN / THWN-2 or XHHW-2.
   3. All conductors shall be #12 AWG or larger.
   4. Conductors that are #8 AWG and larger shall be stranded. Conductors that are #12 AWG and #10 AWG may be stranded if crimp on fork terminals are used for device terminations. Otherwise, #12 AWG and #10 AWG shall be solid conductors. Never place bare stranded conductors directly under device screws.

B. MC Cable: Unless otherwise noted on the Drawings, MC cable is allowed ONLY for luminaire whips. Total length not to exceed six (6) feet. MC cable must meet all requirements listed in this section including (but not limited to) separate full-size neutrals, conductor material, isolated ground, installation per NEC, etc.
   1. Conductor Insulation: The insulation over the conductors shall be type THHN 90°C dry with an extruded polypropylene protective covering.

2. Armor: A zinc coated galvanized steel armor shall be applied over the cabled wire assembly with an interlock in compliance with UL 1569 Section 13. Armor shall be colored to identify the voltage and number of conductors.
3. Fittings: Fittings shall be listed and identified as MCI-A for such use with metal clad interlocking armor ground. Connectors shall be of steel or malleable iron and shall have saddle clamp to insure a tight termination of MC or MCI-A cable to box.

C. Manufactured Conductor Terminations and Connectors:
1. All accessory materials such as connectors, splice and tap fittings, and terminations shall be of a type designed or intended and suitable for the use. They shall be compatible with the conductor material. Both compression (crimp) and mechanical (screw set) connections are acceptable. Installation, compression, and torque settings shall be per manufacturer's recommendations.
2. Only connection devices that require the complete removal of the conductor jacket or insulation and result in a connection to the complete conductor surface area are suitable for use. Insulation piercing type connectors, press in type connectors or Wago style connectors shall NOT be used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. More than one conductor shall not be installed in any termination unless the termination is marked as suitable for more than one conductor.

B. Wire Sizing: Provide conductors sized as indicated on Drawings. Where sizing is unclear or has been omitted, provide conductors with an ampacity at least as large as the ampacity of the load and provide an overcurrent protection device sized as large as the ampacity of the conductors. In such cases, notify the Engineer before installation for size verification.

C. Voltage Drop: The intent of the drawings is to limit the voltage drop from the service entrance conductors to each branch circuit to less than 5%. The electrician is responsible to ensure proper voltage drop values are maintained as mentioned here and mentioned in the NEC.

D. Neutral Conductors: Provide a separate neutral conductor for each feeder or branch circuit. Multiple circuits shall not share a common neutral. Neutral conductors shall be sized as large as the phase conductors. Neutral conductors shall not be of a reduced size.

E. Equipment Grounding Conductors: Provide equipment grounding conductors in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.

F. Number of Current Carrying Conductors (CCC) per conduit:
1. #12 Wire - no more than six (6) CCCs in a single conduit.
2. #10 Wire - no more than nine (9) CCCs in a single conduit.
3. ELSE - no more than three (3) CCCs in a single conduit.
4. Regarding #12 and #10 wire above (ONLY #1 and #2 above), when more than three (3) CCCs are in a single conduit, the electrician is responsible for derating the available ampacity of the current carrying conductors per NEC and provide calculations to the Engineer, when requested. If any derating results in a conductor

ampacity lower than the load for the circuit, all conductors must be removed and repulled in separate conduits to eliminate the derating. No exceptions.

G. Installation in Raceways:
1. All conductors shall be installed in a raceway.

H. Terminations:
1. Use compression (crimp) or mechanical (screw set) type lugs or connectors for all terminations or splices of stranded conductors. See 26 05 26 Grounding and Bonding where thermal welding may be used.
2. Use ring tongue type terminators on all control wiring.
3. Conductive antioxidant shall be applied on all connections per manufacturer's instructions, regardless of conductor material.

I. Splices:
1. Where splices are required, they shall be in a box or enclosure. Splices within a conduit run are not acceptable.

J. Color Coding:
1. Provide factory colored insulated conductors for #6 AWG and smaller.
2. If existing wiring in renovation or addition work has a consistent color coding, then match the existing and note in record documents. Otherwise, colors shall be as follows:

Line	208/120V	240/208V 1ph	240/120V	480/277V
A	Black	Black	Black	BROWN
B	Red	n/a	Orange	ORANGE
C	Blue	Red	Blue	Yellow
Neutral	White	White	White	Gray
Ground	Green	Green	Green	Green
Isol Grnd	Green +Yellow	Green + Yellow	Green + Yellow	Green + Yellow

K. Identification: All conductors in a panelboard shall be identified by means of tags or tape.

L. MC Cable: Where allowed, install MC cable to meet all NEC requirements.
1. Support: All MC cable shall be supported by dedicated J-cable hangers or cable tray. Where suspended from the ceiling or roof structure, use split-ring hangers or wrought-iron hanger rods.

3.2 SITE TESTS

A. Perform in accordance with manufacturer's printed testing procedures, applicable industry standards, ANSI standards, IEEE standards, and NEMA standards. Provide calibrated testing equipment in good working order and which complies with the above requirements. The below test shall be performed after the conductors have been pulled into the conduit and after terminations have been added, but before final connections are made. Document all readings and testing and make documentation available to Owner upon request.

B. Feeder Insulation Test: The insulation of new service entrance conductors and each new feeder run shall be tested using a megger. Readings must indicate not less than one (1) megohm to be acceptable.

C. Branch Circuit Insulation Test: The insulation of each new branch circuit shall be tested using an ohm meter. Readings must indicate not less than one (1) megohm to be acceptable.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Grounding and bonding shall include the solid grounding of the various electrical systems and equipment and the proper bonding of all electrical system components and equipment to meet NEC 250 and all other applicable NEC sections, codes, and ordinances. These systems shall be provided for the proper protection of life, equipment, circuits, and systems.

B. Permanently ground entire lighting and power systems in accordance with the latest adopted version of the NEC, including service equipment, distribution, panelboards, switch and starter enclosures, motor frames, devices, transformers, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

C. Grounding and bonding requirements specified in this section may be supplemented in other sections of these Specifications.

1.2 COORDINATION

A. On all additions and new construction, complete grounding and bonding of concrete encased electrode system (building reinforcing steel /rebar) to the satisfaction of the local AHJ prior to concrete placement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Apache Grounding, Copperweld, Inc., ILSCO Corporation, nVENT (Cadweld, Critec, Erico), Thermoweld, and Thomas & Betts (T&B)

2.2 PERFORMANCE REQUIREMENTS

A. General:
   1. All grounding and bonding shall be in strict accordance with NEC 250, 517.
   2. Grounding electrode system shall have a resistance to earth of five (5) ohms or less. Where this cannot be met, provide two additional ground rods to form a "triple ground rod" installation. Under no conditions shall the system have a resistance greater than twenty-five (25) ohms to ground, per NEC 250, at any location in the system.

B. Ground Rods:
   1. Copper cladding permanently bonded to a high-strength steel core.
   2. 3/4 inch by 10 feet (19mm by 3m) straight, conform to UL 467.

C. Conductors:

1. Grounding Conductor: Copper, insulated (green) where required or uninsulated where allowed in the Specifications or by code, sized per Drawings or NEC Table 250.66.
2. Bonding Jumpers - Insulated conductor, sized to be minimum cross-sectional area greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250.102.
3. Grounding Ring around a building - #2 AWG uninsulated copper, otherwise sized per NEC.
4. Grounding Ring around a utility transformer - #2 AWG uninsulated copper (unless sized per drawings), otherwise sized per NEC or by utility requirements.

D. Connections:
1. General: All connectors shall be listed and labeled as grounding connectors for the materials used.
2. Welded Bond - Exothermic welded connection or bond such as "Cadweld". No phosphorous or any other caustic, toxic or explosive substance may be used.
   a. Provide exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.
3. Clamps - Listed bronze connectors, suitable for grounding and bonding applications, in configurations required for a particular installation.

E. Buss Bars:
1. Bare annealed copper bars, 1/4" x 4" x 20" unless otherwise noted on the Drawings.

PART 3 - EXECUTION

3.1 APPLICATION

A. Unless otherwise indicated, the below list of connection styles shall be followed.

B. Outdoor Below Grade Grounding Connections:
1. Welded bond only, no exception.

C. Outdoor Above Grade Grounding Connections:
1. Clamps may be used. Use welded bond where clamping is not accessible or practical.

D. Indoor Grounding and Power Connections:
1. Clamps may be used. Use low-smoke/low emission welded bond where clamping is not accessible or practical.

3.2 INSTALLATION

A. General:
1. Where the Drawings or Specifications exceed NEC requirements, then follow the Drawings or Specifications.
2. Bond all ground electrodes together to form the grounding electrode system including metal underground water pipe, metal frame of the building or structure, concrete encased electrodes, ground ring, rod and pipe electrodes and plate electrodes.
3. At all electrical system components, assemblies, circuits, etc. that are over 120v to ground, provide locknuts and / or listed fittings per NEC 250.97 for bonding of

metal raceways. In case of oversized, concentric or eccentric knockouts, comply with NEC 250.92(B). The use of snap-in, wedge-type, or pivot-type connectors is prohibited.

4. Refer to Drawings for additional special grounding systems or grounding requirements not mentioned here.

B. Concrete Encased Electrode:
   1. Fabricate with twenty (20) feet (6m) of conductor laid lengthwise in excavation for foundation or footings. Install such that conductor is within two (2) inches (50mm) of the bottom of the concrete. Where base of foundation is less than twenty (20) feet (6m) in length, coil excess conductor at base of foundation. Bond conductor to reinforcing steel at four (4) locations, minimum. Extend conductor below grade and connect to building grounding electrode.

C. Main Electrode:
   1. Provide a building ground rod and bond it to the grounding electrode system. Where ohmic values exceed 5 ohms to ground, the building ground rod shall consist of three ground rods, arranged in an equilateral triangular pattern located at least five (5) feet outside an exterior building wall or as otherwise directed. Space fifteen (15) feet apart and drive into the earth to a point two (2) feet below finished grade to top of rods. Grounding electrode conductor shall form a continuous loop around rods, and conductor shall be properly bonded to each rod by a fusion weld similar to "Cadweld".
   2. Extend grounding electrode conductor from ground rod(s) to the grounded service conductor (neutral) in the main switchboard at an accessible point on the ground bus per NEC 250.24.

D. Main Bonding Jumper: Shall be sized in accordance with NEC 250.102, if not indicated on the Drawings, and installed within the same enclosure as the point of bonding of the system neutral service entrance.

E. Water Pipe Electrode: A ten (10) foot minimum length of electrically-continuous underground metal water pipe. Bond around insulating joints or sections, insulating pipe, and water meters to make pipe electrically continuous.

F. Fuel Gas Piping:
   1. Each above ground portion of a gas piping system upstream from the equipment shutoff valve shall be made electrical continuous and bonded to the building grounding electrode system, as required in NFPA 54.
   2. Gas piping shall not be used as a grounding electrode.

G. Transformers: Ground as a separately derived source.
   1. Where transformer secondary includes a neutral, the neutral shall be bonded to the equipment enclosure and connected to the system ground conductor.
   2. Size system bonding jumper per NEC Table 250.102.
   3. Grounding conductor shall be in raceway and shall be bonded to nearest available point of the building grounding electrode system.

H. Equipment Grounding Conductor (EGC):
   1. Comply with NEC 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

2. All power circuits shall be provided with a separate copper insulated EGC run in the raceway with the power conductors. The conduit shall not be used as the sole means of grounding. The insulation of the EGC shall be green.
3. Bonding to the EGC shall be provided at each end of metallic conduit runs and at all boxes and enclosures.
4. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

I. Exterior Lighting:
1. All metallic outdoor poles and luminaries on metallic or non-metallic lighting poles shall be grounded by bonding in an approved manner to the circuit grounding conductor. In addition to this, bond pole to a #6 AWG bare copper wire which shall also be bonded to a ground rod. Install the ground rod adjacent to the pole base with the top driven at least two (2) feet below grade.

J. Grounding Busses:
1. Provide a copper buss bar where indicated on Drawings or in rooms containing any of the below list.
   a. Provide a #2 AWG insulated grounding electrode conductor from the grounding electrode system to each grounding buss.
   b. Provide in each IDF and MDF room.
   c. Provide at each CATV / MATV head-end mounting board.
   d. Provide at each building communications rack.
   e. Provide at each sound reinforcement equipment rack.

K. Communications Systems:
1. Bond each server, patch panel, data and other communications equipment ground (buss type or grounding conductor type) at each piece of equipment and each equipment rack back to the copper grounding buss installed in the room with a bare #6 AWG ground wire.

L. Lightning Protection System:
1. Bond grounding conductors or grounding conductor conduits to lightning protection down conductors or grounding conductors in compliance with NFPA 780.
2. Bond electric power system ground directly to lightning protection system grounding conductor at closest point to electric service grounding electrode. Use bonding conductor sized same as system ground conductor and installed in conduit.

M. Other Grounding Systems:
1. Other buildings served from common service:
   a. The main building service is the source for electric service.
   b. Bond grounding conductor of building main feeder to grounding electrode system.

3.3 CONNECTIONS

A. General:
1. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

2. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
3. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.

B. Exothermic Welded Connections:
1. Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
2. Terminate insulated EGCs for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground buss in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushing and bare grounding conductors.

C. Compression Type Connections:
1. Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

D. Moisture Protection:
1. Where insulated ground conductors are connected to ground rods or ground busses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

3.4 SITE TESTING

A. Testing:
1. Test the electrical system after installation is complete. Inspect and test for stray currents, unintended ground shorts, and proper physical condition of grounding system. Correct any deficiencies and re-test to verify satisfactory installation.
2. Document all readings and testing and make documentation available to Owner upon request.
3. Perform ground resistance and continuity testing in accordance with IEEE 142.

END OF SECTION

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SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide all raceway and conduits, outlet boxes, pull and splice boxes, wireways, gutters, and associated fittings as indicated on the Drawings and as required for feeders, branch circuits, splices, taps, equipment connections, and for compliance with regulatory requirements. All locations shown on the Drawings are approximate unless dimensioned.

B. Provide complete, separate conduit systems for all electrical systems on this project to include, but not limited to service entrance, feeders, branch circuit, control wiring furnished by this contractor, emergency and standby power and lighting circuits, critical power, communication systems, and other electrical systems as required.

C. Provide outlet wiring boxes of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with knockouts or threaded hubs in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Provide outlets as shown and as required per NEC.

1.2 DESIGN REQUIREMENTS

A. Boxes and fittings shall be made of the same material as the conduit material they are installed with, unless modified below or otherwise noted on the Drawings.

1.3 SUBMITTALS

A. Submit on all conduit, raceways, pull boxes, back boxes, hand holes, cover plates, extension rings, fittings, labeling, and supports for conduits inside and on roof.

1.4 COORDINATION

A. Coordinate mounting heights, orientation and locations of back boxes for outlets mounted above counters, benches, back splashes, etc.

B. Conduit systems shall not be covered or otherwise concealed until review has been made and approvals obtained from the AHJ.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Raceways, Wireways, Gutters and Conduits: Aflex, Atkore (AFC, Allied, FRE, Power Strut, TJ Cope), American Conduit, Calbond, Cantex, Champion, Hoffman, Hubbell, KorKap, Nepco, Nucor, Omega, Plasti-Bond, Perma-Cote, Pittsburgh, Prime Conduit, Sedco, Spang, Square-D, Thomas & Betts, Western Tube and Wheatland, Walker and Wiremold.

B. Surface-mount Raceways: Hubbell, Mono-Systems, Panduit, Tehalit and Wiremold.

C. Boxes and Fittings: Appleton, Atkore (AFC, Allied, Power Strut, TJ Cope), Cantex, Eaton, ECN Korns, Hoffman, Hubbell, Keystone, Lew, Madison, nVent Caddy, Orbit Industries, Quazite, Raco, Regal, Stahlin, Steel City, Thomas & Betts and Walker.

D. Others: Where specifically listed on Drawings.

2.2 GENERAL PERFORMANCE REQUIREMENTS

A. Minimum conduit / raceway size shall be 1/2" for all circuits.

B. Fittings may be set-screw or compression style fittings.

C. All fittings shall have an insulated throat bushing, no exceptions.

D. See Section 26 05 19 - Low Voltage Conductors for information on where MC cable is allowed.

E. Aluminum conduit shall not be installed in direct contact with concrete or masonry construction.

2.3 RIGID METAL CONDUIT - STEEL (RMC)(IMC) - PER ANSI C80

A. Steel: Hot-dipped galvanized rigid steel (GRC) and galvanized intermediate metallic conduit (IMC) with zinc-coated threads and an outer coating of zinc chromate.

B. Fittings: Per NEMA FB 1.
1. Malleable iron, either cadmium plated or hot-dipped galvanized. Die cast zinc.
2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.4 RIGID METAL CONDUIT - ALUMINUM (RAC) - PER ANSI C80

A. Aluminum: Rigid aluminum conduit shall be threaded only.

B. Fittings: Per NEMA FB 1
1. Aluminum fittings required.
2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.5 PVC COATED RIGID METAL CONDUIT - NEMA RN 1

A. Steel: Galvanized rigid steel conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6 and ETL PVC-001.

B. Fittings: Per NEMA FB 1.
1. Malleable iron or steel, PVC coated (40 mils) exterior, urethane coated (2 mils) interior.
2. Use fittings listed and labeled as complying with UL 514B.

C. Conditions: The installer shall be certified by a manufacturer to install coated conduit.

2.6 ELECTRICAL METALLIC TUBING (EMT) - ANSI C80.3

A. Galvanized thin wall steel or aluminum tubing.

B. Fittings: Per NEMA FB 1.
1. Die cast zinc, pressure cast, malleable iron or steel. Clamps shall be steel. Where aluminum tubing is allowed, aluminum fittings are required unless otherwise noted.

2.7 RIGID NONMETALLIC CONDUIT (RNC)

A. PVC: Schedule 40 PVC, NEMA TC 2, high impact resistant.

B. RTRC: Fiberglass, NEMA TC 14, standard wall.

C. Fittings: Per NEMA TC 3 & 14, solvent weld socket type.

D. Conditions: Do NOT use PVC for elbows in sizes 1-1/2" and larger.

2.8 FLEXIBLE METAL CONDUIT (FMC)

A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel.

B. Aluminum: Spiral-wound, square interlocked aluminum.

C. Fittings: Per NEMA FB 1.
1. Cadmium plated two-screw, double-clamp malleable iron. Hot-dipped galvanized two-screw, double-clamp malleable iron. Pressure cast. Steel cast. Zinc coated, aluminum.

2.9 LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFC)

A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel strip with a bonded outer jacket of PVC.

B. Fittings: Per NEMA FB 1.
1. Cadmium plated, compression type, malleable iron. Hot-dipped galvanized, compression type, malleable iron. Terminations shall be insulated throat type.
2. Aluminum: Copper free (1% or less).

2.10 WIREWAYS / GUTTERS

A. Steel: Not less than 16-gauge sheet steel. Size and length shall be as indicated on drawings. Otherwise, provide dimensions per NEC 366 and NEC 376, but never smaller than four (4) inches by four (4) inches. Construction shall be oil-tight, dust-tight and rain-tight with hinged fully gasketed cover. Finish shall be ANSI gray epoxy paint over rust-inhibiting prime coat.

2.11 SURFACE RACEWAYS - SINGLE CHANNEL

A. Steel: Not less than 0.04" thickness sheet steel. One piece for up to seven (7) - #12 AWG wire capacity. Two (2) piece for eight (8) or more - #12 AWG wire capacity. In unfinished spaces, finish shall be enamel over rust-inhibiting prime coat, not less than 0.25 square inch cross section.

B. PVC: Rigid PVC, not less than 0.20 square inch cross section. Two (2) piece construction, minimum five (5) - #12 AWG wire capacity.

C. Finish: In all spaces, coordinate color with Owner's Representative.

D. Fittings: Provide all required manufacturer's standard accessories and fittings for a complete installation.

2.12 SURFACE RACEWAYS - DUAL CHANNEL

A. Aluminum: Two compartment, with receptacles and data devices as noted on electrical and technology drawings.

B. PVC: Wiremold 4320, Panduit T-70 non-metallic raceway or similar, two compartment, with receptacles and data devices as noted on electrical and technology drawings.

C. Finish: In all spaces, coordinate color with Owner's Representative.

D. Fittings: Provide all required manufacturer's standard accessories and fittings for a complete installation.

2.13 GENERAL OUTLET / BACK BOX / JUNCTION BOX

A. All boxes shall meet NEMA OS 1 (metallic) and NEMA OS 2 (nonmetallic).

B. Cast Boxes: NEMA FB 1, Type FS or FD malleable iron or aluminum. Furnish gasketed cover by box manufacturer and provide threaded hubs.

C. Floor-mounted Back Boxes: Shall be adjustable and gasketed.

D. Outlet and Pull Boxes: Single or ganged back boxes.
1. Interior: Standard box shall be 2-1/8" deep or better. Use 3-1/2" deep boxes as needed and 1-1/2" shallow boxes as required for wall depth.
2. Exterior: Standard box shall be 3-1/2" deep NEMA 3R or better.
3. In Ground or Concrete: NEMA 4 cast iron box with external recessed flanged cover. Depth as required.

E. Box Ganging: Gang type boxes shall be used where multiple devices are located adjacent to one another, including ceiling, wall and cast in floor boxes.

F. Box Barriers: In boxes with multiple switches, where the voltage between adjacent switches exceeds 150 volts to ground, provide an enclosure equipped with identified, securely installed barriers between adjacent devices.

2.14 PULL / SPLICE BOXES AND HAND HOLES

A. Surface Mounted Cast Metal Box: NEMA 250, Cast aluminum with ground flange, neoprene gasket and stainless steel cover screws.

B. In-Ground Cast Box: NEMA 250, Type 6, cast aluminum, concrete or fiberglass with flanged (smooth/nonskid) cover, recessed cover box for flush mounting.

C. Handholes: Fiberglass with weatherproof nonskid cover with pre-cut 6 inch x 6 inch (150 mm x 150 mm) cable entrance at center bottom of each side.

2.15 ROOFTOP CONDUIT SUPPORTS

A. Supports shall be adjustable height. Metal parts to be stainless steel or galvanized steel.

B. Approved Products:
   1. Miro Industries model #24-R-AH, 48-R-AH, 24AH and 48AH.
   2. PHP Systems model #PP10.

PART 3 - EXECUTION

3.1 PREPARATION

A. Place conduit sleeves in the cavities of walls and floor slabs for the free passage of conduits.

B. Apply caulking for all conduit sleeves through floors and through exterior walls.

3.2 GENERAL INSTALLATION

A. The Drawings indicate an approximate location of boxes for switches, lighting outlets, power outlets, raceways, etc. The Drawings may not give complete and accurate information in regard to locations of such items. The exact locations shall be determined by reference to the Drawings and by actual measurements during construction of the building, subject to approval by the Owner's Representative.

B. The Owner's Representative reserves the right to adjust locations of raceway and boxes up to six (6) feet in any direction prior to rough-in to accommodate intended purpose at no additional cost.

C. All installations shall meet NEC requirements for acceptable fill ratings and conductor derating. NO exceptions. Listed partitions are acceptable in gutters or similar for proper partitioning.

3.3 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

A. General Application:
   1. Conduit Sleeves: Provide RMC sleeves at all locations where conduits pass through beams, outside walls, fire rated walls, or structural members. The size of these sleeves shall be such as to permit readily the subsequent insertion of conduit of the proper size with adequate clearance for movement due to expansion and contraction. Where conduits pass through outside walls, the inside diameter of each pipe sleeve shall be at least 1/2" greater than the outside diameter of the service pipe. After the conduits are installed, fill the annular space between the conduit and its sleeve with a mastic or caulk. Use packing as required to accomplish this. At fire rated wall penetrations, use fire barrier.
   2. Surface-mount Raceway: Not permitted except as noted on the Drawings or in locations where concealing conduit is not possible.
   3. Branch Circuits: Shall not be installed in or under the ground floor slab unless specifically required on the Drawings or pre-approved by the EOR. No exceptions.

B. Underground / In-ground:
   1. Acceptable Conduit: RMC, PVC, and Fiberglass.

2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.
3. Boxes: Shall be cast metal, concrete or fiberglass. Shall be ANSI 77 traffic rated for the location.
    a. Street / Drive: Vehicle Tier 22 rated.
    b. Sidewalk: Personnel or vehicle Tier 8 rated.
    c. Grass: Personnel Light Duty rated.
4. Conditions: Conduit risers from elbow to above grade shall be RMC.

C. Imbedded in / Passing through concrete:
1. Acceptable Conduit: RMC, PVC, and Fiberglass.
2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.
3. Masonry Boxes: Galvanized steel masonry rated box.
4. Conditions:
    a. PVC allowed in concrete filled storm shelter walls or where required by utility provider.
    b. Where allowed, conduit imbedded in concrete shall not be larger than 3/4". Verify with project Structural Engineer prior to placing.

D. Crawlspace:
1. Acceptable Conduit: PVC.
2. Fittings: Shall match the conduit material.
3. Boxes: Shall match the conduit material.

E. Wet and Damp Locations:
1. Acceptable Conduit: RMC.
2. Fittings: Shall be rated for the space and shall match the material of the conduit they are installed with.
3. Boxes: Recessed shall match conduit material. Surface-mount shall be stainless steel.

F. Concealed / Exposed Dry Locations:
1. Acceptable Conduit - EMT.
2. Fittings: Shall match the conduit material.
3. Boxes: Malleable iron or cast aluminum (type FS / FD), with threaded hubs and gasketed covers.
4. Conditions: Do not use aluminum in cinder-fill walls.

G. Existing Walls:
1. Acceptable Conduit:
    a. Concealed: FMC and EMT.
    b. Surface-Mount: Surface-Mount Raceway and EMT.
2. Fittings: Shall match the conduit material.
3. Conditions: Surface-mount raceway shall be used in finished spaces. EMT may be used only in unfinished spaces, unless otherwise directed on the Drawings.

H. Indoor Equipment Connections:
1. Acceptable Conduit: FMC and LFC (Liquid-Tight FMC).
2. Fittings: Shall match the conduit material.
3. Boxes: Shall match the conduit material.

4. Conditions:
   a. Where FMC or FNC are used, total length not to exceed 72” above ceiling, 48” exposed below ceiling.
   b. In kitchen or similar spaces, use LFC unless otherwise directed on the Drawings.
   c. Install flexible conduit to all recessed luminaires in accessible ceilings. Do not use more than four (4) flexible metal conduits per junction box to supply luminaires in a location. Do not supply a luminaire from another with any raceway or FMC. Suspend junction boxes and conduits from high roofs with hangers and trapeze.

I. Outdoor Above Grade:
1. Acceptable Conduit: RMC.
2. Fittings: Shall match the conduit material.
3. Boxes: Weatherproof cast steel or cast aluminum.
4. Conditions: Conduits may be used on a roof ONLY where indicated on the Drawings and shall be supported per the Specifications.

J. Outdoor Equipment Connections:
1. Acceptable Conduit: LFC (Liquid-Tight FMC).
2. Fittings: Shall be rated for the space or environment.
3. Boxes: Shall be rated for the space or environment.
4. Conditions: Flexible conduit types shall not exceed 72" in length.

K. Corrosive Environments:
1. Acceptable Conduit: PVC and LFNC.
2. Fittings & Boxes: Shall be rated for the space or environment.
3. Conditions: Flexible conduit for equipment connections only unless otherwise noted on the Drawings.

L. Hazardous Locations:
1. Acceptable Conduit: RMC.
2. Conditions: All conduit, boxes, fittings, hardware, etc. shall be rated for hazardous location.

M. Passing Through a Firewall:
1. Acceptable Conduit: EMT and RMC.
2. Conditions: Provide fire caulking at all penetrations.

3.4 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

A. General:
1. Unless otherwise indicated on the Drawings, conduits shall be concealed in walls, partitions and above the ceiling. In rooms where ceilings are not present or scheduled, orient conduit parallel or perpendicular to structure.
2. Conduits shall be continuous between enclosures such as outlet, junction and pull boxes, panels, cabinets, motor control centers, etc. The conduit must enter and be secured to enclosures so that each system is electrically continuous throughout. Where knockouts are used, provide double locknuts, one on each side. At conduit terminations, provide insulated throat fittings. Where conduits terminate in equipment having a ground buss, such as in switchgear, and panelboards, provide conduit with an insulated grounding bushing.

3. Capping
   a. Cap open ends of raceways until conductors are installed to prevent ingress of dirt and moisture.
   b. Cap or close ends and unused openings in wireways and gutters.
4. Sealing
   a. Seal both ends of all conduits that serve as a passageway for control wiring, data, etc. through a rated wall to prevent air / gasses / contaminates from moving from one space to another.
   b. Seal both ends of underground conduits as required to prevent ingress of water and other contaminates from outside.
   c. All Sealant shall be fire caulk, putty packs, etc. to maintain the rating of the wall.
5. Provide insulated ground wire in all PVC conduit and extend to ground buss.
6. Moisture traps: Provide junction box with drain fitting at low points in conduit system to avoid moisture traps.
7. Use expansion-deflection fittings on conduits two (2) inches and larger crossing structural expansion joints and on exposed conduit runs where necessary. Provide bonding jumpers across fittings in metal raceway systems. Provide fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

B. Support:
1. Install conduits parallel and supported on unistrut or equal trapezes and anchored with split ring hangers, conduit straps or other devices specifically designed for the purpose. Wire ties are not permitted. Do not attach raceway to ceiling support wires or other piping systems.
2. Securely fasten and support all conduit runs. Provide required clamps, straps, clips, hangers and brackets. Raceways installed in joists shall be secured to joists with clamps at 20'-0" maximum spacing. Raceways installed parallel to joists shall be supported by caddy clips (1 inch or smaller) or in unistrut / threaded rods / beam clamps trapeze at 15'-0" centers. Raceways installed perpendicular to bottom of joists shall be secured with individual conduit hangers at 10'-0" maximum spacing or unistrut / threaded rods / beam clamps at 15'-0" maximum centers. Raceways supported by straps at walls shall be supported per NEC. Support all raceways within one (1) foot of each box, cabinet, disconnect, bend or other raceway termination.
3. Raceways shall be supported with 2-hole straps. Single hole straps are not acceptable.
4. Support raceway using coated steel or malleable iron straps, clevis hangers, and split hangers.
5. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.

C. Raceway Spacing:
1. Maintain twelve (12) inch (300 mm) clearance between raceway and surfaces with temperatures exceeding 104°F (40°C). (Excluding roof mounted conduits.)

D. Raceway Bends:
1. Make bends with standard ells or conduit bent in accordance with the NEC.

E. Concealed Locations:

1. Install concealed conduit as directly and with the largest radius bends as possible. Conceal conduit in finished areas.

F. Pull String:
1. Provide a Greenlee #431 or equal (240 lbs.) nylon pulling line in all conduits that are to be used as spares and all conduits used by other divisions, such as controls, communications, and similar systems. Identify both ends of the line by means of labels or tags reading "Pulling Line".

G. Fire Rated Walls:
1. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping to comply with the latest applicable edition of the UL Fire Resistance Directory, Volumes I and II.

H. Rooftop Installation:
1. RMC installed on the roof shall be securely fastened in place and supported on approved supports at least every ten (10) feet. Additionally, conduit shall be securely fastened and supported within three (3) feet of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination.
2. LFC on the roof shall be securely fastened in place by an approved means within twelve (12) inches of each box, cabinet, conduit body, or other conduit termination, and shall be supported and secured at intervals not to exceed 4.5 feet. Flexible conduit shall not lay on roof.

I. Raceway Assemblies:
1. Bring conduit to shoulder of fittings; fasten securely.
2. Provide conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

J. Surface Raceway:
1. Provide flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.
2. Provide insulating bushings and inserts at connections to outlets and corner fittings.
3. Serve surface-mount raceways from flush outlet boxes mounted behind raceway where possible and as directed.

3.5 WIREWAY AND GUTTER INSTALLATION

A. Install wireways and surface raceways where noted or as required. Field apply a 90% grey zinc paint coating over cuts or scratches before any other finish is applied.

3.6 COMMUNICATION SYSTEMS CONDUIT INSTALLATION

A. This Contractor shall provide all raceways and conduits for all communication systems shown and / or required per Specifications and as shown on the Electrical and Communications Drawings. Communication systems may include but are not limited to fire alarms, intercoms, data, security, antenna and media management.

B. This contractor shall provide a conduit pathway (minimum 12" long) above ceiling for fire alarm, data, AV systems, etc. between all spaces and the corridor, where walls go to deck. Coordinate exact conduit sizes and quantities (range from one (1x) 1” to two (2x) 4” conduits) with low voltage Contractors and Installers.

3.7 BACK BOXES, OUTLETS AND FITTINGS APPLICATION

A. Back Boxes: Sizes and configuration shall be as required for the intended service and shall conform to and be applied in accordance with NEC Table 314.16(A). Provide extension rings, expandable bars sets, supports, gaskets for weatherproof type etc., where required.

B. Ceiling-mounted Boxes: Provide supports and attachments to properly support ceiling and bracket-type devices or luminaires. Where the box shall support the device, the box shall be rated for the weight of the device / luminaire supported.

C. Voice & Data Outlet: Provide back boxes at each voice and data outlet. Communications wiring, device and plate to be provided by communications Contractor. See Divisions 27 and 28 for additional requirements.

3.8 BACK BOXES, OUTLETS AND FITTINGS INSTALLATION

A. Do not connect or install outlet boxes back-to-back unless prior approval from Engineer is obtained. Where such a connection is necessary to complete a particular installation, fill the voids around the wire between the boxes with sound insulating material.

B. Unless otherwise shown or specified, install boxes for switches at 44" and receptacles at 18" AFF. Verify door swings with Drawings and schedules and locate switches and pull stations on the strike side of the door unless otherwise noted.

C. Where back boxes are required for switches, receptacles, data jacks, thermostats, CO_2 sensors, etc. and are shown next to each other, all devices shall be installed at the same height and, where possible, provide a gang back box and cover them with a multi-gang cover plate.

D. Protect boxes in such a manner as to prevent foreign material, such as plaster, from entering boxes. Boxes shall be thoroughly cleaned of foreign materials before pulling conductors.

E. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

F. Accessible Ceilings: Install outlet and junction boxes no more than six (6) inches (150 mm) from ceiling access panel or from removable recessed luminaire. Provide suitable access doors for all boxes mounted above gypsum / hard or otherwise inaccessible ceilings.

G. Do not fasten boxes to ceiling support wires or other piping systems.

H. Support boxes independently of conduit.

I. Install gang box where more than one device is mounted together. Do not use sectional box.

J. Provide plaster rings for all boxes in plastered walls and ceilings.

K. At all ceiling-mounted receptacle and luminaire locations (exit light, pendants, linear direct / indirect, etc.), provide a heavy-duty dual bar hanger with ceiling ties to support

the back box. Provide Cooper Industries BA50F or approved equal with appropriate back box for the application.

L. All outlet boxes shall be supported by both adjacent joists / studs using a mounting bracket that stretches the entire length between the joists /studs and is mechanically fastened to joists / studs at both ends. An outlet box fastened to a stud must be supported by both ends as mentioned above, OR a CV style back box shall be used IF it is fastened with at least two mechanical fasteners and IF it has far-side box supports (Morris 18350, Orbit ABS-6, Caddy 766A or approved equal). No other style back box mounting styles shall be used.

M. Plates shall cover any cracks between box and tile. Use oversize plates where necessary.

3.9 FLUSH BOXES

A. Mount all outlet boxes such that finished installation with mud ring is within 1/4 inch of the finished wall or ceiling line unless otherwise indicated. Provide knockout closures to cap unused knock out holes where knock out holes have been removed. Install outlets flush with finish walls or ceiling surfaces for concealed wiring.

B. Provide galvanized steel extension rings where required to extend the box forward in conformance to NEC requirements. Attach ring with at least two machine screws. Install electrical boxes and fittings in compliance with NEC requirements and in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that the boxes and fittings serve the intended purposes. Under no circumstances shall a conduit enter/exit an extension ring. Conduits shall enter / exit the electrical box only.

C. Locate boxes and conduit bodies to ensure accessibility of electrical wiring. Install blank cover plates, painted to match surrounding, at pull boxes, junction boxes and all others to which no luminaire or device is to be attached.

3.10 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 07 84 00 - Firestopping.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

3.11 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

END OF SECTION

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SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All identification for electrical equipment and systems that is required by code or ordinance shall be provided, whether or not shown on Drawings or specified herein.

1.2 SUBMITTALS

A. Submit Electrical Identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Requirements:
   1. All means of identification referenced in this section shall be of sufficient durability to withstand the environment per NEC 110.21. Where plastic is used outdoors, it shall be UV rated or treated.
   2. Lettering shall be Arial font and colors shall conform to FS L-P-387.
   3. Thickness for signs and engraved labels shall be 1/16" thick minimum.

B. Signs: For identifying multiple electrical services.
   1. Provide Aluminum OUTDOORS and provide Plastic INDOORS.
   2. Appearance: White with black lettering, lettering to be 1/4" tall minimum.

C. Equipment Labels: For panelboards, switchboards, switchgear, disconnects, equipment, etc.
   1. Provide UV rated engravable plastic (L-P-387) OUTDOORS and Engravable plastic (L-P-387) INDOORS.
   2. Appearance: Lettering shall be 1/4" tall minimum that is White with black lettering for Non-Emerency and Red with Black lettering for Emergency

D. Electrical Safety Labels: For fault current and arc flash labelling.
   1. Inside building or enclosure to be self-adhesive vinyl.
   2. Appearance: Color, layout and dimensions per city requirement. In the absence of any city requirement, use industry standard colors and layout.

E. Marker Labels / Sleeves: For circuit identification and other labelling.
   1. Marker Label - 2" or wider write-on marker label with white writing portion and clear laminating portion for protection.
   2. Marker Sleeves - 2" or wider sleeve colored to identify electrical systems per requirements in Part 3.

F. Wire Markers: For circuit or voltage identification.
   1. Conductor Marking: Electrical tape.

2. Circuit Marking: Tubing type, cloth tape, split sleeve.
3. Appearance: Colors to match requirements in Part 3.

G. Underground Warning Tape:
1. Four (4) inch wide plastic tape.
2. Appearance: Colored red and yellow with suitable warning legend describing buried electrical lines.

H. Mechanical Fasteners: Stainless steel screws, non-corroding pop rivets.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with the Owner's Representative to obtain a list of the finalized owner’s room number list before ordering identification tags.

B. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 APPLICATION OF EQUIPMENT LABELLING

A. Main Service Disconnecting Means:
1. Mark the label on the main service disconnecting means with the calculated fault current listed on the panel schedule along with the issue date of the Drawings per NEC 110.24(A). The calculated fault current shall be labelled "Maximum Fault Current" and the date shall be labelled "Date Calculations Performed". Use the seal date on the drawings for the date field.
2. Provide a sign at each service at each structure per NEC 230.2(E).

B. Panelboards, Switchboards, Switchgear:
1. Circuit directory shall be frame mounted inside the door with heat-resistant transparent face and a directory card that is type written and completely filled out.
2. Circuit directory shall coordinate each breaker with the proper load served. Each circuit shall be uniquely identifiable per NEC 408.4(A) including room numbers. Room numbers shall be as directed by Owner.
3. Circuit directory shall indicate all spares and spaces in erasable pencil.
4. Equipment Label shall indicate the high leg per NEC 408.3.

C. Instantaneous Fault Current (AIC): Electrician to field-mark the equipment labels with the calculated instantaneous fault current (as shown on panel boards) per NEC 110.24(A) and use the issue date of the drawings as the calculation date.

D. When series rated panels are specifically allowed, provide a label affixed by the manufacturer indicating the tested and approved series rating combinations per NEC 240.86. Provide an additional label affixed behind the panel door to be field marked in accordance with NEC 110.22(C).

3.3 INSTALLATION OF EQUIPMENT IDENTIFICATION

A. General:
1. Install all labels in an easily visible location and parallel to equipment lines.
2. Provide signs and tags for equipment requiring identification as shown on Drawings and for equipment as required by the NEC.

3. All signs and tags to be mechanically fastened. Double-sided tape or other fastening methods are not acceptable.
4. Provide for each main disconnect not grouped together.
5. Install signs on outside of cover for safety switches and time clocks.
6. Install signs on outside top, not on door, and at each circuit for panelboards, switchboards and motor control centers.
7. All labeling identification shall contain both the owner's and architect's room names and numbers. Coordinate with General Contractor to secure construction room numbers.
8. Provide all additional signage required by the AHJ at no cost to the Owner.

B. Conduit Identification:
   1. Underground Conduits
      a. All primary and secondary service conduits and all other underground conduits (2" and larger) shall be identified using Underground Warning Tape located no more than 12" below finished grade and run the entire length of all underground conduits.
   2. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), conduits shall be colored with painted band, marker labels or marker sleeves every ten feet (10') maximum and at back box locations using paint or marker labels. All colors shall be by system per the below list:
      a. Fire Alarm System: Red
      b. Voice / Data cabling: Blue
      c. Security System: Green
      d. Intercom, A/V, etc. (Media Mgmt.): Yellow
      e. CATV / MATV: Black
      f. Lighting Controls: Orange

C. Back Box Cover Identification:
   1. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), identify the back box covers per system. by painting the entire cover or by using marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
   2. Cover Identification: Paint the entire cover or use marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
   3. Back Box Cover Information: Label the back box with the source panel and circuiting using Marker Labels or Sharpie. Label as "Future Use" if there are no conductors pulled.
   4. Back Box Cover Color:
      a. Fire Alarm System: Red
      b. Voice / Data cabling: Blue
      c. Security System: Green
      d. Intercom, A/V, etc. (Media Mgmt.): Yellow
      e. CATV / MATV: Black
      f. Lighting Controls: Orange
      g. Other (unless otherwise specified herein): White

D. Electrical Distribution Nameplates:
   1. Application: Panelboards, Switchboards, Switchgear, Transformers, MCCs, etc.

2. Identification: Sign or Equipment Label with mechanical fasteners, per NEC 408.4(B).
3. Information shall include (Example in parenthesis):
   a. Panel designation (CHAC).
   b. Voltage, phase and wires (277/480v 3ph 4w).
   c. Source of service (Fed from MSB).

E. Electrical Equipment Nameplates:
1. Application: Safety switches, disconnects for HVAC, motors, time clocks, water heaters, etc. and enclosure for controls, relays, contactors, solenoids, other electrical assemblies.
2. Identification: Sign or Equipment Label with mechanical fasteners.
3. Information shall include (Example in parenthesis):
   a. Load served (A/H #C206) or (Parking Lot Lighting).
   b. Voltage and phase (480v 3ph).
   c. Circuits used (CHAC-15,17,19).

END OF SECTION

SECTION 26 05 73

POWER SYSTEM STUDIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide calculation of various parameters of the new and / or existing electrical system along with feedback to the Electrical Contractor to ensure:
   1. Proper adjustment of all adjustable breakers for proper operation and tripping sequence.
   2. Proper labelling for equipment and personnel safety.

B. Provide Protective Device Coordination Studies.

C. Provide Arc Flash analysis with proper equipment labelling.

1.2 COORDINATION

A. Coordinate special tests and / or equipment start-up as specified or implied in related sections.

PART 2 - PRODUCTS

2.1 PERFORMANCE / DESIGN CRITERIA

A. Submit studies in accordance with ANSI / IEEE Standard 242.

B. Submit one-line diagram for each electrical service. Key all equipment and components on diagram to items in the studies.

PART 3 - EXECUTION

3.1 GENERAL

A. This Contractor shall coordinate with the submitted equipment manufacturer to provide the below studies per the requirements in the Specifications. This Contractor shall coordinate all wire and conduit sizes and feeder lengths to the equipment manufacturer for the purposes of conducting the studies.

B. The submitted equipment manufacturer shall provide the below studies, complete with a report including any cautionary items, equipment adjustments and proper equipment labels.

3.2 APPLICATION

A. Short-Circuit Current Study (SCCS):
   1. Provide a short-circuit current analysis for each main switchboard and all downstream distribution as required to complete the breaker coordination study and arc flash study requirements below. Short-circuit analysis shall calculate

short-circuit levels at service transformer secondary, switchboard main breaker, each feeder breaker and all levels of downstream distribution equipment. Assume infinite source buss at the utility transformer primary if the primary short-circuit current information cannot be obtained from the utility company.

2. Coordinate the Short Circuit Current Ratings (SCCR / Withstand Rating) of mechanical equipment with the available short circuit current. The SCCR of all electrical and mechanical equipment shall exceed the available short circuit current.
3. Label each switchboard and panelboard with the Instantaneous Fault Current per Section 26 05 53 - Identification for Electrical Systems.

B. Overcurrent Protective Device Coordination Study (Breaker Coordination) (BCS):
1. Provide a time-current coordination study for each system. Coordination study shall compare the operating levels and times of the protective devices to the withstand levels and times that the equipment can sustain without damage or failure. Determine electronic trip unit settings necessary to achieve optimal selective coordination throughout the entire electrical distribution system. Determine setting for all adjustments of trip units of all electronic circuit breakers that are linked by zone-selective interlocking.
2. Provide a breaker coordination study for the entire electrical distribution system when any of the following happen:
   a. Where service entrance equipment is added or changed.
   b. Where distribution panels or sub-panels are added or changed.
   c. Where feeders are changed.
   d. Where the utility transformer is changed.
3. Provide a breaker coordination study for all affected electrical distribution equipment including switchboards, panelboards, MCCs, disconnects, safety switches, etc. when any of the following happen:
   a. Where electrical panels are added or changed but the service entrance equipment is not changed.
   b. Where any mechanical equipment is changed including chillers, cooling towers, air handlers, condensers, pumps, or rooftop units.
4. Submit the short circuit and OCPD coordination to the AHJ / city upon request. The level of detail and format shall conform to city requirements.
5. Provide in the close-out documents, a copy of the breaker coordination study along with an acknolwedgement from the electrician that all adjustments have been made with who did the adjustments and on what date.
6. Adjust settings of adjustable circuit breakers to achieve selective coordination of the system. Notify the Engineer if selective coordination cannot be achieved.
7. Overcurrent Protective Device Coordination Study shall be performed in accordance with NEC and NFPA 99.

C. Arc Flash Hazard Study (AFHS):
1. This contractor required to provide, as a part of this project, an arc flash and fault study with all required labels for the service entrance equipment and all downstream electrical panelboards and switchboards per NEC 110.16 and 110.21(B).
2. This requirement may be met by one of the following methods:
   a. Coordinate this requirement with the equipment manufacturer to provide both the study and the required labels. (usually less expensive)

b. Hire a qualified firm to provide the study and labels.

END OF SECTION

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SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Commissioning:
   1. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
      a. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
      b. Verify and document proper performance of equipment and systems.
      c. Verify that O&M documentation is complete.
      d. Verify that the Owner's operating personnel are adequately trained
   2. The systems to be commissioned include: electrical switchgear and panels, emergency power systems (if included), UPS Systems (if included), Solar Photovoltaic Systems (if included), electrical and lighting controls, fire alarm system, and life safety systems and controls.
   3. Commissioning requires the participation of affected Division contractors to ensure that all systems are operating in a manner consistent with the Contract Documents. All affected Division contractors shall be familiar with all parts of the commissioning plan issued by the CA (Commissioning Authority) and shall execute all commissioning responsibilities assigned to them in the Contract Documents.
   4. Commissioning Team:
      a. The members of the commissioning team consist of the Commissioning Authority (CA), the designated representative of the owner, the General Contractor (GC or Contractor), the Architect and Design Engineers, the Mechanical Contractor (MC), the Electrical Contractor (EC), the Controls Contractor (CC), the Fire Alarm Contractor, and any other installing subcontractors or suppliers of equipment. The Owner's building or plant operator/engineer is also a member of the commissioning team.

1.2 COMMISSIONING AUTHORITY

A. The commissioning authority and/or agency shall be selected and employed by the building owner. The commissioning agent shall be a licensed professional engineer in the State where the work will be performed, and shall be experienced in the commissioning of mechanical and electrical systems of the type installed in this project. Experience in construction process, direct digital control systems, test and balance and ASHRAE Guideline 1 - 1998 is mandatory. The commissioning agent shall not be associated with or employed by a mechanical contractor, or equipment supplier.

1.3 COMMISSIONING PLAN

A. Commissioning Plan:
   1. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CA will provide the plan, which will continue to evolve and expand as the project progresses. The Specifications will take precedence over the Commissioning Plan.

B. Commissioning Process:
   1. The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
   2. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
   3. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems. Generally, these meetings will be included with or will be sequential with regular subcontractor meetings.
   4. Equipment documentation is submitted to the CA during normal submittals, including detailed start-up procedures.
   5. The CA works with the Subs in developing startup plans and startup documentation formats, including prefunctional checklists to be completed, during the startup process.
   6. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.
   7. The Subcontractors, under their own direction, execute and document the prefunctional checklists and perform startup and initial checkout. The CA documents that the checklists and startup were completed according to the approved plans. This may include the CA witnessing start-up of selected equipment and systems.
   8. The installing contractors, suppliers and manufacturers, develops specific equipment and system functional performance test procedures with the assistance of the CA.
   9. The procedures are executed by the Subcontractors, under the direction of, and documented by the CA.
   10. Items of non-compliance in material, installation or setup are corrected at the Subcontractor’s expense and the system retested.
   11. The CA reviews the O&M documentation for completeness. All O&M documentation must be submitted and approved before the start of training.
   12. Commissioning shall be completed before Substantial Completion.
   13. The CA reviews, pre-approves and coordinates the training provided by the Subs and verifies that it was completed.
   14. Deferred testing is conducted, as specified or required.

1.4 RESPONSIBILITIES

A. General Contractor (GC):
   1. Facilitate the coordination of the commissioning work by the CA, and with the CA ensure that commissioning activities are being scheduled into the master schedule.

2. Include the cost of commissioning in the contract price.
3. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
4. In each purchase order or subcontract written, include requirements for submittal data, Systems/O&M data, commissioning tasks and training.
5. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
6. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Commissioning process.
7. Coordinate the training of owner personnel.
8. Prepare Systems/O&M manuals and Systems manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

B. Warranty Period:
1. Ensure that Subcontractors execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
2. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

C. Electrical Contractors and Sub-Contractors:
1. The commissioning responsibilities applicable to each of the subcontractors are generally as follows (all references apply to commissioned equipment only). Specific requirements are shown in the appropriate Divisions.
2. Construction and Acceptance Phases
    a. Include the cost of commissioning in the contract price.
    b. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, Systems/O&M data and training.
    c. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Commissioning process.
    d. Contractors shall provide the CA with normal cut sheets and shop drawing submittals of commissioned equipment as part of the normal submittal process.
    e. Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures.
        1) Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation, start-up and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.
        2) The Commissioning Authority may request further documentation necessary for the commissioning process.

f. Provide a copy of the Systems/O&M manuals and submittals of commissioned equipment, through normal channels, to the CA for review and approval.
g. Contractors shall assist (along with the design engineers) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
h. Provide assistance to the CA in preparing the specific functional performance test procedures. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
i. Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup.
j. During the startup and initial checkout process, execute the prefunctional checklists for all commissioned equipment.
k. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.
l. Address current A/E punch list items before functional testing
m. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.
n. Perform functional performance testing under the direction of the CA for specified equipment. Assist the CA in interpreting the monitoring data, as necessary.
o. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, and A/E and retest the equipment.
p. Prepare Systems/O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
q. Prepare redline as-built drawings for all drawings and final as-builds for contractor-generated coordination drawings.
r. Provide training of the Owner's operating personnel as specified.
s. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

D. Warranty Period:
1. Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
2. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

E. Equipment Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Subs.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CA.

4. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
5. Review test procedures for equipment installed by factory representatives.

F. Commissioning Authority (CA):
1. The CA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the general contractor and the A/E. The primary role of the CA is to develop and coordinate the execution of a testing plan, observe and document performance - that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, checkout and functionally test equipment and systems, except for specified testing equipment supplied and installed by the CA.
    a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
    b. Coordinate the commissioning work and, with the GC, ensure that commissioning activities are being scheduled into the master schedule.
    c. Revise, as necessary, Commissioning Plan-Construction Phase.
    d. Plan and conduct a commissioning scoping meeting.
    e. Request and review additional information required to perform commissioning tasks, including Systems/O&M materials, contractor start-up and checkout procedures.
    f. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
    g. Review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, along with A/E reviews.
    h. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
    i. Approve pre-functional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.
    j. Approve systems startup by reviewing start-up reports and by selected site observation.
    k. Review the functional performance test procedures for equipment and systems developed by the subcontractors and suppliers. This may include energy management control system trending, or manual functional testing.
    l. Coordinate, witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.

m. Review equipment warranties to ensure that the Owner's responsibilities are clearly defined.
n. Oversee and approve the training of the Owner's operating personnel.
o. Compile and maintain a commissioning record.
p. Review and approve the preparation of the Systems/O&M manuals.
q. Provide a final commissioning report.

1.5 WARRANTY PERIOD

A. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
1. Return to the site at 10 months into the 12-month warranty period and review with facility staff the current building operation and the condition of outstanding issues. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the Systems/O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

B. Scheduling:
1. The CA will work with the GC according to established protocols to schedule the commissioning activities. The CA will provide sufficient notice to the CM and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 - EXECUTION

3.1 MEETINGS

A. Scoping Meeting:
1. Within 90 days of commencement of construction, the CA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the GC. Information gathered from this meeting will allow the CA to revise the

Commissioning Plan to its “final” version, which will also be distributed to all parties.

B. Miscellaneous Meetings:
1. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular subs. The CA will plan these meetings and will minimize unnecessary time being spent by Subs.

3.2 REPORTING

A. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

B. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.

C. A final summary report by the CA will be provided focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report.

3.3 SUBMITTALS

A. The CA will provide appropriate contractors with a specific request for the type of submittal documentation the CA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer’s printed installation and detailed start-up procedures, full sequences of operation, Systems/O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority. All documentation requested by the CA will be included by the Subs in their Systems/O&M manual contributions.

B. The Commissioning Authority will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning Agent will notify the appropriate persons as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

C. The CA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

3.4 START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned. Some systems that are not comprised so much of actual dynamic machinery may have very simplified PCs and startup.

B. General:
   1. Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. No sampling strategies are used. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Start-up and Initial Checkout Plan:
   1. The CA shall assist the commissioning team members responsible for start-up of any equipment in developing detailed start-up plans for all equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and start-up are identified in the commissioning scoping meeting and in the checklist forms. Parties responsible for executing functional performance tests are identified in the testing requirements.
      a. The CA assist in the development of checklists that indicate required procedures to be executed as part of start-up and initial checkout of the systems and the party responsible for their execution.
      b. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.
      c. The subcontractor responsible for the purchase of the equipment develops the full start-up plan by combining (or adding to) the CA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
      d. The full start-up plan could consist of something as simple as:
         1) The contractor and CA prefunctional checklists.
         2) The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
         3) The manufacturer's normally used field checkout sheets.
      e. The subcontractor submits the full startup plan to the CA for review and approval.
      f. The CA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
      g. The full start-up procedures and the approval form may be provided to the CM for review and approval, depending on management protocol.

D. Execution of Prefunctional Checklists and Startup:

1. Four weeks prior to startup, the Subs and vendors schedule startup and checkout with the GC and CA. The performance of the prefunctional checklists, startup and checkout are directed and executed by the Sub or vendor. When checking off prefunctional checklists, signatures may be required of other Subs for verification of completion of their work.
2. The CA shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved).
3. For lower-level components of equipment the CA shall observe a sampling of the prefunctional and start-up procedures.
4. The Subs and vendors shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.
5. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off.

E. Deficiencies, Non-Conformance and Approval in Checklists and Startup:
1. The Subcontractors shall clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CA within two days of test completion.
2. The CA shall work with the Subcontractors and vendors to correct and retest deficiencies or uncompleted items. The CA will involve the CM or GC and others as necessary. The installing Subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA recommends approval of the execution of the checklists and startup of each system using a standard form.

3.5 FUNCTIONAL TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.
1. Objectives and Scope:
a. The objective of functional testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
b. In general, each system should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required.
2. Development of Test Procedures:
a. Before test procedures are written, the CA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Each Sub or vendor responsible to execute a test, shall provide assistance to the CA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution,

the CA shall provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CA may submit the tests to the A/E for review, if requested.

b. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

3. Test Methods:
   a. Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results. The CA will determine which method is most appropriate for tests that do not have a method specified.
4. Coordination and Scheduling:
   a. The Subs shall provide sufficient notice to the CA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CA will schedule functional tests through the GC and affected Subcontractors. The CA shall direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.
   b. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

3.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation:
   1. The CA shall witness and document the results of all functional tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the GC for review and approval and to the Subs for review. The CA will include the filled out forms in the Commissioning Report.

B. Non-Conformance:
   1. The CA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported on a standard non-compliance form.
   2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution will be documented on the procedure form.
   3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
   4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
      a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
         1) The CA documents the deficiency and the Sub’s response and intentions and they go on to another test or sequence
      b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
         1) The deficiency shall be documented on the non-compliance form with the Sub’s response and a copy given to the GC and to the Subcontractor representative assumed to be responsible.

2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
3) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CA. The CA reschedules the test and the test is repeated until satisfactory performance is achieved.

C. Cost of Retesting:
1. The cost for the Subcontractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC.
2. The Contractor shall respond in writing to the CA at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
3. The CA retains the original non-conformance forms until the end of the project.

D. Failure Due to Manufacturer Defect:
1. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable. In such case, the Contractor shall provide the Owner with the following:
a. Within one week of notification, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided within two weeks of the original notice.
b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
c. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
d. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

E. Approval:
1. The CA notes each satisfactorily demonstrated function on the test form. The CA recommends acceptance of each test using a standard form. The Owner gives final approval on each test using the same form, providing a signed copy to the CA and the Contractor.

3.7 SYSTEMS/OPERATION AND MAINTENANCE (O&M) MANUALS

A. The following Systems/O&M manual requirements do not replace O&M manual documentation requirements elsewhere in these specifications.

B. Each Division shall compile and prepare documentation for all equipment and systems covered in that Division and deliver this documentation to the GC for inclusion in the Systems/O&M manuals, according to this section, prior to the training of owner personnel.

C. The CA shall receive a copy of the O&M manuals for review.

D. Field checkout sheets and logs should be provided to the CA for inclusion in the Commissioning Record Book.

E. Review and Approvals:
   1. Review of the commissioning related sections of the Systems/O&M manuals shall be made by the A/E and by the CA.

3.8 TRAINING OF OWNER PERSONNEL

A. The GC shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.

B. The CA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

3.9 WRITTEN WORK PRODUCTS

A. Written work products of Contractors will consist of the start-up and initial checkout plan described and the filled out start-up, initial checkout and prefunctional checklists, manufacturer's factory and field testing and inspection forms, contractors' inspection and functional testing forms, Systems/O&M Manuals, training plans and training records.

B. These work products will be supplied to the CA to be included in the final commissioning report.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide a lighting control system for the proper operation of exterior lighting, except for lighting intended for 24-hour operation.

1.2 DEFINITIONS

A. Motion Sensor - A sensor that detects when an occupant is in a space. This sensor can be wired or configured to be an occupancy sensor or vacancy sensor.

B. Occupancy Sensor - A motion sensor designed or programmed to automatically turn the lighting in a space "on" when an occupant enters the space (based on major motion) and automatically turn the lighting in a space "off" after the occupant is no longer present or detected (based on minor motion) for a predetermined length of time.

C. Vacancy Sensor - A motion sensor designed or programmed to require an occupant to manually turn the lighting in a space "on" and automatically turn the lighting in a space "off" after the occupant is no longer present or detected (based on minor motion) for a predetermined length of time.

D. Dual Technology Sensor - A motion sensor with both infrared and ultrasonic technologies or both infrared and microphonic technologies.

E. Photocell - A light sensitive sensor used to communicate with a room controller to dim the lighting in a daylight zone according to the ambient lighting entering a space via any method other than electric lighting.

F. Room Controller - The local space lighting controller that interfaces with the luminaires, motion sensors, photocells, smart switches, etc. in each space to control on / off, "scenes", dimming, and daylight harvesting. This may include manufacturer verbiage such as power pack, distributed controller, driver interface modules, interface components, etc. Some or all of this function may be an integral part of the luminaires in the space.

G. Smart Switch - Intelligent programmable switch capable of communicating with the lighting control system in the space to trigger on / off, "scenes", dimming, etc.

H. Network Controller - The building-wide controller that connects room controllers together into a central network.

I. Daylight Zone - Markings indicating how far exterior natural lighting can reach into a space. Luminaires in a daylight zone are to be controlled separately from the luminaires in other daylight zones and separately from the rest of the space. We consider the daylight zones in every space. However, to avoid confusion, only daylight zones affecting the controls design will be shown on the Drawings.

J. Functional Testing - Start-up or testing performed by the manufacturer or certified representative to verify the operation of the complete lighting control system.

K. Commissioning Agent - Third-party hired by the Owner or Owner's Representative to verify proper operation of the lighting control system as designed to meet the Energy Code commissioning requirements.

1.3 COORDINATION

A. Coordinate motion sensor and photocell mounting and locations with architectural RCP (ceiling type, ceiling height, baffles, etc.), mechanical (HVAC duct work, grilles, etc.), plumbing (exposed piping, sprinkler heads, etc.), technology (A/V, projectors, etc.) and other trades, as required, before installation.

1.4 PRE-INSTALLATION MEETING

A. Meet with the manufacturer of the lighting control system on-site to review installation, wiring methods and exact equipment locations of all components prior to starting installation. At this meeting the Contractor shall be trained by the manufacturer or vendor on the installation, setup and functionality of the system. Failure to have this meeting will result in the Contractor assuming full responsibility of all costs incurred to move controls and sensors, replace equipment due to product damage, costs due to installation errors or failure to meet the full intent of the design.

1.5 SUBMITTALS

A. Submit from the following list, all items used on this project: Motion sensors, photocells, smart switches, time switches, room controllers, network controller, plug load controller, software, lighting contactors, low voltage wiring, intelligent luminaires, etc.

B. Product data for motion sensors shall clearly indicate coverage areas for major motion and minor motion determined in accordance with the testing procedures of NEMA Guide Publication WD 7 Occupancy Motion Sensors Standard.

1.6 SHOP DRAWINGS

A. Submit shop drawings of each RCP area in the project showing the specific locations of all parts of the lighting control system including motion sensors, photocells, smart switches, room controllers, network controller, plug load controller, enhanced building controls (if required), etc. Motion sensors shown shall include sensor type, sensor mounting, and other pertinent data to allow evaluation of the proposed system.

B. Submit a complete wiring diagram for all motion sensors, photocells, smart switches, room controllers, network controllers, etc. for the project. Typical wiring diagrams will be rejected.

C. Submit a sequence of operations for each unique switch type describing the function of each button on each switch and the effects on the lighting in the space. This sequence of operations should be similar to the Lighting Control Chart with the added information describing how the lighting control system pieces / parts work together.

D. Submit a list of switch types with a list of proposed button labels. This list should be similar to the Button Info in the Lighting Control Chart with added information showing switch button layouts and actual labels for the project.

1.7 WARRANTY

A. Provide a five (5) year parts and one (1) year labor warranty on the entire lighting control system. Warranty coverage shall begin at the time of Project Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. If they comply with these specifications, products of the following manufacturers will be acceptable:
   1. Acuity Controls.

B. No other manufacturers will be accepted. Submitting on any brand other than those listed here will be rejected. No exceptions.

2.2 GENERAL REQUIREMENTS

A. Refer to the RCP, Lighting Control Chart and Luminaire Schedule for the switch type, controls and sequence of operation in various areas throughout the building and additional requirements and information. For projects beyond the scope of a single system, multiple systems shall be networked together to accommodate any project size requirements.

B. The lighting control system shall include all required devices for a complete and proper operating system to automatically control the lighting to meet the intent of the Energy Code. The system may include but not be limited to motion sensors, room controllers, network controller, plug load controller, enhanced building controls (if required), low voltage control wiring, photocells, smart switches, intelligent luminaires and all required conduit and back boxes. Not all required components are shown on the Drawings.

C. All parts of the lighting control system shall meet the following requirements:
   1. Shall be warranted by the same company and be from the above list of manufacturers.
   2. Shall be aesthetically compatible. i.e., from the same product line or family of product.
   3. Shall be the same release and most current release generation of the product.
   4. Shall be UL listed as an assembly and shall be plenum rated.
   5. Shall NOT be battery operated devices or controls.

D. Color: Device color and plates shall be coordinated with the Owner's Representative and shall reasonably match across all Divisions. Emergency devices and plates shall be red.

E. All device plates shall be attached with screws. No screwless device plates are allowed.

F. If a FACP exists or shall be installed, then provide fire alarm integration as noted on the Lighting Control Chart. This feature shall be provided via a single contact closure at the FACP as a trigger to the lighting control system. Provide all associated hardware and wiring from the FACP to the lighting control system necessary for a complete and working system.
   1. Fire Alarm Activation: The lighting controls shall turn all interior and exterior building-mounted lights on to meet NFPA 101 Section 7.8.1.2.2 requirements.
   2. Fire Alarm Deactivation: The lighting controls shall return all interior and exterior building-mounted lights to the previous state before the fire alarm was activated.

G. If a generator or UPS provides backup / auxiliary power to any luminaires, then power shall be provided for all lighting control system components in those spaces such that all functions of the lighting control system remain operable under any power condition.

H. If a generator or UPS provides emergency power to any emergency luminaires, all emergency luminaires shall turn on to maximum lumen output. If battery packs provide power for emergency lighting, all emergency luminaires shall turn on to maximum lumen rating of the battery pack.

I. Wiring between sensors and control units shall be 18 AWG minimum (stranded preferred) or CAT5/5e/6. Pre-terminated low voltage wiring from the lighting controls manufacturer is preferred.

J. Integration with existing lighting control systems:
   1. A networked distributed lighting control system currently exists in the existing building. Components need to be compatible with the existing system and installed to tie into the existing networked lighting control system.
   2. If an existing lighting control system exists in areas that are to remain, then the new system shall work with the existing system.
   3. When the fire alarm activates an alarm, the existing lighting control system shall turn on all new luminaires controlled by the lighting control system in addition to all of the existing lighting that it currently controls.

2.3 MOTION SENSORS

A. Sensor Design and Layout: Provide the quantity of motion sensors required for complete and proper coverage without gaps within the range of coverage of controlled areas. Rooms shall have 100% coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room. The locations and quantities of sensors shown on the Drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Provide additional sensors if required to properly and completely cover the respective room. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.

B. Coverage and Orientation: Select the appropriate type of sensor for complete coverage of each space. All motion sensors are to be in the best location to avoid false triggers from movement outside an open doorway.

C. All motion sensors shall be dual technology.

D. All motion sensors to be set to the timeout indicated in the Lighting Control Chart and adjusted to maximum sensitivity. Motion sensors must be capable of being set down to five (5) minutes and one (1) minute for testing.

E. Coverage areas for major motion and minor motion shall be determined in accordance with NEMA WD 7 Guide Section 3.

F. Ultrasonic technology shall utilize a frequency that does not interfere with other sensors, hearing aids, smartboards, etc.

G. All motion sensors shall have masking or internal shielding available to control coverage pattern in the field. Stickers or other external adhesive masking will not be accepted.

2.4 SMART SWITCHES

A. Shall control the luminaires in the space for all on / off, dimming, "scene" controls, manual override, etc. as indicated in the Lighting Control Chart and as required by the Energy Code.

B. All smart switches are to be engraved or internally labeled so that the function of each button is clearly identified. All labeling or engraving must be of high quality and be provided by the lighting control system manufacturer.

C. Timer Switches, where indicated on the Drawings, shall have an override not exceeding the maximum time allowed by the Energy Code.

2.5 ROOM CONTROLLER

A. Shall operate all lighting in the space based on input from the smart switch(es), motion sensors, photocells, etc. via low-voltage control output and relays / contactors using zero-cross technology.

B. In the event of a hardware, software or component failure, the lighting in the space shall default to the "ON" position.

C. Provide room controllers, as required, for complete control of all lighting in the space to meet the Energy Code requirements and design intent shown on the Drawings.

2.6 MAINTENANCE SERVICE

A. Provide a three (3) year manufacturer Software Service Agreement with the lighting control system. The agreement shall cover all minor updates, bug fixes and maintenance to the software of the system to maintain all original functionality. The Software Service Agreement shall start at the time of Project Substantial Completion.

2.7 SYSTEM SUPPORT

A. Provide five (5) year complete system support starting from Project Substantial Completion. The entire lighting control system (hardware and software) shall be included in the support. The support shall include phone and email communication (as a minimum) for the duration of the support. The system support shall include all technical support, hardware and software questions, warranty help, etc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Where work is to be performed in an existing facility, visit the site of the proposed work and observe its conditions so that you may be fully informed as to the materials, labor, workmanship and conditions under which the work is to be done.

3.2 INSTALLATION

A. General:
1. Provide all lighting controls, as required and where indicated, in accordance with manufacturer's written instructions and project shop drawings, applicable requirements of the NEC, and recognized industry practices to ensure that products serve the intended function.
2. Provide the room controller, as required, located above the ceiling above the switches near the exit door. Provide a permanent label on the ceiling to identify its location. The label material shall be as described in Section 26 05 53 - Identification for Electrical Systems. The label shall say "Lighting Controller". It is acceptable for a room controller to serve more than one space.
3. Provide conduit and wiring in accordance with Section 26 05 33 - Raceways and Boxes for Electrical Systems and Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables.
4. All motion sensors and switches located in gyms, play areas, multipurpose spaces, etc. shall have a wire guard.
5. Exact locations of all equipment shall be based on observing good installation practice and shall be coordinated with other elements of the RCP.

B. Existing Conditions:
1. Field verify location of existing network controller(s) in the existing building. If an additional network controller is needed to control the lighting in the new portion of the building, then the new and existing network controllers must be connected and operate as one network controller.

C. Lighting Control System Integration with EMCS:

1. Exterior lighting shall be integrated into the lighting control system or EMCS through BACnet interface.
2. Provide BACnet object list to EMCS Contractor.
3. Contractor to expose BACnet objects related to footcandle levels, motion sensor status and commanded light levels for each space.
4. BACnet objects need to be labeled or mapped to the room number they are serving.

D. Lighting Control Cable Routing and Installation:
1. Cable routing and installation shall be per the EIA (Electronic Industries Association) recommendations, manufacturers recommendations and per the NEC.
2. All wiring shall be bundled with hook and loop (Velcro, no cable ties) and supported from the building structure via j-hooks (60" spacing max), not fastened to any other building system. Wiring shall not be in contact with the ceiling or ceiling supports.
3. All conduit ends, box openings and pathways shall be de-burred, cleaned, and secure prior to installation of cable.
4. Provide a plastic snap-in bushing at each box opening (T&B 3210 series or similar), passage through a metal stud (T&B SB12160SC or similar), and at the end of all open conduit stubs or sleeves (T&B Series 390 / 442 or similar) prior to lighting control cable installation to protect the cabling from damage.
5. Do not route cables through fire doors, ventilation shafts, grates, or parallel with line voltage electrical conductors.
6. Lighting control cable shall not be installed in the same conduit, raceway, tray, duct, or track with line voltage electrical cable without a metallic barrier meeting NEC requirements.
7. No terminations or splices shall be installed in or above ceilings, other than in designated end point housings.
8. Conduit, duct, or track shall be used for lighting control cable in exposed areas.

3.3 SEQUENCES OF OPERATION

A. Lighting Controls:
1. The smart switch shall be required to be pressed to turn the lights "on" in all spaces where a vacancy sensor is required. Otherwise, an occupancy sensor may automatically turn the luminaires "on". Two minutes prior to turning the lights "off", the lighting control system shall dim the luminaires in the space to 50% of their previous output as a notification to the occupants that the controls will soon turn the lighting off. A momentary "blink" is allowed if luminaires are not dimmable. If the motion sensor is not triggered within the two minutes, the lighting in the space shall turn "off". If the motion sensor is triggered, the lighting control system shall dim the lighting back up to the previous lighting level and timeout is restarted. In spaces with timer switches, the system shall accept an override signal at any time either before or after the lighting is turned off. The occupant shall not be required to wait for the lights to go out before issuing the override.
2. Where shown on the Drawings, a photocell is to be used to measure the light level and signal to the room controller to dim the luminaires continuously (from 100% to 15% or lower, including off) in the daylight zone to maintain a consistent (within +10% and -0%) lighting level in the space.

3.4 FUNCTIONAL TESTING

A. Coordinate the below requirements with the manufacturer representative.
1. Certified factory representative shall provide all initial field programming of the system as part of the system startup process.
2. Certified factory representative shall inspect the finished installation against the shop drawings and installation instructions.
3. Certified factory representative shall do functional testing of the finished installation. Submit documentation of the functional testing in accordance with closeout submittal requirements.

3.5 ADJUSTING

A. Motion sensors may be affected by various conditions in the room. It may be necessary for the Contractor to make adjustments, change the location or type of sensor to obtain proper operation in a specific room. The Contractor / equipment manufacturer shall have final responsibility for proper operation and coverage of the system in each room and should therefore make labor allowance for such changes and adjustments. The Contractor is also responsible for acquiring approval from the Engineer for any changes or deviations from project specifications.

B. Contractor shall work with the manufacturer to correct all findings from manufacturer functional testing.

C. Contractor shall work with the manufacturer to correct all findings made by the Commissioning Agent or registered design professional, whichever entity performs the commissioning service. This Contractor is responsible for the entire lighting control system and luminaires to pass the commissioning inspection and reporting.

3.6 SYSTEM STARTUP

A. Provide the initial programming, aiming and start-up of the system.

B. After system startup, the manufacturer or manufacturer's representative shall test the operation of the complete system (all components, every space) to ensure the proper operation throughout the range of building operating conditions. Provide documentation of such functional testing in the closeout submittals. Testing individual components, third-party commissioning, etc. shall not be a replacement for complete system testing.

3.7 THIRD-PARTY COMMISSIONING

A. In addition to functional testing by the Contractor and the manufacturer, additional third-party commissioning is required to meet the Energy Code requirements. The manufacturer shall be present during the third-party commissioning process. See Section 26 08 00 - Commissioning of Electrical Systems for more information.

3.8 OWNER TRAINING

A. After functional testing and commissioning are complete, the manufacturer shall provide a minimum of four (4) hours of on-site training to the Owner’s personnel in the operation, adjustment, and maintenance of the system. The length of the training session shall be at the discretion of Owner. Do this training in a location where it can be recorded by the Owner. (With prior approval of the Owner, the Contractor can arrange to record the training and present it to the Owner.) Coordinate date, time and location of training one (1) week prior to meeting and provide documentation of such training in the closeout submittals. The training shall cover the following items in detail:
   1. Scope of system: Review the as-built documentation with the Owner to detail extent of system. Identify locations of all wall stations, wiring, and panels that fall within the scope of the lighting control system. Define clear lines of scope between lighting control system and EMCS functions, if applicable.
   2. Operation of system: Cover normal operation of switches, push-buttons, LCD interfaces and software (if provided). Provide documentation to the Owner showing the operational zoning of controlled circuits and all time clock events programmed into the lighting control System. Show the Owner how to change and add / delete events.
   3. Maintenance and troubleshooting of system: Detail any required or optional preventive maintenance actions required of the Owner. Review step-by-step procedures to troubleshoot all possible failure modes of each component type of the lighting control system. Cover procedure to get lights turned on in any space containing a lighting control

system in the event the control system fails. Identify any specialized equipment necessary to support all the above actions.

4. Service and support of system: Identify nearest direct support contact for the manufacturer and provide both telephone and email contact details.

END OF SECTION

SECTION 26 20 00

LOW VOLTAGE ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Electrical service including underground primary requirements, transformer and secondary enclosure requirements, overhead and underground service entrance requirements, metering, and final connections.

B. Provide and install all components of the low voltage distribution system(s) including all switchboards, panelboards, transformers, fuses, circuit breakers, disconnects, MCCs, etc. as shown on the Drawings and as required for a complete and working system. All equipment shall be sized to meet the latest adopted version of NEC 220 requirements as a minimum.

1.2 COORDINATION

A. Prior to ordering disconnects and fuses or fuse holders, coordinate fuse ratings with the Mechanical Contractor to verify that fuses for all mechanical equipment matches the Maximum Over-Current Protection (MOCP) values of the mechanical equipment being provided. This Contractor to adjust upstream breaker sizes, branch circuit conductor sizes, whip sizes and disconnect sizes to accommodate the fuse (Over-Current Protection Device, OCPD) requirements for the supplied equipment.

1.3 SUBMITTALS

A. Provide scaled shop drawings for each electrical equipment room showing the placement of all panelboards, transformers, and other equipment such as mechanical equipment, drawn to scale and dimensioned. Such shop drawings will be reviewed for compliance with the intent of the Drawings and the spaces available for all electrical equipment.

B. Clearly indicate on the submittals whether equipment is fully-rated or series-rated and arrange the submittals in order the panelboards appear on the Drawings.

C. Include the following parameters as applicable in the submittal: equipment name, description, voltage, phase, ampacity, kVA rating, K-rating, control voltage, impedance, etc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All panelboards, switchboards, disconnects, OCPDs, etc. shall be from the same manufacturer to ensure proper breaker coordination.

B. All equipment on this project shall be new. Refurbished or used equipment will not be acceptable.

C. Approved Manufacturers: Square-D.

D. All other manufacturers shall require pre-approval in accordance with Section 26 00 00 - Electrical.

2.2 GENERAL REQUIREMENTS

A. Unless specifically noted otherwise on the Drawings, all equipment in these Specifications shall meet the requirements outlined below.

B. Conductor material for switchboards, panelboards, disconnects, etc. shall be copper.

C. Transformer coils shall be continuous wound and conductor material shall be copper.

D. Unless otherwise indicated on the Drawings, provide the following enclosures for all panelboards, switchboards, switchgear, disconnects, transformers, etc.:
1. NEMA 1 - All equipment located in interior dry locations.
2. NEMA 3R - All equipment located in damp, wet or exterior locations.
3. NEMA 4X - All equipment located in corrosive environments.

E. All panelboards, switchboards, disconnects, etc. shall have weatherproof threaded hubs for top / bottom / side conduit entries.

F. All equipment shall have a factory applied gray finish applied over a rust inhibiting treatment. Any items which have the finish marred shall be touched up or refinished to like new condition before final acceptance. This shall include, but shall not be limited to, sanding and properly removing rust or other contaminants and completely repainting equipment if damage is extensive. Overall acceptance is subject to approval of the Owner's Representative.

G. Provide all labeling / identification per Section 26 05 53 - Identification of Electrical Systems.

H. Provide, at each main switchboard and all downstream distribution, a complete (time-current) coordination study and an arc flash study with all required labels. Contractor may use the equipment manufacturer to provide both the required studies and the required labels. Contractor to adjust all settings for electronic-trip circuit breakers. See Section 26 05 73 - Power System Studies for more details.

2.3 PANELBOARD / SWITCHBOARD COMMON REQUIREMENTS

A. Construction: NEMA PB 1, UL 67, interiors shall be completely factory assembled. See General Requirements above for NEMA enclosure rating requirements.

B. Enclosure Properties: Door in door construction, standard conduit knockouts in ends and sides of cabinet. Provide flush type combination catch and key door locks on all panelboards and load centers. Key all locks alike, provide two keys with each panelboard.

C. Bus Information:
1. Ground Bus: Full length, 25% phase rated, bonded to each bus, additional isolated bus in computer and communication panels.
2. Neutral Bus: Full length
   a. 200% of phase rated for all non-linear, computer or isolated ground (IG) panels.

b. 100% of phase rated for all lighting and power panels.

D. OCPDs: Provide bolt-on circuit breakers unless otherwise indicated on the Drawings.

E. Fault Withstandability: Suitable for operation and able to withstand the symmetrical short circuit current as indicated on the Drawings or available at the location, whichever is larger.

F. Spaces: Install all allotted or indicated spaces so that future OCPDs can be added without additional machining, drilling, tapping or bus extensions.

G. Circuit Identification:
1. Frame-mounted directory with a heat-resistant transparent face for identifying circuits. Mount inside the panelboard door. Use equipment names as reflected by panelboard schedules on the Drawings. Use room names and numbers selected by the Owner's Representative, which may differ from those shown on Drawings.
2. Provide on all new and revised existing panelboards per Division 26 with new information. See Section 26 05 53 - Identification for Electrical Systems for more information.

H. Features and Accessories:
1. Provide metering and instrumentation per Section 26 09 13 - Electrical Power Monitoring and per Division 23 Energy Management Control System requirements.
2. Provide GFCI and GFPE protection as indicated here, as shown on the Drawings and where required per NEC.
3. Provide SPDs at each main switchgear per Section 26 43 00 - Surge Protective Devices.

2.4 PANELBOARDS

A. Construction:
1. Flush-mounted panelboards: Trims shall fasten to permit both horizontal and vertical adjustment. Provide barriers per NEC 215.15.
2. Surface-mounted panelboards: Trims shall fasten to insure no overhang.

2.5 SWITCHBOARDS (> 1200A AMPS)

A. Construction:
1. Provide the required number of sections of the required size to fit in the space provided.
2. Connect sections with busing. Cabled connections are not allowed.
3. Switchboards rated 2,000 amps or greater shall have a minimum depth of 30 inches.

B. Overcurrent Protection Devices:
1. Circuit breakers: Shall be capable of field-installable shunt trip, all shall be capable of being locked in the OFF position.
2. Fused switches: Provide fused switches and fuses as indicated on the Drawings.
3. Clearly indicate size of breaker or fused switch and ON / OFF positions for all OCPDs.

2.6 TRANSFORMERS

A. Construction:
1. UL 1561, UL 5085, factory-assembled, enclosed, ventilated, air-cooled, dry-type, with lifting brackets, sized as indicated on Drawings.
2. Transformers shall be rated for continuous operation at rated kVA, 24 hours per day, 365 days per year with normal life expectancy as defined in IEEE 65.
3. Minimum transformer efficiency shall meet Title 10 CFR Part 431.
4. K-13 and K-20 rated transformers shall have a 200% neutral bar.

B. Enclosure Properties:
1. Enclosed, with vent openings (to meet NEC 450.21), UL 1561 listed.
2. Audible sound levels shall be in accordance with NEMA ST-20.
3. Capable of operating at 115% on 115°C rise, with ambient temperature rise not exceeding 40°C.

C. Insulation: Unless otherwise noted on the Drawings, provide the following:
1. Class 155 or higher, no exceptions.
2. 1-15 kVA: Class 185 with 115°C rise.
3. 16-500 kVA: Class 220 with 115°C rise.

D. Tap arrangement: Use in the high voltage winding unless noted otherwise on the Drawings. Provide taps at 2.5% each, at least two (2) above and at least two (2) below nominal voltage.

E. Mounting Options:
1. 1-15 kVA: Suitable for wall mounting.
2. 16-75 kVA: Suitable for wall, floor stand, or trapeze mounting.
3. Larger than 75 kVA: Suitable for floor stand or trapeze mounting.
4. Floor mounting shall be bolted to a four (4) inch raised concrete pad.

2.7 SAFETY SWITCHES AND ENCLOSED CIRCUIT BREAKERS

A. Product Description:
1. Provide single-throw, horsepower rated, 100% load break and make rated, designed for locking in "ON" or "OFF" position, steel cabinets, as required by the application and required per the NEC.
2. Provide equipment rated for the required voltage and with the number of poles required, dependent on the equipment requirements.
3. Provide SPDs at equipment in accordance with Section 26 43 00 - Surge Protection Devices.

B. Construction:
1. All safety switches and enclosed circuit breakers shall be Heavy Duty (HD) type and built per NEMA KS 1 and UL 98.

C. Disconnect / Safety Switches:
1. Safety switches shall be fused, unless indicated as non-fused on the Drawings.
2. All disconnects / safety switches shall be lockable in the OFF position.
3. Use fuse clips which are rejecting type to accept Class RK or L fuses only.
4. Size fused safety switches and upstream conductors serving motor loads at 175% of motor nameplate or per NEC values, whichever is larger, and round to the next standard size.

D. Enclosed Circuit Breakers: Provide where indicated on Drawings, otherwise provide a disconnect / safety switch.

2.8 CIRCUIT BREAKERS

A. Product Description: Bolt-on, quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the Drawings.

B. Interrupting Ratings: Provide size (ampacity) and withstand (AIC) rating as indicated on the Drawings. Series rated panels are NOT allowed. All panels shall be FULLY RATED.

C. Thermal Magnetic Circuit Breaker: Bi-metallic overload elements, magnetic trip, common trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.

D. Electronic-Trip Circuit Breaker: Solid-state, microprocessor-based, true RMS sensing trip units with the following field-adjustable trip response settings:
   1. Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
   2. Long time delay.
   3. Short time pickup and delay.
   4. Instantaneous pickup.

E. Features and Accessories: Provide as required by NEC, as indicated in the Specifications and as shown on the Drawings.
   1. AFCI: Arc fault sensing where arc fault protection is indicated or required.
   2. GFCI / GFPE: Ground fault pickup and delay where ground fault protection is indicated or required by NEC.
   3. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
   4. Lock-Out Provision: For locking the circuit breaker in the off position.

F. Provide number of poles indicated for the specified equipment or service, with common trip handle for all poles.

G. Independently mount so that a single unit can be removed from the front of the panelboard without disturbing or removing main bus, other units or other branch circuit connections.

H. All circuit breakers that have an overcurrent trip setting fixed or adjustable at 1200a or higher shall have an Energy-Reducing Maintenance Switch or similar approved method for arc energy reduction and shall meet all requirements of NEC 240.67 and NEC 240.87. No exceptions.

2.9 FUSES

A. Performance Requirements:
   1. All fuses shall be from the same manufacturer.
   2. Provide ampacity rating as indicated on the Drawings or required by NEC.
   3. Unless otherwise indicated on the Drawings, size fuses serving all motor loads at 175% of motor nameplate FLA or NEC motor table ampacity, whichever is larger.

B. 600-amp and less: UL Class RK-1 dual element, time delay.

C. 601-amp and larger: UL Class L time delay.

2.10 GROUND FAULT PROTECTION

A. Ground Fault Protection System:
   1. Ground sensor relay (GSR) system with ground break components, solid state construction, adjustable current pick-up and time delay settings.
   2. Coordinate ground sensor (CT) with integral test winding of sufficient size to encircle all phase and neutral conductors, for zero-sequence monitoring and a solid-state relay to operate the trip circuit on the main switches.
   3. Provide required transformer to supply power for tripping switches and connect phase to phase.

B. Accessories Included:
   1. Ground fault relaying system for main switches to be zero-sequence type.
   2. Ground fault current-detection range to be 100a to 1,200a.
   3. Time delay range to be instantaneous to 60 cycles.
   4. Derive tripping and control power from control power transformers in switchboard.
   5. Components shall include static ground fault sensor, current monitor, and test panel.

C. Where ground fault protection is required per NEC or indicated in the Specifications or the Drawings, coordinate with the equipment manufacturer to provide all proper GFCI / GFPE requirements for personnel (5ma) and equipment (30ma).

2.11 FRACTIONAL HORSEPOWER MOTOR-RATED SWITCH

A. Product Description: NEMA WD-1 & WD-6, motor-rated toggle switch. For use when switch-mounted thermal overload relays are not required.

B. See Specifications section 26 27 26 - Wiring Devices for additional requirements.

2.12 CONTACTORS AND RELAYS

A. General:
   1. NEMA ICS 2, magnetically operated contactor with poles and contacts to match the circuit function and load. All contactors used for lighting shall be "lighting-rated".
   2. Coordinate coil voltage with controls system. 120v preferred. Provide fused control circuit transformers as required.
   3. Provide an enclosure to house all contactors and relays. See General Requirements above for NEMA enclosure rating requirements.
   4. All contactors to be rated for the load type, voltage and continuously rated current.
   5. Provide sufficient contactors and/or poles to accommodate quantity of circuits required to be switched plus an additional 25% for future growth.
   6. Mechanically-held contactors are required except where electrically-held contactors are specifically noted in the Drawings or Specifications.

B. Mechanically-Held Contactors:
   1. Mechanism electrically operated by solenoids and mechanically latched.
   2. Coil clearing contacts to de-energized coils when device is held closed.
   3. Required remote control relay and controls for proper latching and unlatching.

C. Electrically-Held Contactors:
   1. Mechanism electrically-held by a solenoid.
   2. Required relays and controls for proper operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify mounting supports are properly sized and located including concealed bracing in walls.

3.2 PREPARATION

A. Coordinate with the power utility company to obtain information regarding the available short circuit current at the service point. Provide this information to the electrical gear manufacturer for use in the overcurrent protective device coordination study required by Section 26 05 73 - Power System Studies.

B. Coordinate all requirements with the power utility company and include in the base bid, including but not limited to the following:
   1. Whether the service will be overhead or underground.
   2. The extent of any underground primary.
   3. The need for a secondary enclosure. Provide in bid if required.
   4. Any charges from the power utility company for providing service.
   5. The need for a transocket for utility metering.

3.3 APPLICATION

A. Panelboards and Switchboards: Provide a complete isolated ground system including isolated ground panelboard with 200% neutral, SPD and separate isolated ground bus where indicated on the Drawings.

B. Transformers:
   1. Provide K-1 transformers when serving panelboards, unless altered by below items.
   2. Provide K-13 transformers when serving isolated ground panelboards.
   3. Provide K-20 transformers when serving panelboards in network operations centers (NOC).

C. Circuit Breakers:
   1. Provide ground fault circuit breakers (GFCI) where indicated on the Drawings, panelboard schedules and / or as required by NEC 210.8(B), 422.5, etc. For example, provide protection at all EWCs, hand dryers, kitchen equipment, concessions equipment, etc. Pull separate neutrals with each circuit to ensure correct GFCI operation.
   2. Provide combination AFCI / GFCI circuit breakers where AFCI protection is required per NEC and as indicated on the Drawings.

D. GFCI Protection:
   1. Provide ground fault protection at all service entrance equipment in accordance with NEC 230.95.
   2. Provide ground fault sensing and indication on emergency systems in accordance with NEC 700.27.

3. Provide ground fault protection at any additional locations indicated on the Drawings.

E. Motor Disconnecting Means:
1. Provide a motor-rated switch as a disconnecting means at all motors powered by 120v, 277v and 208v 1ph 20A circuits, unless otherwise indicated on the Drawings.
2. Provide a fused disconnect at all motors not listed above, unless otherwise indicated on the Drawings.

3.4 INSTALLATION

A. General:
1. Set all equipment plumb, straight and level.
2. Provide and install all equipment, including electrical connections, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the NECA "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended function.

B. Panelboards and Switchboards:
1. Install in the locations as shown and as recommended in NEMA PB1.1. Mount the panelboards such that the top of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above the floor or working platform. Space all panelboards and switchboards to meet the requirements of NEC 110 and 408. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secured.
2. Provide required SPD breaker for each panelboard/ switchboard as indicated on the Drawings.
3. Coordinate installation of panelboards and enclosures with other trades, including Mechanical and Plumbing to avoid clearance issues with dedicated equipment space and working clearances.
4. Place all free standing or floor mounted equipment on four (4) inch housekeeping pads.

C. Transformers:
1. Mount transformers on additional vibration isolators and / or on neoprene and spring isolators at floor or other mounting points to meet sound ratings. Install per manufacturer's recommendations.
2. Exterior weatherproof transformers: Mount on six (6) inch thick minimum steel reinforced concrete slab. Extend slab one (1) foot beyond transformer on each side. Provide weather shields from the manufacturer.
3. Use flexible conduit, six (6) feet maximum length, for connections to transformer. Make conduit connections to side panelboard of enclosure.
4. Check for damage and tight connections prior to energizing transformer. Measure primary and secondary voltages and make appropriate tap adjustments.
5. At all floor-mounted transformers, installation shall be level and equipment shall be bolted to a raised four (4) inch concrete pad.
6. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.

D. Fuses:
1. Check fasteners on fuse clips for tightness when installing fuses.

2. Install fuses so label is in an upright, readable position. Fuses without labels are not acceptable.
3. Do not install fuses until equipment is ready to be energized.

E. Safety Switches and Enclosed Circuit Breakers:
1. Mount switches within six (6) feet of the equipment served, so that operating handle is easily accessible. Align tops of switches when grouped together.
2. Provide a four (4) inch housekeeping pad for all free standing / floor mounted safety switches whether they are mounted inside or outside.
3. Mount vertically on required separate support system hardware with switch easily accessible (door to open 90 degrees minimum).
4. Permanently mount safety switches from inside with plated or stainless bolts, toggle bolts or anchors. Exposed mounting bolts, screws, etc. are not acceptable.
5. Permanently install fusible switches with Class R fuse kits so that fuses are readable when looking at open switch.
6. Do not mount switches / disconnects to access panels or on nameplate data on equipment per NEC.
7. Installation of conductors: Switches shall not be used as “junction boxes” between HVAC units (splicing or “pig tailing” is not permitted). The maximum number of conductors allowed per termination is determined by the manufacturer’s approved rating for each terminal or lug.

F. Contactors and Relays:
1. Unless otherwise indicated on the Drawings, mount contactors in electrical enclosures in the electrical room, mechanical room or designated area on Drawings in accordance with manufacturer's instructions and recommendations.
2. Provide an override toggle switch for maintenance and testing located beside each contactor used for lighting.
a. Provide relay with integral override switch per Exterior Lighting Controls details on the Drawings.

3.5 ELECTRICAL SERVICE AND METERING PROVISIONS

A. The Contractor shall provide all materials and labor shown on the Drawings and / or required for the complete installation except as specifically indicated to be by the serving power utility company. The Contractor shall meet all requirements as directed by the serving power utility company at the cost to the Contractor.

3.6 ADJUSTING

A. Electrical Load Balancing: Balance panelboards by checking each phase of all panels under full load and arrange so that all phases carry the same load as near as possible by moving individual branch circuits. After load balancing is complete, correct panelboard schedule directories to reflect all breakers and loads correctly.

B. Transformer Voltage Adjustments: Measure primary and secondary voltages and make appropriate tap adjustments.

C. GFCI Protection: Initial adjustments at service entrance equipment:
1. Initial settings: At the time of installation, adjust the settings of the ground fault protection device as follows:
a. Time delay: Adjust the time delay to 0.3 seconds.

b. Pick-up: In no case can the setting exceed 1,200a. Observing this absolute maximum, adjust the ground fault trip setting to the greater of the following two options:
   1) 15% of the trip rating of the main breaker in the service entrance equipment.
   2) At least as large as the trip rating of the largest downstream overcurrent device that serves a single piece of equipment.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide factory fabricated wiring devices of the type and electrical rating for the service indicated. Provide proper selection to fulfill the wiring requirements. All wiring devices and associated wall plates shall be colored to match each other, unless indicated otherwise on the Drawings or changed by owner requirements, code requirements or these specifications.

B. Provide switch, receptacle, outlet, conduit, and special purpose wall plates for wiring devices, with ganging and cutouts as indicated, provided with metal screws for securing plates to devices with screw heads colored to match finish of plate.

C. Provide a compatible receptacle for the cap or plug and cord of all other equipment installed in this project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following, unless specific manufacturers are listed or restricted elsewhere in this specification section:
   1. Arrow Hart, Bell, Bryant, Cooper Industries, Eaton Corp., GE, Gleason, Graco, Hubbell, Kellems, KH Industries, Legrand, Leviton, Pass & Seymour, PerfectLine, ReelCraft, Wattstopper, and Wiremold

2.2 GENERAL REQUIREMENTS

A. Unless otherwise specified herein or indicated on the Drawings, all devices shall be specification grade, heavy duty, 20a rated (at equipment rated voltage with the required number of poles), back and side-wired with grounding terminals. Screw terminals or plugtail (P&S PTx series or similar) devices only, no push-in terminals. These devices shall comply with NEMA WD 1 and WD 6 Standards and shall all be listed.

B. Color:
   1. Device color shall be coordinated with Owner's Representative and shall reasonably match across all divisions. Emergency devices and plates shall be red.
   2. Device plate material shall be as follows: In gang toilets, mechanical spaces, kitchens and gyms, use stainless steel device plates and covers. In other finished spaces use smooth nylon device plates and covers.

C. All devices shall be properly labelled and identified per NEC, NFPA and IECC requirements. Additionally, all emergency device coverplates shall be labelled with the panelboard name and circuit number.

2.3 AC / TOGGLE SWITCHES

A. Unless otherwise specified herein or indicated on the Drawings, all switches to be quiet-type, complying with UL 20 and Federal Specification WC 896.

B. Key-operated switches shall be single pole, with factory-supplied key in lieu of switch handle. Corbin-style or barrel lock and key. Single-hump key not acceptable.

C. Wall Switches:

	Single Pole	Double Pole	Three-Way	Four-Way	Pilot Light
Eaton / Arrow	AH1221	AH1222	AH1223	AH1224	equal
Leviton	1221-2	1222-2	1223-2	1224-2	1221-PLR
Hubbell	HBL1221	HBL1222	HBL1223	HBL1224	HBL1221-PL
P & S	PS20AC1	PS20AC2	PS20AC3	PS20AC4	PS20AC1-RPL

D. Slotted Key-operated Switches:

	Single Pole	Double Pole	Three-Way	Four-Way
Eaton / Arrow	AH1221L	AH1222L	AH1223L	AH1224L
Leviton	1221-2L	1222-2L	1223-2L	1224-2L
Hubbell	HBL 1221L	HBL 1222L	HBL 1223L	HBL 1224L
P & S	PS20AC1L	PS20AC2L	PS20AC3L	PS20AC4L

E. Captive Twist Key-operated Switches:

	Single Pole	Double Pole	Three-Way	Four-Way
Eaton / Arrow	AH1191N	AH1192N	AH1193N	equal
Leviton	1221-2KL w/WS-35 key	1222-2KL w/WS-35 key	1223-2KL w/WS-35 key	1224-2KL w/WS-35 key
Hubbell	HBL 1221-RKL	HBL 1222-RKL	HBL 1223-RKL	HBL 1224-RKL
P & S	PS20AC1KL	PS20AC2KL	PS20AC3KL	PS20AC4KL

F. Motor-rated Switches:

	20A 2-Pole	20A 3-Pole	30A 3-Pole
Eaton / Arrow	AH6810U	equal	AH7810UD
Leviton	MS302-DS	MS303-DS	MS303-DS
Hubbell	HBL7832D	HBL7810D	HBL7810D
P & S	7802MD	7803MD	7803MD

2.4 RECEPTACLES

A. Unless otherwise specified herein or indicated on the Drawings, all receptacles to be NEMA 5-20R duplex, complying with NEMA WD 6 Standards, UL 498 and UL 943, Federal Specification WC 596F and WC 596.

B. Isolated Ground (IG) Receptacles: All IG receptacles to be four wire with self-ground strap. Place these receptacles at all computer and communications / technology locations if IG panelboards are provided.

C. GFCI Receptacles: GFCI receptacles to be NEMA 5-20R duplex, self-test, auto monitoring, complying with UL 498 and UL 943.

D. SPD Receptacles: NEMA 5-20R duplex, Type 3 SPD, >200 Joules, >6kA Surge, 3-mode, with indicator light.

E. Specification Grade, Heavy Duty Receptacles:

	20A Duplex	20A GFCI	20A IG	20A SPD	20A Tamper
Eaton / Arr	5362	GF20	IG5362	5362S	TR5362
Leviton	5362	GFNT2	5362-IG	7380	5362-SG
Hubbell	5362	GFRST20	IG5352	HBL5362-SA	5362TR
P & S	5362	P2097	IG5362	5362-SP	TR5362

F. Weatherproof Receptacles:
1. All weatherproof receptacles shall have GFCI protection at the device or at the breaker.

G. Controlled Receptacles:
1. Provide Leviton 5362-S1 series or equivalent by Eaton, Hubbell or P & S.
2. All controlled receptacles required to meet the Energy Code shall be duplex receptacles with the top receptacle controlled and the bottom receptacle non-controlled, unless otherwise noted on the Drawings.
3. All controlled receptacles shall meet NEC 406.3 marking requirements.
4. When controlled receptacles are required refer to Section 26 09 23 - Lighting Control Devices for plug load controllers and Sequence of Operations.

H. USB Charger Receptacles: 125V, 20A; comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, UL 498, UL 1310, and Federal Specification WC 596.
1. Provide Leviton T5833 series or equivalent by Eaton, Hubbell or P & S.
2. Single-piece, rivetless, nickel-plated, all-brass grounding.
3. USB Receptacles: Dual, Type A and C.
4. Line Voltage Receptacles: Dual, two-pole, three-wire, self-grounding.

2.5 VOICE / DATA OUTLETS

A. Refer to Division 27 for additional device and device plate requirements.

2.6 DEVICE PLATES

A. Both standard and oversized (jumbo / mid-size) device plates are allowed.

B. All device plates shall be attached with screws. No screwless device plates are allowed.

C. Weatherproof Cover Plates:
1. Provide cast metal weatherproof device plates with hinged cover with self-closing lid for all exterior receptacles and where noted on the Drawings. Leviton WM1D series or equivalent by Eaton, Hubbell or P & S.
2. When any outdoor receptacle is permanently in use (heat tape, etc.) provide a cover listed as "While In Use". Leviton IUM1x series or equivalent by Eaton, Hubbell or P & S.

PART 3 - EXECUTION

3.1 APPLICATION

A. All devices shall have GFCI and AFCI protection where required per NEC 210.

B. All receptacles shall meet tamper-resistant requirements where required per NEC 406 for the location installed.

3.2 INSTALLATION

A. All Devices:
1. Install devices plumb and level and mount all devices per ADA.
2. Install switches with OFF position down.
3. The Owner's Representative can move any device, before installation, up to six (6) feet in any direction at no additional cost to the Owner.
4. Install 302 / 304 stainless steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
5. Do not install behind markerboards, millwork, permanent mounted equipment, etc. Verify on Architectural drawings before installation. Where installed in unsuitable location, the Contractor will move as directed at no cost to the Owner.

B. GFCI Receptacles:
1. Install separate GFCI device at each location. Do not use feed through feature for any GFCI receptacle unless specifically noted on the Drawings.

C. Device Plates:
1. Use a single one-piece device plate for ganged devices (switches & receptacle).
2. Device plates shall be flush, level and completely cover all openings per NEC. Provide oversized plates where required. Where oversized plates are used, all plates in the space shall be oversized for consistency.

3.3 QUALITY CONTROL

A. Verify outlet boxes are installed at proper height and covers properly attached.

B. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify each receptacle device is energized and test each for proper polarity.

E. Test each GFCI receptacle device for proper operation.

END OF SECTION

SECTION 26 41 13

LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnishing and installation of a lightning protection system.

1.2 SUBMITTALS

A. Provide system plan and riser of all components. Plan shall be submitted with submittals and shall include all components, devices, wires, rods, ground receptacles, ground enhancement equipment, access wells and other materials as required. Plan shall also include all points of connection as required.

1.3 QUALITY ASSURANCE

A. The lightning protection system shall be installed by a lightning protection accredited contractor who specializes in this field.

B. The contractor must have at least five (5) continuous years of experience in installation of lighting protection systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers - American Lightning Rod Co., Advanced Lightning Technology, East Coast Lightning Equipment, Inc., Harger Lightning Protection, Inc., Heary Bros. Lightning Protection Co., Robbins Lightning Protection, Thompson Lightning Protection, Inc., and VFC Lightning Protection.

2.2 GENERAL REQUIREMENTS

A. The lightning protection system shall be the standard product of manufacturers regularly engaged in the production of lightning protection materials and shall be the manufacturers latest approved design. The components shall be UL listed and properly UL labeled.

B. All materials shall be new and of a design and construction to suit the application where it is used in accordance with accepted industry standards and LPI, UL and NFPA.

2.3 CABLE CONNECTORS

A. Type: Cast bronze with screw pressure type stainless steel bolts and nuts. Tinned copper adjustable straps. Aluminum components shall be used on roofs that utilize aluminum, galvalume, or galvanized metal roofing components. On aluminum, galvalume or galvanized metal roofs or where aluminum, galvalume or galvanized metal roof components exist, the entire roof lightning protection system shall utilize aluminum components to ensure compatibility. However, the down leads and

grounding shall utilize copper with the bimetal transition occurring at the through roof assembly with an approved bimetal through roof assembly.

2.4 GROUNDING TERMINALS

A. Type: 5/8 inch in diameter by ten (10) feet long copper clad steel terminal.

2.5 SURGE PROTECTION DEVICES

A. A surge protection device (SPD) at the main electrical service entrance is required by lightning protection standards.

B. The SPD must comply with the most current version of UL Standard 1449 as a Type 1 or Type 2 lightning rated unit. It shall be the responsibility of the Contractor to furnish and install or verify that such SPD is installed on the main electrical service.

2.6 OTHER MATERIALS

A. Provide and install all air terminals, air terminal bases, conductors, fasteners, down conductors common grounding system and roof penetrations per NFPA 780 and LPI-175.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The installation shall be UL listed, overseen by an LPI Certified Master Installer and accomplished by a Lightning Protection Contractor that is a member of the LPI.

B. All materials shall be installed in a neat, workmanlike manner. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper down leads, and proper ground terminals. Copper down lead conductors shall be utilized even when aluminum is required on the roof. Down lead conductors shall not be brought directly through the roof. Through roof assemblies with solid brass, aluminum or stainless steel rods shall be utilized for this purpose. The structural steel framework may be utilized in the installation as outlined by LPI, UL, and NFPA standards.

C. For pitched roofs with eave height exceeding fifty (50) feet, eave level protection shall be addressed as outlined by LPI, UL, and NFPA standards.

D. For structures exceeding sixty (60) feet in height, a ground counterpoise shall be addressed as outlined by LPI and NFPA standards.

E. For structures exceeding 200 feet in height, an intermediate loop (potential equalization) shall be addressed as outlined by LPI, UL, and NFPA standards.

3.2 COORDINATION

A. The Lightning Protection Contractor shall work with other trades to insure a correct, neat and unobtrusive installation. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to the lightning protection components and building finishes.

B. The Lightning Protection Contractor shall be required to coordinate locations of through-roof penetrations and submit details of through-roof penetrations as required. The roofing contractor shall be responsible for sealing and flashing all lightning protection roof penetrations as per the roof manufacturer's recommendations.

C. The Lightning Protection Contractor shall use a compatible adhesive to adhere lightning protection components to the roof when required and obtain approval of the compatible adhesive from the roof manufacturer / contractor prior to the installation.

D. Should the roofing contractor / manufacturer require any special walk pads, membrane patches, pavers, etc. under the lightning protection components, it shall be the responsibility of the roofing contractor to furnish and install such items. The Lightning Protection Contractor shall be responsible for marking the roof with conductor and/or pad locations.

E. It shall be the responsibility of the Lightning Protection Contractor to assure a common bond to all incoming media such as the main water, gas, and electric and to assure interconnection with other ground systems.

3.3 FIELD QUALITY CONTROL

A. The lightning protection installation shall conform to the requirements and standards for lightning protection systems of the LPI, UL, and NFPA. Upon completion, the following certifications shall be delivered to the Owner: a certification letter and warranty by the Lightning Protection Contractor, LPI Re-conditioned Certification or LPI Limited Scope Report from Lightning Protection Institute - Inspection Program (LPI-IP), depending on the lightning protection scope of work.

B. It is recommended the lightning protection system be visually inspected at least annually per NFPA by a Lightning Protection Contractor that is a member of the LPI.

END OF SECTION

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SECTION 26 43 00

SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide Surge Protective Devices (SPDs) as indicated on the Drawings, as required in NEC 242 and as indicated below.

B. Provide SPDs for phone, data, security, and other systems.

1.2 ABBREVIATIONS

A. MCOV - Maximum Continuous Operating Voltage

B. SCCR - Short Circuit Current Rating

1.3 SUBMITTALS

A. Submit product data for all SPDs used on the project. Provide evidence that all SPDs are listed to the most current edition of UL 1449 by an OSHA approved safety testing agency (i.e. UL, ETL, or CSA). Provide a submittal package that includes specifications, third party testing and listing letters.
   1. Product data to be issued in submittal:
      a. Maximum Single Impulse Surge Current Rating
      b. Surge Life (Repetitive Surge) Rating
      c. Voltage Protection Rating / Clamping Voltage (VPR)
      d. Nominal Discharge Current (I_n)

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers - Square-D.

2.2 EQUIPMENT

A. General:
   1. Technology: Construction shall be Metal Oxide Varister (MOV) componentry with bidirectional operation.
   2. Protection modes: Provide at least seven (7) mode protection (L-N, L-G, N-G) with discrete protection elements on each mode.
   3. Protection: Each SPD shall be protected upstream by a dedicated UL rated fuse or disconnecting means.
   4. Provide surge protection plus filtering of disruptive noises, EMI / RFI interference to >-40dB from 3kHz to 1 MHz according to Military Standard 220B.
   5. Listing and ratings: SPDs shall be tested and performance rated per UL 1449. Clamping voltage shall be clearly stated on both submittals and equipment installed.

6. Voltage ratings (per UL 1449):

Rated Line Voltage	MCOV	VPR
120 / 240v 120 / 208v	150v	700v (L-N, L-G), 1200v (L-L)
240 / 480v 277 / 480v	320v	1200v (L-N, L-G), 1800v (L-L)
480v (2 ph. Delta)	600v	1800v (L-G), 3000v (L-L)

7. Alarms and monitoring: Provide all SPDs with the following:
   a. LED indicator lights for power and protection status.
   b. Audible alarm, with silencing switch, to indicate when protection has failed.
   c. One set of dry contacts (1-NO and 1-NC) rated at 5A and 240v for remote monitoring of protection.
8. Mounting: All SPDs may be internally-mounted or externally-mounted if mounted directly beside the panel it serves.
9. Digital Surge Event Counter with battery backup.

B. Service Entrance: SPDs at the electrical service entrance (main distribution panel or main service disconnecting means) shall meet the following additional criteria:
   1. Modular construction, field replaceable, internal or external mount, NEMA rated for the environment.
   2. UL 1449 location rated as Type 1 and Type 2 SPD device.
   3. UL 1449 Nominal Discharge Current (I_n): 20kA (8 x 20 µs waveform).
   4. Maximum Single Impulse Current Rating: 100kA / mode and 200kA / phase.
   5. Life Cycle Test (IEEE C62.41.2 C3): 10kA / phase at greater than 20,000 impulses.
   6. SCCR: 200kAIC or no less than specified rating at the service entrance.

C. Panelboards: SPDs at all other panelboards shall meet the following additional criteria:
   1. Modular construction, field replaceable, internal or external mount, NEMA rated for the environment.
   2. UL 1449 location rated as Type 2 device.
   3. UL 1449 Nominal Discharge Current (I_n): 20kA (8 x 20 µs waveform).
   4. Maximum Single Impulse Current Rating: 50kA / mode 100kA / phase.
   5. Life Cycle Test (IEEE C62.41.2 C3): 10kA / phase at greater than 5,000 impulses.
   6. SCCR: 100kAIC or no less than specified rating of the electrical subpanel.

D. Outdoor Mechanical Equipment: SPDs at RTUs, condensers, fans, etc. shall meet the following additional criteria:
   1. Outdoor rated NEMA 4X enclosure, nipple-mounted (preferred).
   2. UL 1449 location rated as Type 2 SPD device.
   3. UL 1449 Nominal Discharge Current (I_n): 10kA (8 x 20 µs waveform).
   4. Maximum Single Impulse Current Rating: 25kA / mode and 50kA / phase.
   5. Life Cycle Test (IEEE C62.41.2 C3): 10kA / phase at greater than 2,500 impulses.
   6. SCCR: 100kAIC or no less than specified rating of the equipment.

E. Receptacles with Type 3 SPD installed: See Section 26 27 26 - Wiring Devices for more information.

F. SPD for telephone, video, data and alarm lines shall meet the following criteria:
   1. Comply with appropriate UL 497, 497A, 497B and 497C standards for secondary protectors.

2. Technology can be Gas Tube, Silicon Avalanche Diode or hybrid.
3. Rated Line Voltage (RMS): 150v for phone, 24v for data and control.
4. MCOV: 180vac tip (or ring) to ground.
5. Clamp Voltage (Pair): Tip to ground and ring to ground to be 300v.
6. Maximum Single Impuse Current Rating: 10kA (8 x 20 µs waveform).
7. Life cycle test 3kA at greater than 1,000 impulses.

PART 3 - EXECUTION

3.1 APPLICATION

A. For new construction, provide SPDs at each location listed below. For renovations and additions, provide SPDs at the locations listed below which are affected / replaced / added to by the project but do not already have SPD protection.
   1. Each electrical service entrance equipment.
   2. Each computer panelboard and at each isolated ground / nonlinear panelboard.
   3. All emergency systems switchboards and panelboards.
   4. Each panelboard noted on the Drawings in addition to above requirements.
   5. Provide SPD protection on all outdoor HVAC equipment unless requirement is removed or altered by Section 26 20 00 - Low Voltage Distribution, Part 2 Enclosed Switches and Circuit Breakers. Mount SPDs to bottom of safety switch or as recommended by the manufacturer.
   6. One SPD power outlet at each Energy Management Control Panel located by project controls contractor.
   7. Each new telephone and data incoming line.
   8. All new video or alarm system wire entering from the outside of the facility.
   9. In or on each fire pump controller in accordance with NEC 695.15.

3.2 INSTALLATION

A. Where externally-mounted SPDs are provided, install the SPDs next to the panel they protect. Do NOT extend the lead length beyond the manufacturer's requirements.

B. SPDs installed in panelboards shall be either direct connected to the main bus or via a dedicated branch breaker sized per manufacturer recommendations, unless otherwise noted on the Drawings.

END OF SECTION

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SECTION 26 50 00

LIGHTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Interior and exterior lighting systems including, but not limited to, luminaires, drivers, emergency drivers, emergency lighting, power transfer devices, poles and pole bases, etc.

B. Exceptions include Section 26 55 61 - Theatrical Lighting and Section 26 56 68 - Exterior Athletic Lighting.

1.2 COORDINATION

A. Coordinate the location, mounting height and mounting style of luminaires with architectural RCP, mechanical (HVAC duct work, grilles, etc.), plumbing (exposed piping, sprinkler heads, etc.), technology (A/V, projectors, etc.) and other trades, as required, before installation.

B. In any space with a ceiling other than gypsum, T-grid or exposed, the Contractor shall install 3-4 luminiares and make the installation available for review by the Owner's Representative before installing the remaining luminiaires in the space.

C. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.

1.3 SUBMITTALS

A. Submit luminaires shown on the Luminaire Schedule on the Drawings and those noted on the Drawings but not on the schedule.

B. Product Data: In addition to the above requirements, submit complete product information for the following:
   1. Luminaires - complete manufacturer part number, delivered lumens, L70 rating, LM-80 testing hours, CCT (Correlated Color Temperature), CRI (Color Rendering Index), input wattage, finish, EPA (Effective Projected Area).
   2. Drivers - controls / dimming, power factor, THD (Total Harmonic Distortion).
   3. Emergency LED drivers - run time, battery chemistry, wattage.
   4. Power transfer devices for emergency lighting - manufacturer part number, wiring diagram.
   5. Poles - pole height, material, thickness, finish.

C. Indicate if DLC (DesignLights® Consortium) listing applies only to certain color temperatures, beam spreads, or other luminaire options. Indicate if any luminaire options void the DLC listing.

1.4 SAMPLES

A. Submit non-returnable samples of luminaires upon request. Include all components necessary for a working product.

1.5 WARRANTY

A. Provide a five (5) year manufacturer's warranty for all luminaires and emergency LED drivers. The warranty shall include all luminaire components including, but not limited to, LED arrays, drivers, luminaire body and hardware. LED arrays will be considered defective if a total of 15% or more of the individual diodes fail to illuminate.

B. Provide a one (1) year factory warranty on the pole and five (5) year extended warranty on pole finishes.

C. The warranty period shall cover the cost of equipment, materials, mobilization and labor for repair and replacement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Only those manufacturers of luminaires and poles listed on the Luminaire Schedule are acceptable.

2.2 PERFORMANCE / DESIGN CRITERIA

A. All luminaires shall be compatible with lighting controls shown on the Drawings or specified in Section 26 09 16 - Electrical Control Components and / or Section 26 09 23 - Lighting Control Devices.

B. Pole assemblies shall meet wind loading requirements for the area in which they are installed or 100 mph, whichever is greater. Pole assemblies include the pole, the pole base, pole-mounted luminaires, and any other component that would affect wind loading. Pole bases shall be designed by a Structural Engineer licensed to work in the state.

C. IECC 2015: To meet the enhanced digital lighting controls option, all luminaires shall be digitally addressable through the lighting control system. Refer to Section 26 09 23 - Lighting Control Devices, for additional requirements.

D. Exterior lighting shall meet all current city ordinances for light levels, light trespass and specific shielding requirements.

2.3 EXISTING PRODUCTS

A. New luminaires must match existing luminaires in all areas including but not limited to style, finish, orientation, mounting height, CCT, voltage, etc. The new luminaires shall meet the switching, dimming and control requirements of all current adopted codes and standards.

B. New poles must match existing poles in all areas including but not limited to style, finish, height, quality, etc. The new poles shall meet all current adopted codes and standards.

2.4 LUMINAIRES

A. All luminaires shall have the following listings based on usage:
   1. LED luminaires shall comply with UL 8750 and UL 1598 requirements.
   2. Emergency luminaires, including exit signs, shall be UL 924 listed.
   3. Luminaires in hazardous locations shall comply with UL 844 requirements and be suitable for the environment.

B. See the Luminaire Schedule for CCT, THD, CRI, lumen output tolerance, wattage tolerance, L70 rating. When these values are not listed on the schedule, use the following values:
   1. CCT - 4000K, minimum 80 CRI (interior) and 70 CRI (exterior), THD 10% max, life expectancy - L70 at 50,000 hours per LM-80 test data using TM-21 procedures.
   2. Tolerance for Lumen Output shall be + / - 8% and Wattage (VA) shall be +5% / -10%.

C. CCT: Color Temperature shall be within a 3-step Standard Deviation Color Matching (SCDM) or MacAdam ellipse in accordance with ANSI C78.377.

D. Expected Life: The estimated L70 of LED luminaires shall be derived from LM-80 test data in accordance with TM-21 procedures. LM-80 test data shall be measured in accordance with LM-79 procedures.

E. Efficacy: All general purpose LED luminaires shall have a minimum efficacy of 90 lumens / watt.

F. Finishes: Unless otherwise noted, consult Owner's Representative for factory luminaire finish.

2.5 INTERIOR LUMINAIRES

A. All luminaires in gyms, play areas, multipurpose spaces, etc. shall have a hinged wire guard and retainer latches for tool-less maintenance.

2.6 EMERGENCY LIGHTING AND EXIT SIGNS

A. All emergency lighting and exit signs shall be provided with status indicator lamp and test switch. Integral test switch is preferred.

B. See Emergency LED Drivers part below for emergency driver information.

2.7 EXTERIOR LUMINAIRES

A. Pole mounted luminaires shall have an option for internal glare control or external glare shield.

2.8 POLES & POLE BASE HARDWARE

A. Pole Height: Poles shall be of the height and with brackets, etc. as indicated on the Luminaire Schedule. Where pole height has not been given, provide twenty-five (25) feet minimum length poles for parking lot and driveway lighting, and twelve (12) feet minimum length poles for walkway lighting.

B. Wind Load: All poles shall rated for 100 miles per hour wind speed with gust factor of 1.3. Provide all windstorm certificates as required.

C. Steel and Aluminum Poles: Shall be one piece, ground smooth.

D. Concrete Poles: Concrete poles shall conform to ASTM C150, Type I or III, or other types for special conditions.

E. Pole Base Hardware: Provide hot-dipped galvanized anchor bolts, pole base cover (no exposed hardware acceptable), templates, ground rods, rigid metal conduit elbows, concrete base, etc., for the installation of concrete bases as detailed on the Drawings.

F. Finishes: Unless otherwise noted, consult Owner's Representative for factory UV rated powder coat finish or clear anodized finish on all poles and associated hardware.

2.9 LED DRIVERS

A. Shall be factory installed, unless otherwise indicated on the Drawings or prior approval is given by the Engineer.

B. Drivers shall comply with UL 8750, be UL Type TL or UL Class P listed and bear such labels.

C. Voltage: Drivers shall be 60hz, universal input voltage (120v thru 277v) + / - 10% unless otherwise indicated on the Luminaire Schedule. Drivers shall demonstrate no visible change in light output with a variation of + / - 10% change in line voltage input.

D. Remote Drivers: Unless otherwise dictated on the Drawings, remote drivers shall have remote wiring capability of fifty (50) feet minimum.

E. Sensor Compatibility: Drivers shall be compatible with and not cause interference with the operation of motion sensors or other infrared control systems.

F. Performance: Drivers shall have a power factor of 0.9 or greater, have an efficiency of 85% or greater and have an audible noise rating of 27dB Class A or less.

G. Case Temperature: Interior drivers shall have a maximum case temperature rating of 75ºC. Exterior drivers shall have a maximum case temperature rating of 85ºC.

H. Operating Ambient Temperature Range: Drivers shall be rated for a temperature range of 32ºF - 122ºF when mounted inside and rated to 0ºF when outside or above an outside ceiling.

I. Electromagnetic Compliance: Drivers shall comply with CFR Title 47 Part 15 Class A.

2.10 EMERGENCY LED DRIVERS

A. In addition to the above driver requirements, Emergency drivers shall also meet the following:
   1. Shall be rated for at least ninety (90) minutes at full light output (120 minutes in storm shelters) unless otherwise noted on the Drawings.
   2. Shall operate with constant output power to maintain the output wattage to the LED array even as the system voltage diminishes.
   3. Shall be maintenance-free, nickel-cadmium battery technology.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all luminaires of the types indicated, in accordance with NEMA standards, manufacturer's recommendations, and NEC requirements.

B. Install indoor lighting systems in accordance with NECA / IESNA 500 and all exterior lighting systems in accordance with NECA / IESNA 501.

C. Install all interior and exterior luminaires as shown on the Drawings. Where the layout needs to be altered, coordinate with the Owner's Representative for direction before installing luminaires to ensure even illumination and proper light levels.

D. Provide support for all interior luminaires by means of bar hangers extended across the main ceiling support members. See lighting details on the Drawings for more information.

E. All interior luminaires shall be independently supported from the building structure.

F. Provide luminaires complete with LED arrays, LED drivers, and other accessories necessary for proper installation in the building construction and listed for fire rated ceilings where required by code or shown on the Drawings.

G. Provide all exterior parking lot, area, site and walkway poles complete with luminaires, any required mounting hardware, wiring, controls, etc. required for a complete system.

H. Lighting Control: Provide switches with matching technology (line voltage dimming, 0-10V dimming, etc.) for dimming drivers in the locations shown on the Drawings. Provide lighting controls in accordance with Section 26 09 16 - Electrical Control Components, Section 26 09 23 - Lighting Control Devices and / or Section 26 55 61 - Theatrical Lighting.

I. Emergency Lighting: Provide an emergency LED driver, power transfer switch, internal wiring etc. in each luminaire that is indicated on the Drawings as an emergency luminaire or night light.

J. Emergency Lighting Power: For all emergency lighting powered by a generator or UPS, provide an emergency power circuit to every power transfer device.

K. Mount recessed luminaires in the center of a ceiling tile or as shown on the Drawings.

L. Provide luminaire whips (flex conduit / metal clad cable) from a junction box to each luminaire (not to exceed four luminaires per junction box) access plate. Luminaire whips between luminaires will not be accepted. Refer to luminaire installation details on the Drawings for more information.

M. Locate all remote LED drivers and / or emergency LED drivers as noted on the Drawings. Otherwise, install above the ceiling above each luminaire or in an adjacent room with a low ceiling for easy access. Provide a permanent label on the ceiling t-grid to identify locations of all remote drivers. Mount drivers on rubber insulators.

N. All exit signs and night lights shall not be switched. Provide a constant hot tied back to the panelboard serving the lighting in the space.

3.2 SITE QUALITY CONTROL

A. Prior to final inspection, check all luminaires for damage during construction and replace damaged luminaires at no additional expense to the Owner. Test all emergency luminaires for proper operation, including exercising all transfer switching, emergency LED drivers, generator, etc. All luminaires shall be cleaned and completely operational at the time of final acceptance of the building.

B. Where specific light levels are mentioned on the Drawings and the luminaire type, quantity, locations or lumen output is changed, the Contractor shall ensure light levels are met. Re-aim or add lighting as necessary.

C. The design intent shown on the Drawings meets the city ordinances for outdoor lighting trespass and minimum light level requirements. It is the responsibility of this Contractor to ensure that the lighting is installed to meet the design intent and city ordinances. Where required, re-aim or add shields to meet these requirements.

3.3 ADJUSTING

A. The Contractor shall move any luminaire up to six feet in any direction as directed at no additional cost.

END OF SECTION

SECTION 26 56 68.10

EXTERIOR ATHLETIC LIGHTING LED UPGRADE

HHAPART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Upgrade light levels and uniformity on the field(s) by replacing existing HID luminaires with LED luminaires. Where possible, increase the number of luminaires to raise light levels without compromising the integrity of the existing light poles or overloading the existing electrical infrastructure.

1.2 RELATED REQUIREMENTS

A. Section 26 00 00 – Electrical

B. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

C. Section 26 05 26 – Grounding and Bonding for Electrical Systems

D. Section 26 05 33 – Raceways and Boxes for Electrical Systems

1.3 REFERENCES AND STANDARDS

A. AASHTO LTS-6 – Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

B. ANSI C78.377 – Specifications for the Chromaticity of Solid-State Lighting Products

C. ANSI / IES RP-6 – Recommended Practice: Lighting Sports and Recreational Areas

D. ASCE / SEI 7-10 – Minimum Design Loads for Buildings and Other Structures

E. IESNA LM-79 – Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products

F. IESNA LM-80 – Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

G. IESNA TM-21 – Projecting Long Term Lumen, Photon, and Radiant Flux Maintenance of LED Light Sources

H. University Interscholastic League – Lighting Information for Sports Facilities

1.4 ABBREVIATIONS

A. FC – Footcandles

B. CD – Candela

1.5 DEFINITIONS

A. Light loss factor (LLF) – The formula for calculating the light loss factor is as follows:

LLF = LLD X LDD

where

LLD = lamp lumen depreciation

LDD = luminaire dirt depreciation

B. Coefficient of variance (CV) – A measure of uniformity. The formula for calculating CV values is given in ANSI / IES RP-6.

C. Initial illuminance level – The illuminance level after a 100-hour burn-in period.

D. Maintained illuminance level – The illuminance value at 85 percent rated lamp life.

1.6 COORDINATION

A. Coordinate retrofit schedule with owner event schedule.

1.7 SUBMITTALS

A. Submittals required in this section shall conform to and be submitted in accordance with the General Conditions, Division 01, and Division 26 requirements.

B. The submittal package shall include product data on the following:
1. LED luminaires
2. Drivers
3. Pole-top luminaire assemblies
4. Engineered pole bases for relocated poles
5. Electrical components enclosure
6. Wire harness
7. Control and monitoring cabinet
8. Warranty

C. The submittal shall include the following shop drawings before construction:
1. The manufacturer shall submit a lighting plan to a structural engineer with all pertinent information to determine if the existing poles will support the new EPA and weight of the new luminaires and crossarms.
2. The structural engineer shall provide a letter or other document confirming that the existing pole-bases and poles are in good condition and will properly support the new lighting system. The document or letter shall be sealed by the structural engineer.
3. The structural engineer shall provide drawings for the new pole bases. Drawings shall be sealed by the structural engineer. Drawings shall included depth, diameter and reinforcement.
4. The manufacturer shall submit a computer derived lighting plan showing the point-by-point horizontal initial illuminance levels. This will be used to field verify the lighting levels after installation.

5. The manufacturer shall submit a computer derived lighting plan showing the point-by-point horizontal maintained illuminance levels at 85 percent of rated lamp life.

D. The two above lighting plans shall indicate illuminance levels on the grid spacing indicated below. The grid shall be oriented such that one of the calculation points is offset fifteen feet in each direction from a point at the midpoint of the playing field.

E. In addition to the point-by-point illuminance levels, each of the two above lighting plans shall indicate the following:
1. The LLF factor used in the computations.
2. The maximum to minimum ratio of each field and associated area.
3. The coefficient of variance of each field and associated area.
4. The mounting height of the luminaires.
5. The number of luminaires used at each pole or location.
6. The kilowatt consumption of the total lighting system and each individual pole.
7. The luminaire lumen output used in the calculations.

F. Light Aiming Point Plan: The manufacturer shall submit an aiming plan indicating the horizontal degree setting and the vertical degree setting of each luminaire on each of the pole assemblies.

1.8 CLOSEOUT SUBMITTALS

A. Submit per Closeout Submittals requirements in 26 00 00 - Electrical and any additional requirements listed below.

B. The Contractor shall provide a copy of the final test results and the final aiming diagram to the Owner's Representative.

1.9 QUALITY ASSURANCE

A. Any Contractor bidding this project shall meet the following requirements:
1. Shall have been in business at least ten (10) consecutive years under the same name and shall have installed, under that name, at least ten (10) sports lighting systems similar to this project.
2. Shall provide a list of at least two (2) projects within a 175-mile radius of the school district to allow school administration officials to visit the job site for review of the system installation and service. Each referenced project must be a sports lighting system of similar scope or larger.
3. Shall have an office within 175 miles of the job site staffed with trained technicians who are qualified to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up and perform a 100 percent operational audit of all installed devices, to instruct the Owner’s Representative in the proper operation of the system, and to provide service throughout the warranty period.

B. Bidders who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements described herein will be disqualified.

C. The Owner’s Representative may make such investigations as they deem necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish

to the Owner's Representative all such information and data for this purpose as the Owner's Representative may request.

D. Before using the bid of a subcontractor as part of their bid, the Contractor shall satisfy themselves that the proposed subcontractor can satisfy all the requirements expressed above.

E. The Owner's Representative reserves the right to reject the bid from any bidder who has previously failed to perform properly, or complete on time, contracts of a similar nature.

1.10 EXISTING FIELD CONDITIONS

A. The lighting manufacturer shall contract a licensed (in the same state as the installation) structural engineer to provide an analysis and inspection of existing poles and pole bases to ensure poles and pole bases will properly and safely support the weight and wind loading of new lighting equipment.

1.11 WARRANTY

A. Warranty: Manufacturer shall supply a signed warranty covering the entire system for ten (10) years beginning at the time of Project Substantial Completion. Warranty shall guarantee specified maintained light levels. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other manufacturers.

B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on / off status, hours of usage and luminaire outage for ten (10) years beginning at the time of Project Substantial Completion. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Manufacturer is responsible for removal and replacement of failed luminaires, including all parts, labor, shipping, and equipment rental associated with maintenance. Owner agrees to check fuses in the event of a luminaire outage.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. If they comply with these specifications, products of the following manufacturers will be acceptable:
   1. Musco Sports Lighting (Basis of Design)
   2. Techline Sports Lighting

B. No other manufacturers will be accepted. Submitting on any brand other than those listed here will be rejected. No exceptions.

2.2 PERFORMANCE / DESIGN CRITERIA

A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired, and tested.

B. All materials, components, products, assemblies, equipment, etc. shall be new, free from defects, listed (by an NEC accepted listing agency), and approved / rated for the environment and purpose.

C. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO / EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the crossarms, pole, or electrical components enclosure.

D. System Description: Lighting system is intended to mount to existing structures and shall reuse existing foundations, poles and underground supply wiring. The new lighting system shall consist of the following:
   1. Pole-top Luminaire Assembly: Galvanized steel pole-top luminaire assemblies to replace existing pole-top by slip fit over the pole sections, bolting to top flange, or clamping to pole. The manufacturer must supply new galvanized steel bolt-on crossarm assemblies, or supply calculations that show crossarms are strong enough to support new loads without deflection.
   2. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
   3. The manufacturer shall supply all drivers and supporting electrical equipment.
      a. Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Provide a fused disconnect per circuit mounted in the enclosure on each pole. Integral drivers are not allowed.
   4. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
   5. Athletic lighting controls shall include a control cabinet with the following hardware:
      a. Contactor section with contactors for each circuit (control zone) for each pole.
      b. On-off control switches as required.
      c. Monitoring hardware and interface as required to meet monitoring features outlined below.
   6. Athletic lighting controls shall include the following features:
      a. Individual control of each ball field.
      b. Individual control of each zone (main lighting, spectator / bleacher lighting, security lighting, entertainment lighting, etc.).
      c. Remote control of each ball field and zone via website, tablet or phone app.

2.3 ELECTRICAL REQUIREMENTS

A. Voltage: Lighting system voltage for each campus is as follows:
   1. Football Fields
      a. Cain Middle School - 480V, 1ph

b. Rockwall High School - 480V, 1ph
c. Rockwall Heath High School - 480V, 3ph
d. Williams Middle School - 480V, 3ph

2. Football Field Security Lighting
   a. Cain Middle School - 480V, 1ph
   b. Rockwall High School - 480V, 1ph
   c. Rockwall Heath High School - 480V, 1ph
   d. Williams Middle School - 480V, 1ph
3. Tennis Courts
   a. Cain Middle School - 480V, 1ph
   b. Williams Middle School - 480V, 1ph

B. Voltage Drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

C. Lightning Grounding: Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL listed per UL 96 and UL 96A.
   1. If grounding is not integrated into the structure, the manufacturer or installer shall supply grounding electrodes, down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780.

D. Surge Protection: Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2-2002.

2.4 ON-FIELD LIGHTING PERFORMANCE

A. Illumination Levels and Design Factors: Playing surfaces shall be lit to average target illumination level and uniformity as specified in the table below. The manufacturer shall provide a guarantee that light levels will be sustained over the life of the warranty period. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below.

The manufacturer shall provide lumen maintenance data of the LED luminaires used per IESNA TM-21 and will incorporate the lumen maintenance projections into the lighting designs to ensure target light levels are achieved throughout the guaranteed period of the system. Per IES guidelines, lumen maintenance hours should be reported based on the 6x multiplier of testing hours.

Area of Lighting	Average Target Illumination Levels	Max to Min Uniformity Ratio	CV	Grid Spacing
Football (Rockwall HS & Rockwall Heath HS)	80 FC	1.7:1.0	0.13	30’x30’
Football (Cain MS & Williams MS)	50 FC	2.5:1.0	0.21	30’x30’
Track (Rockwall HS & Rockwall Heath HS)	30 FC	3.0:1.0	0.25	30'x30'
Track (Cain MS & Williams MS)	20 FC	4.0:1.0	0.3	30'x30'
Tennis Courts	50 FC (No Point Less Than)	2.0:1.0	0.17	20’x20’

B. Playability: Lighting design and luminaire selection should be optimized for playability by reducing glare on-field and providing sufficient uplight.
   1. Aiming Angles: To reduce glare, luminaire aiming should ensure the top of the luminaire field angle (based on sample photometric reports) is a minimum of 10 degrees below horizontal.
   2. Glare Control Technology: Luminaires selected should have glare control technology including, but not limited to: external visors, internal shields and louvres. No symmetrical beam patterns are acceptable.
   3. Aerial Lighting: Adequate illumination must be provided above the field in order to see the ball in flight. It is recommended that a lighting analysis be performed above the field of play to evaluate the visibility of the ball over its typical trajectory to ensure the participants will adequately see the ball. Calculation planes should be evaluated up to the maximum anticipated height for the level of play.

2.5 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers, and external shields. No symmetrical beam patterns are accepted.

B. Lighting Ordinance: System shall meet all current city ordinances for light levels, light trespass and specific shielding requirements.

C. Spill Light and Glare Control: The manufacturer shall assess both spill and glare at all areas of concern on adjacent properties. To minimize impact, values must not exceed the values allowed by current city ordinances taken at three (3) feet above grade. Field measurements of spill light and glare shall be taken at the areas of concern.

D. Environmental Glare Impact Scans: Environmental glare impact scans must be submitted showing the maximum candela from the field edge on a map of the surrounding area until 500 CD or less is achieved.

E. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights. Illumination level shall be measured in accordance with ANSI / IES RP-6 after one (1) hour warm up.

F. Sample Photometry: The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified testing laboratory with a minimum of five (5) years experience or by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

G. Field Verification: Lighting manufacturer shall supply field verification of environmental light control using a meter calibrated within the last twelve (12) months.
   1. Spill Verification: The light sensing surface of the light meter should be held thirty-six (36) inches above the playing surface with the sensing surface horizontal (for horizontal readings) or vertically pointed at the brightest light bank (for max vertical readings).
   2. Glare Verification: The light sensing surface of the luminous intensity meter should be held sixty (60) inches above grade with the aperture adjusted so that it detects luminous intensity from the brightest luminaire on each light bank.

2.6 SYSTEM CONTROL REQUIREMENTS

A. Instant On / Off Capabilities: System shall provide for instant on / off of luminaires.

B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.

C. Contactor Control of Luminaires: To minimize wear on drivers and other electrical components and prevent luminaires from turning "on" due to communication loss, circuits must be controlled via contactor switching, not dimming driver output to zero.

D. Dimming: System shall provide three-stage dimming (high-medium-low). Dimming will be set via scheduling options (website, mobile app, phone, fax, email).

E. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP / IP communication link. Trained staff shall be available 24 / 7 to provide scheduling support and assist with reporting needs.
   1. The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute "early off" commands by phone. Scheduling tool shall be capable of setting curfew limits.

2. Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

F. Remote Lighting Control System: System shall allow the Owner and users with a security code to schedule on / off system operation via a website, phone, fax or email up to ten (10) years in advance. Manufacturer shall provide and maintain a two-way TCP / IP communication link. Trained staff shall be available 24 / 7 to provide scheduling support and assist with reporting needs.

The Owner may assign various security levels to schedulers by function and / or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute “early off” commands by phone. The scheduling tool shall be capable of setting curfew limits.

The controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

G. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

H. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaires, outages, control operation and service. Mobile application shall be suitable for IOS, Android and Blackberry devices.

I. Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the Owner.
1. Cumulative hours shall be tracked to show the total hours used by the facility.
2. Report hours saved by using early off and push buttons by users.

J. Communication Costs: Manufacturer shall include communication costs for operating the control and monitoring system for a period of ten (10) years.

K. Communication with Luminaire Drivers: Control system shall interface with drivers in electrical components enclosures by means of fiberoptics or powerline communication. Where wired communication cannot be installed, wireless communication is acceptable.

2.7 STRUCTURAL PARAMETERS

A. Per the 2021 International Building Code (IBC), the new EPA / loading on the lighting structure / poles shall not exceed the existing lighting poles. Lighting manufacturer is required to provide an analysis and inspection of existing poles to ensure they are equipped structurally to accommodate the weight and wind loading of new lighting equipment.

B. Wind Loads: Wind loads shall be based on the 2021 International Building Code. Wind loads shall be calculated using ASCE 7-10, an ultimate design wind speed of 115 mph and exposure category C.

C. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to AASHTO LTS-6.

D. Foundation Design for Relocated Poles: The foundation design shall be based on soil parameters as outlined in the geotechnical report.

E. Foundation Drawings for Relocated Poles: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These drawings must be submitted at time of bid to allow for accurate pricing.

2.8 LED LUMINAIRES

A. Correlated Color Temperature (CCT): The luminaires shall have a minimum CCT of 5700 Kelvin. CCT shall be within a 3-step Standard Deviation Color Matching (SCDM) or MacAdam ellipse in accordance with ANSI C78.377.

B. Color Rendering Index (CRI): The luminaires shall have a minimum CRI of 70.

C. Expected Life: The luminaires shall have a minimum L70 rating of 75,000 hours. The estimated L70 rating of the LED luminaires shall be derived from LM-80 test data in accordance with TM-21 procedures. LM-80 test data shall be measured in accordance with LM-79 procedures.

D. Efficacy: All LED luminaires shall have a minimum efficacy of 90 lumens / watt.

2.9 COST OF OWNERSHIP

A. The manufacturer shall submit a ten (10) year Cost of Ownership summary that includes energy consumption, anticipated maintenance costs, and control costs. All costs associated with faulty luminaire replacement - equipment rentals, removal and installation labor, and shipping - are to be included in the maintenance costs.

PART 3 - EXECUTION

3.1 ERECTION

A. The erection of the poles shall be in accordance with the manufacturer’s instructions.

B. The installation of the luminaires shall be in accordance with the manufacturer’s instructions.

C. Aiming of sports lighting luminaires shall be by the Contractor and shall be in accordance with the manufacturer’s preferred method of achieving the desired results.

3.2 GROUNDING

A. Each pole shall be grounded. The ground resistance shall be no less than 2.5 ohms. Ground terminals shall be located not less than two (2) feet from the pole.

3.3 FIELD QUALITY CONTROL

A. The Contractor shall give a minimum two-week notice of the test. During this period, the Contractor shall complete the Field Lighting Pretest Form attached at the end of this

section and shall submit the completed form to the Owner's Representative and Engineer prior to the final test.

B. Test methods, instruments, and test intervals shall meet the approval of the Owner's Representative prior to testing.

C. The Contractor shall take voltage and current readings at each pole base during the time of the test for the purpose of ascertaining the approximate luminaire operating condition. Voltage at the pole base shall be adjusted within + / - 5% of rated driver voltage.

D. Illumination Measurements: Upon Project Substantial Completion and in the presence of the Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified by the Contractor. The illumination measurements shall be conducted in accordance with ANSI / IES RP-6.
   1. The Contractor shall provide stakes or other identifiable markings at all test points on the field at the time of the test.
   2. Horizontal illuminance readings shall be conducted in accordance with ANSI / IES RP-6. Measurements shall be taken at thirty-six (36) inches above grade, with the light meter held horizontally. Dark clothing shall be the attire for all participants during the testing. Readings shall be recorded for each point and the results confirmed by the Owner's Representative and / or Engineer.
   3. The measured values shall be within + / - 10% of the calculated values indicated on the computer derived lighting plan of the initial illuminance levels.

E. Field Light Level Accountability
   1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period. These levels will be specifically stated as "guaranteed" on the illumination summary provided by the manufacturer.
   2. The Contractor / manufacturer shall be responsible for conducting initial light level and glare (candela) testing and an additional inspection of the system, in the presence of the Owner, one year from the date of commissioning of the lighting system.
   3. The Contractor / manufacturer shall be held responsible for any and all changes needed to bring the fields back to compliance for light levels and uniformities. The Contractor / manufacturer will be held responsible for any damage to the fields during these repairs.

3.4 ADJUSTING

A. Apparent "hot spots" or "dark spots" shall be eliminated by further luminaire adjustment as required.

B. Correcting Non-Conformance: If, in the opinion of the Owner's Representative, the actual performance levels including footcandles, uniformity ratios, uplight for aerial visibility, and offsite candela readings are not in conformance with the requirements of the performance specifications and submitted information, the manufacturer shall be required to make adjustments to meet the specifications and satisfy the Owner with no additional cost to the Owner or Engineer.

FOOTBALL FIELD LIGHTING PRETEST FORM

Prior to the light meter test of the above reference project, the following checklist items are required:

A. All crossarms shall be properly aligned. Crossarms shall be parallel with the foul or boundary lines.

_____ _____

(Signed) (Date)

B. All luminaires shall be operational and burned in for 100 hours.

_____

_____

(Signed) (Date)

C. The field must be staked off with stakes or flags at grid intervals as outlined in the specifications.

_____

_____

(Signed) (Date)

D. All luminaires shall be aimed per the manufacturer's computed printout.

_____

_____

(Signed) (Date)

E. Electrical contractor or sports lighting system installer shall perform their own lighting meter test and shall adjust luminaires until light level and uniformity meet the specifications. Please forward results to EMA, Attention: Nada Fierro.

_____

_____

(Signed) (Date)

Failure to perform any of the above items will result in a delay of final testing.

Please call me if you have any questions.

TENNIS COURT LIGHTING PRETEST FORM

Prior to the light meter test of the above reference project, the following checklist items are required:

A. All crossarms shall be properly aligned. Crossarms shall be parallel with the foul or boundary lines.

_____

_____

(Signed) (Date)

B. All luminaires shall be operational and burned in for 100 hours.

_____

_____

(Signed) (Date)

C. The court must be staked off with stakes or flags at grid intervals as outlined in the specifications.

_____

_____

(Signed) (Date)

D. All luminaires shall be aimed per the manufacturer's computed printout.

_____

_____

(Signed) (Date)

E. Electrical contractor or sports lighting system installer shall perform their own lighting meter test and shall adjust luminaires until light level and uniformity meet the specifications. Please forward results to EMA, Attention: Nada Fierro.

_____

_____

(Signed) (Date)

Failure to perform any of the above items will result in a delay of final testing.

Please call me if you have any questions.

END OF SECTION

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SECTION 27 10 30

DATA CABLE PLANT

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Communication Systems complete including selective modification of existing system to be revised and expanded, cabling, special back boxes, hardware, and all other required devices and equipment.

B. This specification and the drawings provides requirements for the installation and testing of a complete data cable plant providing all permanent premise cabling and wiring devices required to support a facility wide computer network system as shown or indicated on the drawings and/or as specified.

C. Provide all equipment, accessories, materials, tools, scaffolding, man lifts, labor, supervision, transportation and services necessary for or incidental to the installation and testing of the data cable plant.

D. As required by the contract documents the Data contractor shall be responsible for demolition of any devices and cabling previously abandoned back to source in the areas of the scope of work.

E. The station (horizontal) cabling shall extend from each designated data jack to the nearest IDF or the MDF.

F. Each IDF (Intermediate Distribution Frame) shall be connected by the data backbone cabling to the MDF (Main Distribution Frame). Refer to riser diagram on plans.

G. Refer to Data Cable Plant System Schedule on drawings for part numbers and additional information.

H. Provide and install, prior to cable installation, plastic snap in bushings at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves to protect the cabling from damage.

I. It is the intent of these specifications to provide complete installations although every item necessary may not be specifically mentioned or shown.

J. This project shall include preparation of construction plans locating the data cable plant devices and having the plans reviewed by Owner and the Owner's Representative.

K. Provide all training, as-built drawing and manual documents as outlined in these specifications.

L. Provide an extended warranty as outlined in these specifications.

M. It shall be the responsibility of the Division 26 Electrical Contractor to provide:
   1. Provide and install all conduit and standard electrical boxes for the data cable plant as specified herein. The data cable plant contractor shall coordinate all conduit

and box requirements and locations with, and provide special back boxes to, the electrical contractor prior to installation.
2. Provide equipment grounding system, conductors, and bus bars as outlined in Division 26.
3. Cabling in all open ceiling areas shall be enclosed in conduit. This shall include spaces with suspended acoustical cloud and/or canopy type ceilings.
4. Furnishing and installation of all floor boxes, surface raceways, and other wireways which are detailed or specified under Division 26.
5. Provide required conduit for accessibility to attic or plenum space.
6. Provide 120-volt power and hook-up to equipment provided in Division 27.
7. Installation of special back boxes supplied by data cable plant contractor.
8. Provide equipment mounting boards as indicated on the drawings.
9. Provide conduit to remote areas outside of the building as outlined on the drawings.
10. Coordination of requirements of Division 27 with the Builder.

1.2 WORK NOT INCLUDED.

A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services.

B. All electronic equipment, telephone-switching units, and cross connect; telephone sets, network switching equipment, transceivers, routers, network interface cards, computers, and software are not included in this section.

1.3 RELATED SECTIONS

A. Section 26 00 00 – Electrical.

1.4 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) EQUIPMENT

A. Refer to Responsibility Matrix on drawings for equipment that applies.

B. The contractor shall verify that new and existing products and site conditions are satisfactory for installation or relocation of OFCI equipment. If unsatisfactory conditions exist or other discrepancies are identified, the contractor shall immediately document the conditions and notify the owner in writing.

C. The contractor shall coordinate all required equipment schedule quantities and any dimensions or variations required to adapt to field conditions with the owner at the earliest possible date.The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

D. The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

E. The owner shall coordinate delivery dates with the builder to meet the construction schedule.

F. The installation of items as identified in the plans and specifications as OFCI equipment shall conform to the provisions of the Contract Documents and shall be coordinated with the builder.

G. Installation shall be performed by competent and trained workers in accordance with all applicable codes and governing regulations.

H. Installation, testing, and startup shall comply with the manufacturer's instructions.

I. The contractor shall provide all miscellaneous hardware, structural support, cabling, fittings, etc. that is not included by the manufacturer, but required for installation.

J. The contractor shall clean and adjust all relocated and new OFCI products as necessary.

K. All crating, packing materials, and debris shall be properly disposed of off-site.

L. Installation shall be subject to inspection by the owner representative, owner, and builder. The installer shall not proceed until any unsatisfactory conditions are corrected. Any damage caused by improper handling or installation procedures shall be corrected at no cost to the owner.

M. For drop shipped equipment, the builder shall be the consignee and shall have a representative on-site for coordination of delivery, receiving shipments, and inspect each shipment for obvious signs of damage or shortages. The builder shall be responsible for all shipping damage claims, including hidden damage, refusal of shipment, and Return Authorization procedures. The builder shall provide secure storage, handling, and protection from the elements, prior to the contractors' acceptance for installation.

N. For equipment stored at an owner's facility, the contractor shall load the equipment and provide transportation to the work site. Prior to loading, the contractor shall inspect the equipment for obvious signs of damage and document all quantities, noting shortages from the project requirements, indicating acceptance of the merchandise as is and in good order.

O. The contractor shall conduct and properly document testing of all installed equipment to verify proper operation. When appropriate, on-site operation and maintenance instruction shall be provided to the owner's personnel. This instruction shall include demonstration of proper use, maintenance, and cleaning procedures.

P. The nature of the equipment procurement shall determine responsibility for resolving any claims with the manufacturer or supplier relating to defects in material or workmanship and warranty claims. The party that purchased the equipment shall resolve these issues.

1.5 PRESCRIPTIVE CODES, STANDARDS AND REGULATIONS

A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards, except when requirements are exceeded by the contract documents.

B. In addition to requirements outlined in other sections of the specifications these codes and standards are imposed as applicable to the work in each instance.

C. The equipment, materials, and installation shall confirm to the latest version of all applicable codes, standards and regulations, of authorities having jurisdiction.

D. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes and standards.

E. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.

F. The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.

G. The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

H. Where local codes and ordinances are not in writing or on record, but local precedence have been set, the Owner shall pay for any additional resulting cost.

1.6 PLANS AND SPECIFICATIONS

A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth, each item essential to the functioning of the system.

B. The drawings are generally diagrammatic and show approximate location and extent of work.

C. Install the work complete including minor details necessary to perform the function indicated. Provide data cable plant, including all connections, complete in every respect and ready to operate.

D. If clarification is needed, consult the Owner's Representative.

E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Owner's Representative for his interpretation.

F. The Owner's Representative reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.7 SITE VISIT

A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities and work to remote areas.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished, or the amount of work to be done. It being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans, or required by nature of the site of which may be fairly implied, as essential to the execution and completion of any and all parts of the work.

1.8 SUBMITTALS

A. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.

B. Submittal shall be electronically transmitted in PDF file format.

C. For each submittal provide a cover sheet with the name and location of the project, the name, address and telephone number of the Contractor, and the name, address and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.

D. Quality Assurance Submittal including special boxes, cable, and other material as requested by the Owner's Representative:
   1. Letter from manufacturer stating that the Contractor is an Authorized Factory Distributor for the area where the project is located.
   2. The selected Contractor must be a local certified Panduit One Partner with current Platinum Status and and active deploy competency certificate. The Contractor must be a certified Integrator/Installer authorized by Panduit (the Manufacturer) to provide a Panduit Structured Cabling System 25-year Warranty (no exceptions) to the Owner covering all network cable and connectivity hardware products comprising this installation site. All UTP cable and all wiring devices installed shall be products of one approved manufacturer or joint manufacturers program and approved for use in their extended warranty program. The Contractor and Manufacturer shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship for a period of twenty-five (25) years from the date of substantial completion. Provide a copy of contractor Panduit One Partner with current Platinum Status certification to provide a Panduit Structured Cabling System and sample warranty text.

E. Product Data Submittal to include:
   1. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
   2. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections
   3. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list.
   4. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
   5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
   6. Submit a sample of the extended product warranty language.
   7. Any resubmittals shall include a complete revised equipment list and any product data that is revised.

F. Shop Drawings Submittal to include:
   1. Produce accurate to scale (min. 1/8” = 1’) drawings showing equipment and device layouts prepared using a CAD or BIM engineering drawing program. When CAD background files are not available for existing buildings the Contractor shall inspect the site and collect information to create a floor plan. Walls shall be double line showing the thickness, single line diagrams are not acceptable.
   2. Other disciplines devices or equipment not relevant to this scope of work shall not be shown on shop drawings. Submitting modified contract documents shall not be permitted.
   3. Every room shall have a name and number identifying the use of the space.

4. When multiple buildings make up the system, provide a block diagram of the project site showing all buildings to be covered by the system and detailing the route and type of connection between buildings. Note building entry points, conduit type and size, and routing pathway (underground or over canopy installation).
5. Shop or coordination drawings shall include information that will allow the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product.
6. Resubmittals shall include revision notation and clouded changes.

1.9 QUALIFICATIONS OF A PROPOSED CONTRACTOR

A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified

B. The Contractor shall employ full-time, factory-trained, licensed, local technicians and installers for product installation, maintenance, support, service and warranty.

C. The proposed contractor, as a business entity, shall be a local certified Panduit One Partner with current Platinum Status and an active deploy competency certificate, an authorized distributor and designated representative of the equipment manufacturer, with full extended warranty privileges. The proposed contractor shall have been actively engaged in the business of selling, installing, and servicing commercial building commercial cable systems for a period of at least 5 years.

D. Recently formed companies are acceptable only if specific pre-approval is requested, and granted by the owners represenative, based on experience of key personnel, current and completed projects, and all licensing requirements are met 10 working days prior to the contract proposal date.

E. The proposed Contractor shall have an office within 150-miles of the job site, staffed with factory-trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up, and perform a 100 percent operational audit of all installed devices. The technicians shall instruct the Owners' representatives in the proper operation of the system, and to provide service throughout the warranty period. The contractor shall be capable of dispatching technicians to repair a system within six (6) hours of a service request.

F. The proposed contractor shall be fully experienced in the design and installation of the type of system and manufacturer herein specified and shall furnish with the contract proposal an itemized list of the installations of the type specified herein.

G. The contractor shall employ factory-trained technicians capable of supporting the maintenance of the system. No contract employees are allowed. All installing technicians shall be employed by the proposed contractor.

H. The Owner's Representative or Owner may investigate, as they deem necessary to determine the ability of the proposed Contractor to perform the work. The proposed contractor shall furnish to the Owner with any information or data requested for this purpose.

I. The Owner's Representative or Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.

J. The Owner's Representative or Owner reserves the right to reject the proposal of any contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

1.10 ADDITIONAL MATERIALS: INCLUDE IN THE BASE CONTRACT PROPOSAL

A. All costs to provide 5 additional data outlet locations including all cable and devices as directed by the Architect. Conduit and standard back boxes by Division 26 Electrical Contractor.

PART 2 - PRODUCTS

2.1 GENERAL

A. All cable and wiring devices provided shall be listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.

B. Refer to Data and Telephone Cable Plant System Schedule on plan for part numbers and additional information.

C. Only equipment devices have been shown on the contract drawings. Specific wiring between equipment has not been shown.

D. All equipment and components shall be new, and the manufacturers’ current model. All like devices shall be of the same manufacturer and model number.

2.2 ACCEPTABLE MANUFACTURES

A. Descriptions and details, acceptable manufacturers' names listed and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.

B. Proposed contractors wishing to propose any product substitution must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.

C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified.

D. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of alternate products shall be based on the decision of the Owner and Architect. Prior approval to make a

proposal for this project does not automatically ensure products will be an acceptable equivalent.

E. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

F. The selected contractor must be a certified Integrator/Installer authorized by one of the Manufacturers listed below to provide an extended warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. All UTP cable, fiber optic cable, and all wiring devices installed shall be products of one approved manufacturer or joint manufacturers program and approved for use in their extended warranty program. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship; provide a copy of contractor certification.

G. The manufacturers model numbers, functions, and features described in this specification section are those of the following manufacturer.
   1. Panduit and General Cable PanGen Plus Structured Cabling Solution with a 25-year warranty

2.3 WALL PLATE COLOR

A. Color of device/wall plates to best match project light switches and electrical outlets, coordinate with the Electric Contractor.

2.4 DATA/TELEPHONE CABLING PLANS

A. Provide adjacent to the equipment rack in each MDF and IDF a plan view of all building areas covered by the equipment closet meeting the following requirements:
   1. Framed and secured to the wall and plan covered with clear acrylic panel.
   2. Size to clearly show all required information.
   3. "YOU ARE HERE" indicator with arrow.
   4. Room names and numbers. Verify with Owner.
   5. Show each device with symbol and identification address number as designated by owner.
   6. Symbol legend.
   7. True north arrow
   8. Scale indicator

2.5 DATA/DESK TELEPHONE STATION WALL PLATES AND JACK INSERTS

A. Provide single or multiple jack modular wall plates where shown on plans or required. The number next to symbol on plans indicates the quantity of data lines/jacks at that location, single outlets are not numbered. Where a desk telephone jack (D/#) is designated on plans the faceplate to include a telephone jack along with the data jacks. Each data or telephone jack shall be terminated and mounted in a suitable faceplate for all wall, enclosure, millwork, floor box, modular furniture, etc. locations. All terminations shall be made per the manufacturers' instructions. Jack type to match colors above. Refer to System Schedule on plan for part numbers and additional information.

B. Use a single gang faceplate with label window for all standard wall outlets, use NEMA duplex or Decora style frames as required for floor boxes, surface raceway, etc. Refer to System Schedule on plan for part numbers and additional information.

2.6 EMERGENCY SERVICE/VOICE LINES

A. Provide connectivity for emergency service/voice lines from the MDF, one line to each elevator phone and 911 emergency telephone, two lines to each alarm system digital communicator (DC).

2.7 19" OPEN EQUIPMENT RACKS

A. Rack location shall be verified by owner and engineer prior to installation.

B. In the MDF, provide one (1) one Four Post Rack, rack space to be reserved for server equipment provided and installed by the Owner, and at least one (1) Two Post Rack as required to accommodate the drop count.

C. In each IDF, provide at least two (2) Two Post Racks as required to accommodate the drop count.

D. Ladder type cable tray shall be routed over all floor mounted racks from wall to wall.

E. Mount fiber termination cabinets in the top portion of the rack and then the patch panels. Reserve the lower 50% of rack space for mounting of network electronics by the Owner.

2.8 BUSHINGS

A. Provide a plastic snap in bushing at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves prior to cable installation to protect the cabling from damage:
   1. Box openings - Thomas & Betts Knockout Bushing Series 3210, or equivalent.
   2. Metal stud passage - Thomas & Betts Twist It Bushing Catalog Number SB1216-SC, or equivalent.
   3. Conduit ends - Thomas & Betts Anti-Short Bushing Series 390 or Tite-Bite Combination couplings Series 442, or equivalent.

2.9 J-HOOKS

A. All attachments shall be specifically designed for telecommunications cabling.

B. Attachments for cabling support shall be spaced at approximately 48 to 60 inches on center. Cable bundles shall not be allowed to sag down more than 12-inches mid-span between attachments.

C. Maximim bundle size is 24 cables.

D. Attachments shall be sized for 25% capacity to allow for future expansion.

E. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm with data cable). Multiple J-Hooks can be placed on the same attachment point, up to the rated weight load of the attachment device.

F. Acceptable manufacturers:
   1. Erico.

2. Panduit
3. Cooper B-line.

2.10 CABLE TIE WRAPS

A. Plenum rated Velcro hook cable ties shall be furnished and installed to attach wire bundles to supports and for appropriate wire management as required. Provide and install Panduit TAK-TY HLTP series cable ties with UL 94-V2 flammability rating, or equivalent.

B. Hard plastic or metal tie wraps will not be allowed on any data cable (Category rated UTP).

2.11 MEASURING PULLING TAPE (MULE TAPE)

A. All future use innerduct and conduit cable pathways shall include a Measuring Pulling Tape (Mule Tape) made of woven Polyester, Aramid, Kevlar, or an equivalent fiber blend. Measuring Pulling Tape shall have a minimum tensile strength of 1250 lbf. or as required and shall be pre-lubricated for prevention of burn though and marked for measuring in feet. Measuring Pulling Tape installed in underground pathways shall incorporate a 22 gauge minimum solid corrosion resistant copper conductor for use in radio signal locating procedures.

2.12 LADDER TYPE CABLE TRAY

A. Ladder type cable tray shall be routed over all floor mounted racks from wall to wall, provide all necessary hardware to attach the ladder rack to the top of the floor rack and to the walls. All field cuts shall be filed smooth, dressed square, and painted to match.

B. Utilize tray splicing, support, and coupling hardware supplied by and installed as recommended by the manufacturer.

C. Cable tray and rack shall be securely supported and grounded.

D. Cable tray shall be of heavy-duty tubular steel construction with black powder coat finish, 12" wide, with cross members at 12" intervals. At each ladder rack joint, provide a Grounding Kit. Provide fire-retardant flat black colored rubberized material end caps to cover all exposed ends of ladder rack. At the top of each rack, provide a Rack-to-Runway Mounting Plate, Cable Runway Elevation Kit, and Cable Runway Radius Drop. At each wall, provide a Horizontal Wall Angle Support. Provide Cable Runway Center Support hanger brackets and similar and 5/8” all-thread rod hanger supports from the building structure at any span that exceeds 60” from other support (rack and wall mounting locations), at intervals of 60” on center maximum.

E. Provide Chatsworth Product Inc. Universal Cable Runway or equivalent.

2.13 MESH CABLE TRAY

A. Mesh constructed cable tray systems shall be utilized for high capacity and special pathway support requirements. Mesh cable tray shall be constructed from steel wires. All edges and welds are to be smooth and free of burs or sharp edges. Mesh tray assemblies shall be zinc plated after fabrication. All field cuts shall be filed smooth, dressed square, and touched up with zinc bearing paint to prevent rust formation. Mesh openings shall not exceed 2” x 4”. Provide sizes from 3” wide x 2” deep up to 24” wide

x 4” deep as required for a 50% maximum initial fill rate. Provide straight sections, vertical offsets, tees, crosses, radiused bends, reducers, and radiused dropouts as required. Utilize tray splicing, support, and coupling hardware supplied by and installed as recommended by the manufacturer. Support from building structure.

B. Provide minimum of 12" clearence above cable tray.

C. Chatsworth Products Inc. Universal Cable Runway or equivalent.

D. Provide Mono-Systems Inc. Mono-Mesh Cable Tray MM2-12-118 series as required or equivalent.

PART 3 - EXECUTION

3.1 SYSTEM DESCRIPTION

A. Each data jack shall be terminated and mounted in a suitable faceplate for all wall, enclosure, millwork, floor box, modular furniture, etc. locations.

B. All jack wall plates and housings shall have machine printed labels meeting ANSI/TIA-606-C standards inserted behind built-in clear plastic windows, or engraved plastic nameplates permanently attached, indicating cable run identification number(s).

C. All outlets shall be RJ-45 style jacks. All cabling and connectors provided will meet and be tested to ANSI/TIA-568 Style B Pin/Pair assignment (T568B) requirements.

D. The data cable plant will provide the permanent part of the building wiring (cable plant) required to provide connection for telephones or network computers.

E. Label the cable run designator on both ends of all cables, patch panel jacks, termination cabinet connectors, and all jack wall plates and housings. In addition, label the cable run designator(s) on the ceiling grid bar at jack locations that are concealed above a drop ceiling; including those for wireless access points, cameras, projectors, etc. Labels shall be polymer film Turn-Tell flexible non-smear, or equivalent, machine printed labels complying with ANSI/TIA-606-C standards.

F. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., cable shall not be supported by or lay on suspended ceilings). Fasteners and supports shall be adequate to support the required load.

G. The installation shall be subject to inspection and approval by the Architect/Engineer.

3.2 CABLE RUN DESIGNATOR LABELING SCHEME

A. Each patch panel jack, wall plate jack, terminal cabinet connector, both ends of each cable run and on the ceiling grid bar at jack locations that are concealed above a drop ceiling shall be labeled with a cable scheme run designator machine printed labels installed according to EIA/TIA 606 standards. All labeling shall conform to industry standards and best practices.

B. Labeling types and scheme shall be verified and coordinated with the Owner prior to any installation. Contractor to submit labeling scheme to Engineer and Owner for approval prior to installation.

3.3 CABLE ROUTING AND INSTALLATION

A. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical code requirements.

B. Cable pathways, conduit, and cable support systems shall be complete with bushings, de-burred, cleaned, and secure prior to installation of cable.

C. All wiring shall test free from opens, grounds, or shorts. All communications cable shall be supported from the building structure and bundled. Do not attach any supports to joist bridging or other lightweight members.

D. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling.

E. Communications cable must not be fastened to electrical conduits, mechanical ductwork/piping, sprinkler pipes, or routed to obstruct access to hatches, doors, utility access panels, or service work areas. Do not route cables through fire doors, ventilation shafts, grates, or parallel with line voltage electrical conductors. Communication cables shall not be run loose on ceiling grid or ceiling tiles.

F. Support shall be provided by mounting appropriate fasteners that may be loaded with multiple cables. Provided that the weight load is carried by the support rod or wire, the support assembly may attach to the ceiling grid for lateral stabilization. The required support wires for the ceiling grid or light fixtures shall not be utilized. Any fastener attached to the ceiling grid shall not interfere with inserting or removing ceiling tiles. The cable pathway of supports must be positioned at least 12 inches above the ceiling grid.

G. Communication cables shall be run in conduits, where stubs are provided, from wall or floor jacks to accessible areas above finished ceilings. Conduit shall be required only within walls and concealed spaces to provide access.

H. Provide bushings to protect the cable from damage for conduit ends, box openings, and passage through metal studs.

I. Communication cables shall be run in bundles above accessible ceilings and supported from building structure. Cabling shall be loosely bundled with cable Velcro hook ties randomly spaced at 30 to 48 inches on center, cable ties shall not be tight enough to deform cabling and shall not be used to support the cabling. Maximim bundle size is 24 cables.

J. Each cable run shall include a three-foot service loop with Velcro hook ties located in the ceiling above the rack. This is to allow for future re-termination or repair.

K. All cabling shall be placed with regard to the environment, EMI/RFI interference, and its effect on communication signal transmission.

L. Non-conductive fiber optic cable is immune from EMI/RFI interference. Give priority when selecting a route to minimize exposure to possible cable damage from maintenance or service of all systems in the attic space.

M. Do not route any data cable within two feet of any light fixture, HVAC unit, service access area, electric panel, or any device containing a motor or transformer.

N. Communication cable will not be installed in the same conduit, raceway, tray, duct, or track with line voltage electrical cable without a metallic barrier meeting NEC requirements.

O. Maximum cable pulling tension should not exceed 25 pound-force (110 N) or the manufactures recommendation, whichever is less.

P. Any pulling compounds utilized must be approved by the cable manufacturer and shall not degrade the strength or electrical characteristics of the cable.

Q. No terminations or splices shall be installed in or above ceilings, other than in designated end point housings.

R. Cable bends shall not be tighter that the manufacturers' suggested bend radius.

S. Mount all equipment firmly in place. Route cable in a professional, neat and orderly installation.

T. Provide for adequate ventilation to all equipment racks and take precautions to prevent electromagnetic or electrostatic hum.

3.4 UTP CABLE TERMINATION PRACTICES

A. Insulation Displacement Contact (IDC) connectors shall be used and installed per the manufactures' recommendations.

B. Strip back only as much cable jacket as required to terminate.

C. Preserve wire-pair twists as closely as possible to point of termination (0.5" maximum) to keep signal impairment to a minimum.

D. Avoid twisting cable jacket during installation.

E. Avoid twisting cable jacket during installation.

F. Take care to ensure all data UTP wiring devices are designed for T568B wiring, T568A devices use a different pair assignment and should not be mixed.

G. Data and Telephone Cable UTP T568B, Identical to AT&T 258A and WECO, Pin/Pair Assignments (All RJ-45 modular jacks):

3.5 OPTICAL FIBER CABLE INSTALLATION AND TERMINATION PRACTICES

A. The following fiber optic connector installation methods are acceptable; fusion splice connection of factory made pigtail connectors, epoxy/polish style connectors, or non-epoxy compression cam gel style connectors. In each case, the connector manufactures' instructions shall be followed and the recommended tools and supplies, including break out kits when required, shall be used for termination and testing. All Fiber strands to be terminated including future use pairs.

B. As per industry standard - IEC 61300-3-35 during optical fiber connector termination, certify, all terminations with a 200-power microscope (minimum). Follow all of the

connector manufacturers' recommendations. Unacceptable flaws in the termination's will include, but not be limited to, scratches, full or partial cracks, bubbles, pits, or residual dirt, dust, oil, moisture, grinding or sanding debris in the connector. The acceptable final inspection shall show a connector tip that is properly aligned and free of imperfections in 100% of the core and 80% of the cladding. Any connectors that fail testing shall be inspected and re-tested after rework.

C. During installation of optical fiber cable, do not allow pulling tension to exceed cable manufacturers' specification for the cable being installed. Only the strength member of the cable shall be subjected to the pulling tension.

D. Clean all optical fiber connector tips prior to inserting them into mating receptacles or bulkheads and re-install dust covers. Clean the tester launch cord prior to each insertion, as well.

3.6 CABLE SUPPORT

A. Conduit, duct, or track shall be used for communication cable in exposed areas.

B. Cable fill shall not exceed the manufacturers' instructions for each type of support.

C. All conduit, ducts, track, and raceways shall be supported from the structure at industry standard intervals for the size specified, utilizing proper anchoring devices.

D. Solid, ladder, or mesh cable tray/duct shall be required for narrow depth cable routes that would allow sags to rest upon the ceiling, electrical conduits, HVAC equipment, ducts, or lighting fixtures.

E. Vertical cable runs exceeding 12" in equipment closets shall require ladder or mesh type cable support tray. Attachment shall utilize appropriate mounting hardware and accessories for vertical placement and allow a minimum of 2" clearance between the wall and runway. Cable attachment shall be made by Velcro hook ties in a basket type configuration.

F. All vertical supports shall be attached to the building support structure or concrete ceiling with anchors load rated for 100-lbs. minimum. Down rods shall be a minimum of 1/4" diameter. Steel uni-strut cross supports shall be 2" minimum.

G. Cable runway or tray shall be grounded to an appropriate building ground at each end and bonded at each joint.

H. Rubber or plastic boots shall be installed at the ends of horizontal support rails to prevent cable damage or injuries to personnel.

3.7 FIRE OR DRAFT STOPPING, PENETRATIONS, AND CORING

A. UL Listed fire stopping methods that match the fire rating of the wall or floor being penetrated are to be used at all fire barrier penetrations. Seal the interior of the conduit sleeve around the cables and around the outside of the sleeve on each side of the penetration with fire-stop caulk or putty, install according to the manufacturers' instructions.

B. All penetrations through fire rated walls or floors shall feature a suitable length of metal conduit. Hole diameter shall not exceed ½" larger than the conduit or sleeve to be

installed. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor penetrations with ductwork, piping, line voltage electrical conduits, etc.

C. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly.

D. Draft/Noise Stopping - This Contractor prepares for and applies draft/noise stopping to all non-rated wall penetrations. Draft/Noise stopping shall minimize the movement of air and sound from enclosed areas to other parts of the building. This shall include but not limited to:
   1. Neatly cutting all non-rated wall/floor penetrations with a 1” maximum clearance. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor penetrations with two types of ductwork, piping, line voltage electrical conduits, communications cabling, etc.
   2. Provide and install non-combustible mineral wool, fiberglass, cellulose insulation, caulk, and sealant as required. Seal the interior of conduit sleeves around the cables and around the outside of the sleeve on each side of the penetration with caulk or putty, install according to the manufacturers’ instructions.

E. Upon approval, the Contractor shall be required to supply all labor, equipment, tools, and materials to create any additional penetrations, and shall provide the sleeve, temporary and final fire stopping. Special care shall be taken not to stress, overheat, or penetrate any building support member. Coring shall be made with equipment appropriate for the dry penetration of concrete and block materials. Under no circumstances shall penetrations be made utilizing a chisel or percussion type equipment. Concrete, block, or plaster cores shall be made by dry saw/core methods only.

3.8 EXISTING DATA SYSTEMS DEMOLITION, MODIFICATION AND EXPANSION FOR ADDITIONS AND RENOVATIONS

A. The Data contractor shall be responsible for demolition as required of the existing systems, including demolition of any devices and cabling previously abandoned. Demolition shall include:
   1. Disconnection and removal of all communication devices not to remain in service in walls, floors, and ceilings.
   2. Removal of exposed abandoned conduit and supports including brackets, stems, hangers, and other accessories located on walls and above accessible finished ceilings. Cut abandoned conduit flush with walls, floors, etc., and patch surfaces.
   3. Provide a blank cover for abandoned device back boxes that are impractical to remove from masonry construction without unnecessary damage.
   4. Repair of any finishes or adjacent construction damaged during modification, extension, and demolition work.

3.9 EXAMINATION

A. Verify field conditions including existing systems, equipment models, configurations, circuiting arrangements, cabling, and devices. Adjust all circuiting, cabling, and materials to be provided as required by job conditions.

B. Project drawings are based on casual field observation and existing record documents when available, report any significant discrepancies to the Engineer before disturbing existing systems.

C. The Contractor accepts the existing conditions when beginning demolition.

3.10 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment in areas of renovation that are to remain or be reused.

3.11 OPERATION OF NEW EQUIPMENT PRIOR TO PROJECT COMPLETION

A. When the phasing of a project requires that data systems are operable in certain areas and the Owner needs to operate the equipment the contractor shall make such provisions. The warranty period shall commence on new equipment when it is operated for the beneficial use of the Owner. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, properly adjust, and complete all punch list items before final acceptance by the Owner. In these cases, the date of acceptance and the start of the warranty may be different dates.

3.12 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.

B. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

C. Failure to comply with the above to the satisfaction of the Owner's inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.

3.13 FINAL OBSERVATION

A. It shall be the duty of the Contractor to make a careful observation trip of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Owner Representative to make a final observation.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, et cetera, called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Owners Representative at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, et cetera, before preparing for submission to verify that the terms check with the requirements of the specifications.

C. The following and other provisions of Division 1 General Conditions will be required at time of final completion:
   1. Final clean up completed.
   2. All systems are fully operational, all material and devices installed.
   3. As-built (as installed) drawings and operations manuals.

3.14 CUTTING AND PATCHING

A. Notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, et cetera, of any openings that will be required for his work.

B. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.

C. All necessary cutting of walls, floors, partitions, ceilings, et cetera, as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor's expense in a neat and workmanlike manner, and as approved by the Owner Representative.

D. Patching of openings and/or alterations shall be provided by the communications Subcontractor or at the Subcontractor's expense in an approved manner.

E. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Owners Representative.

F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

G. All openings in exterior walls shall be sealed watertight.

H. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.

3.15 WARRANTY, SERVICE, TESTING, CERTIFICATION

A. The Contractor must provide an extended warranty that is inclusive of the Manufacturer’s warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship for a period of no less than twenty years (period as is customary for the Manufacturer) from the date of substantial completion. Any equipment or cabling shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner.

B. The System Contractor shall make a thorough inspection of the complete installation to ensure the following:
   1. Complete and functional system.
   2. Installed in accordance with manufacturers’ instructions.
   3. All cabling shall test free from all grounds, opens, and shorts.
   4. A representative of the Owner shall have an opportunity to be present for all final testing. Coordinate final testing with Owner, schedule as near as possible to acceptance date.

3.16 UTP CABLES AND LINK TESTING

A. Acceptance Testing: Test each conductor of every cable on the reel to verify length and continuity. Cables that have been damaged in transit must be replaced. Installed cable that proves to be defective will be replaced at the contractor’s expense.

B. Final Testing: All UTP cabling will be certified to meet and or exceed the specifications as set forth for Permanent Link Testing of all Power over Ethernet electrical parameters including alien crosstalk performance. Mechanical requirement testing and test methods shall meet ANSI/CEA S–90–661 or ANSI/CEA S–102–732. Certified cable channel performance shall meet or exceed the requirements of ANSI/TIA-568, ANSI/TIA-1152-A, and ISO/IEC 11801 Standards for Structured Telecommunications Cabling Installations in a configuration up to 100 meters.

C. Test alien crosstalk (near-end and far-end loss) for a cabling system using a network analyzer with 100-Ω pair terminations per industry standards.

D. The cable tester shall be ETL verified to IEC Level V accuracy or equivalent with the latest version of firmware and shall produce an electronic or printed report, noting label information, for each cable run. These reports are to be included in the close-out documentation. Testing shall be conducted with a TREND Networks LanTEK IV, Fluke DSX-5000, or equivalent, permanent link adapters, high-performance channel adapters, termination plugs, 8-pin modular couplers and analysis software. Certifications shall include indistry standard parameters for each pair of each cable installed.

3.17 OPTICAL FIBER TESTING

A. Acceptance Testing: Test each strand of every optical fiber cable on the reel with an OTDR, to verify length and continuity. Fiber cables that have been damaged in transit must be replaced. Installed fiber cable that proves to be defective will be replaced at the contractor’s expense.

B. Final Testing: After termination, each individual fiber of each cable segment shall be tested bi-directionally using an OTDR, both to determine the installed length and continuity. All individual fibers of each cable segment will be tested using a power meter to determine the actual loss. These readings will be taken at the 850 nm and 1300 nm windows for Multi-mode and 1310 nm and 1550 nm windows for single-mode. Testing will be in both directions. The final readings shall be listed in the certification report. These readings must not be higher than the “Optimal Attenuation Loss.” The OAL will be calculated using the manufacturers’ factory certified test results, (dB/Km) converted to the actual installed lengths plus the manufacturers’ best published attenuation losses for the connector and/or splice installed on this project. (0.20 for Connectors and 0.10 for splices.) The OAL shall be used for comparison with the end to end power loss test results prior to acceptance by the construction manager.

C. Fiber optic cable shall be subjected to bi-directional testing meeting ANSI/TIA-568 requirements. The cable tester shall produce a printed report, noting label information, for each cable run. These reports are to be included in the close-out documentation.

3.18 DRAWINGS, MANUALS, AND TRAINING

A. As-built drawings and operating and maintenance manuals may be electronically transmitted in PDF file format.

B. Upon completion of the installation, and prior to final inspection, the Contractor shall furnish as-built drawings.

C. In addition, the contractor shall furnish complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets. Manuals shall include wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system. Provide a parts list with manufacturer and model number for commonly replaced parts. Include complete instructions for the inspection, testing, and maintenance of the system. Place final cable certification test results in manuals.

D. All cable paths and wiring methodology shall be documented. All cables shall have both ends labeled and included in the as-built documentation. Provide an MS Excel worksheet compatible format spreadsheet file cross referencing all cable run numbers, architectural room number, and owners room number for the origin and destination of each cable run.

E. A formal on-site training session shall be provided by the Contractor to the Owners Representative / Maintenance personnel and shall include instruction on the documentation, location, inspection, maintenance, testing, and operation of all system components. Provide a minimum of two (2) hours of documented general instruction. It shall be the responsibility of the Contractor to coordinate time and location of training sessions with the Owner.

END OF SECTION

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SECTION 27 41 31

INTEGRATED AUDIO-VISUAL SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Audio Video Systems complete including selective modification of existing system to be revised and expanded, cabling, special back boxes, hardware, and all other required devices and equipment.

B. Provide all equipment, accessories, materials, tools, scaffolding, man lifts, labor, supervision, transportation and services necessary for or incidental to the installation and testing of the data cable plant.

C. As required by the contract documents this contractor shall be responsible for demolition of any devices and cabling previously abandoned back to source in the areas of the scope of work.

D. Provide and install, prior to cable installation, plastic snap in bushings at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves to protect the cabling from damage.

E. It is the intent of these specifications to provide complete installations although every item necessary may not be specifically mentioned or shown.

F. Refer to System Schedules on plan for part numbers and additional information.

G. This project shall include preparation of construction plans locating the audio video devices and having the plans reviewed by Owner and the Owner's Representative.

H. Provide all training, as-built drawing and manual documents as outlined in these specifications.

I. Provide a warranty as outlined in these specifications.

J. It shall be the responsibility of the Division 26 Electrical Contractor to provide:
   1. Provide and install all conduit and standard electrical boxes for the audio video system as specified herein. The audio video contractor shall coordinate all conduit and box requirements and locations with, and provide special back boxes to, the electrical contractor prior to installation.
   2. Provide equipment grounding system, conductors, and bus bars as outlined in Division 26.
   3. Cabling in all open ceiling areas shall be enclosed in conduit.
   4. Furnishing and installation of all floor boxes, surface raceways, and other wireways which are detailed or specified under Division 26.
   5. Provide required conduit for accessibility to attic or plenum space.
   6. Provide 120-volt power and hook-up to equipment provided in Division 27.
   7. Installation of special back boxes supplied by audio video contractor.
   8. Provide equipment mounting boards as indicated on the drawings.

9. Provide conduit to remote areas outside of the building as outlined on the drawings.
10. Coordination of requirements of Division 27 with the Builder.

1.2 WORK NOT INCLUDED.

A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services.

1.3 RELATED SECTIONS

A. The conditions of the Division 0, Division 1, Division 26 requirements, and the contract requirements that include the General Conditions and the Supplementary Conditions apply to work of this division.

B. Section 26 00 00 – Electrical.

1.4 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) EQUIPMENT

A. Refer to Responsibility Matrix on drawings for equipment that applies.

B. The contractor shall verify that new and existing products and site conditions are satisfactory for installation or relocation of OFCI equipment. If unsatisfactory conditions exist or other discrepancies are identified, the contractor shall immediately document the conditions and notify the owner in writing.

C. The contractor shall coordinate all required equipment schedule quantities and any dimensions or variations required to adapt to field conditions with the owner at the earliest possible date.The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

D. The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

E. The owner shall coordinate delivery dates with the builder to meet the construction schedule.

F. The installation of items as identified in the plans and specifications as OFCI equipment shall conform to the provisions of the Contract Documents and shall be coordinated with the builder.

G. Installation shall be performed by competent and trained workers in accordance with all applicable codes and governing regulations.

H. Installation, testing, and startup shall comply with the manufacturer’s instructions.

I. The contractor shall provide all miscellaneous hardware, structural support, cabling, fittings, etc. that is not included by the manufacturer, but required for installation.

J. The contractor shall clean and adjust all relocated and new OFCI products as necessary.

K. All crating, packing materials, and debris shall be properly disposed of off-site.

L. Installation shall be subject to inspection by the owner representative, owner, and builder. The installer shall not proceed until any unsatisfactory conditions are corrected.

Any damage caused by improper handling or installation procedures shall be corrected at no cost to the owner.

M. For drop shipped equipment, the builder shall be the consignee and shall have a representative on-site for coordination of delivery, receiving shipments, and inspect each shipment for obvious signs of damage or shortages. The builder shall be responsible for all shipping damage claims, including hidden damage, refusal of shipment, and Return Authorization procedures. The builder shall provide secure storage, handling, and protection from the elements, prior to the contractors' acceptance for installation.

N. For equipment stored at an owner's facility, the contractor shall load the equipment and provide transportation to the work site. Prior to loading, the contractor shall inspect the equipment for obvious signs of damage and document all quantities, noting shortages from the project requirements, indicating acceptance of the merchandise as is and in good order.

O. The contractor shall conduct and properly document testing of all installed equipment to verify proper operation. When appropriate, on-site operation and maintenance instruction shall be provided to the owner's personnel. This instruction shall include demonstration of proper use, maintenance, and cleaning procedures.

P. The nature of the equipment procurement shall determine responsibility for resolving any claims with the manufacturer or supplier relating to defects in material or workmanship and warranty claims. The party that purchased the equipment shall resolve these issues.

1.5 PRESCRIPTIVE CODES, STANDARDS AND REGULATIONS

A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards, except when requirements are exceeded by the contract documents.

B. In addition to requirements outlined in other sections of the specifications these codes and standards are imposed as applicable to the work in each instance.

C. The equipment, materials, and installation shall confirm to the latest version of all applicable codes, standards and regulations, of authorities having jurisdiction.

D. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes and standards.

E. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.

F. The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.

G. The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

H. Where local codes and ordinances are not in writing or on record, but local precedence have been set, the Owner shall pay for any additional resulting cost.

1.6 PLANS AND SPECIFICATIONS

A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth, each item essential to the functioning of the system.

B. The drawings are generally diagrammatic and show approximate location and extent of work.

C. Install the work complete including minor details necessary to perform the function indicated. Provide audio video systems, including all connections, complete in every respect and ready to operate.

D. If clarification is needed, consult the Owner's Representative.

E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Owner's Representative for his interpretation.

F. The Owner's Representative reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.7 SITE VISIT

A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities and work to remote areas.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished, or the amount of work to be done. It being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans, or required by nature of the site of which may be fairly implied, as essential to the execution and completion of any and all parts of the work.

1.8 SUBMITTALS

A. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.

B. Submittal shall be electronically transmitted in PDF file format.

C. For each submittal provide a cover sheet with the name and location of the project, the name, address and telephone number of the Contractor, and the name, address and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.

D. Quality Assurance Submittal including special boxes, cable, and other material as requested by the Owner's Representative:
   1. Letter from manufacturer stating that the Contractor is an Authorized Factory Distributor for the area where the project is located.

E. Product Data Submittal to include:

1. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
2. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections
3. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list.
4. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
6. Submit a sample of the extended product warranty language.
7. Any resubmittals shall include a complete revised equipment list and any product data that is revised.

F. Shop Drawings Submittal to include:
1. Produce accurate to scale (min. 1/8” = 1’) drawings showing equipment and device layouts prepared using a CAD or BIM engineering drawing program. When CAD background files are not available for existing buildings the Contractor shall inspect the site and collect information to create a floor plan. Walls shall be double line showing the thickness, single line diagrams are not acceptable.
2. Other disciplines devices or equipment not relevant to this scope of work shall not be shown on shop drawings. Submitting modified contract documents shall not be permitted.
3. Full fabrication details of any custom enclosures and millwork indicating size, material, finish and openings for equipment.
4. Projector, loudspeaker, camera mounting details, include hardware types and load capacity.
5. Provide complete drawings on custom fabricated plates or panels. Drawings shall include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.
6. Labeling: Equipment and cabling labeling scheme - include font sizes and styles, explanation of scheme, and designator schedule.
7. Schedules: Wiring schedule showing source and destination of wiring and indicating which wiring is in conduit. Junction box schedule showing type of box, size, mounting, and location. Include this information with remainder of wiring diagrams.
8. Every room shall have a name and number identifying the use of the space with ceiling heights notated for each space or group of spaces throughout the design.
9. When multiple buildings make up the system, provide a block diagram of the project site showing all buildings to be covered by the system and detailing the route and type of connection between buildings. Note building entry points, conduit type and size, and routing pathway (underground or over canopy installation).
10. Shop or coordination drawings shall include information that will allow the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product.
11. Resubmittals shall include revision notation and clouded changes.

1.9 QUALIFICATIONS OF A PROPOSED CONTRACTOR

A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified

B. The Contractor shall employ full-time, factory-trained, licensed, local technicians and installers for product installation, maintenance, support, service and warranty.

C. The proposed contractor, as a business entity, shall be a local authorized distributor and designated representative of the equipment manufacturer, with full extended warranty privileges. The proposed contractor shall have been actively engaged in the business of selling, installing, and servicing of similiar systems for a period of at least 5 years. Selected contractor must be certified in specified system, subcontracting other companies certified in proposed product shall not be allowed.

D. Employ CTS and CTS-I staff (certified by AVIXA) and assigned to, and active on this project.

E. A minimum of one (1) CTS employee to supervise each project, and on site during the construction phase.

F. Recently formed companies are acceptable only if specific pre-approval is requested, and granted by the owner represenative, based on experience of key personnel, current and completed projects, and all licensing requirements are met 10 working days prior to the contract proposal date.

G. The proposed Contractor shall have an office within 150-miles of the job site, staffed with factory-trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up, and perform a 100 percent operational audit of all installed devices. The technicians shall instruct the Owners' representatives in the proper operation of the system, and to provide service throughout the warranty period. The contractor shall be capable of dispatching technicians to repair a system within six (6) hours of a service request.

H. The proposed contractor shall be fully experienced in the design and installation of the type of system and manufacturer herein specified and shall furnish with the contract proposal an itemized list of the installations of the type specified herein.

I. The contractor shall employ factory-trained technicians capable of supporting the maintenance of the system. No contract employees are allowed. All installing technicians shall be employed by the proposed contractor.

J. The Owner's Representative or Owner may investigate, as they deem necessary to determine the ability of the proposed Contractor to perform the work. The proposed contractor shall furnish to the Owner with any information or data requested for this purpose.

K. The Owner's Representative or Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.

L. The Owner's Representative or Owner reserves the right to reject the proposal of any contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

PART 2 - PRODUCTS

2.1 GENERAL

A. All cable and wiring devices provided shall be listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.

B. Refer to System Schedule on plan for part numbers and additional information.

C. Only equipment devices have been shown on the contract drawings. Specific wiring between equipment has not been shown.

D. All equipment and components shall be new, and the manufacturers' current model. All like devices shall be of the same manufacturer and model number.

E. Both ends of all cables shall be labeled utilizing self-laminating polymer film non-smear, machine printed labels.

F. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., cable shall not be supported by or lay on suspended ceilings). Fasteners and supports shall be adequate to support the required load.

G. Where required, provide manufacturer's rack mount adapter or one manufactured by Middle Atlantic unless specified elsewhere.

H. Remove or blank out all manufacturer's names, logos, or other symbols from loudspeakers or other objects placed in view of the public. If logos are removable, remove and repaint to the color of the adjacent surface reattach.

2.2 ACCEPTABLE MANUFACTURERS

A. Descriptions and details, acceptable manufacturers' names listed and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.

B. Proposed contractors wishing to propose any product substitution must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.

C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified.

D. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of alternate products

shall be based on the decision of the Owner and Architect. Prior approval to make a proposal for this project does not automatically ensure products will be an acceptable equivalent.

E. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

F. The selected contractor must be a certified Integrator/Installer authorized by one of the Manufacturers listed below to provide an extended warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship; provide a copy of contractor certification.

G. Acceptable Manufacturers Include:

Allen and Heath	United Kingdom
Atlas IED	Phoenix, AZ
BSS Audio	South Jordan, UT
Community Professional Loudspeakers	Chester, PA
Crestron Electronics	Rockleigh, NJ
Crown Audio	Elkhart, IN
Danley Sound Labs	Gainesville, GA
Denon Professional	Cumberland, RI
Electro-Voice	Fairport, NY
Extron	Anaheim, CA
Furman Contractor	Petaluma, CA
JBL Professional	Northridge, CA
Listen Technologies Corporation	Bluffdale, UT
Lowell Mfg.	Pacific, MO
Middle Atlantic Products	Fairfield, NJ
Neutrik	Charlotte, NC
QSC	Costa Mesa, CA
Octasound	Ajax, ON
Radio Design Labs	Prescott, AZ
Sennheiser	Old Lyme, CT
Shure Incorporated	Niles, IL
Soundcraft	Northridge, CA
West Penn Wire	Washington, PA

H. Other manufacturers must be approved by the owners represenative, unless indicated by these specifications.

2.3 WALL PLATE COLOR

A. Color of device/wall plates to best match project light switches and electrical outlets, coordinate with the Electric Contractor.

2.4 CABLES & WIRING

A. Cable shall have appropriate fire rating (CMR, CMP, OFNR, OFNP, etc.) and labeled on jacket of cable.

B. Furnish an insulated #6 copper ground wire run from the amplifier to an earth ground, attached securely to the amplifier case, and terminated at each end to bare metal.

C. Where speaker cables are run exposed through a return air plenum, provide plenum rated cable.

D. Shielded cables located in raceways shall have aluminum foil shield with drain wire.

E. Loudspeaker Wiring:
   1. Provide wire size as required for load and length to meet industry standards
   2. Jacket color: black

F. Microphone/Line Level Wire:
   1. Provide shielded 22 AWG cable
   2. Bonded jacket
   3. Jacket color: black

G. Ethernet/LAN Cable (UTP):
   1. Enhanced category 6
      a. 4 pair, 23-AWG Bare Copper
      b. Standard Termination T568B
      c. Color - Yellow
   2. Enhanced category 6A
      a. 4 pair, 23-AWG Bare Copper
      b. Standard Termination T568B
      c. Color - Yellow

H. RF Antenna Cables (as required by manufacturer’s specifications)
   1. RG-58/U Type
      a. 20 (19x32) Tinned Copper Conductor
      b. 100% Bi-Foil, Tinned Copper Braid Shield with 95% or better coverage
      c. Nominal Impedance of 50Ω
   2. RG-213/U Type
      a. 13 (7x21) Tinned Copper Conductor
      b. Bare Copper Braid Shield with 95% or better coverage
      c. Nominal Impedance of 50Ω
   3. RG-8/U Type
      a. 10 AWG Solid Tinned Copper Conductor
      b. 100% Bonded Bi-Foil + 90% Tinned Cu Braid Shield
      c. Nominal Impedance of 50Ω

I. Acceptable cable manufacturers

West Penn	Washington, PA
Windy City Wire	Bolingbrook, IL
Liberty	Colrado Springs, CO
Belden	St. Louis, MO
Commscope	Hickory, North Carolina

2.5 BUSHINGS

A. Provide a plastic snap in bushing at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves prior to cable installation to protect the cabling from damage:
   1. Box openings - Thomas & Betts Knockout Bushing Series 3210, or equivalent.
   2. Metal stud passage - Thomas & Betts Twist It Bushing Catalog Number SB1216-SC, or equivalent.
   3. Conduit ends - Thomas & Betts Anti-Short Bushing Series 390 or Tite-Bite Combination couplings Series 442, or equivalent.

2.6 J-HOOKS

A. All attachments shall be specifically designed for telecommunications cabling.

B. Attachments for cabling support shall be spaced at approximately 48 to 60 inches on center. Cable bundles shall not be allowed to sag down more than 12-inches mid-span between attachments.

C. Attachments shall be sized for 25% capacity to allow for future expansion.

D. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm with data and telephone cable). Multiple J-Hooks can be placed on the same attachment point, up to the rated weight load of the attachment device.

E. Acceptable manufacturers:
   1. Erico.
   2. Panduit
   3. Cooper B-line.

PART 3 - EXECUTION

3.1 CABLE ROUTING AND INSTALLATION

A. Cooperation with trades of adjacent, related or affected materials or operations, and or trades performing continuations of this work under subsequent contracts are considered a part of this work. In order to effect timely and accurate placing of work and to bring together, in the proper and correct sequence, the work of such trades, including work provided under a Division 1 allowance.

B. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical code requirements.

C. Cable pathways, conduit, and cable support systems shall be complete with bushings, de-burred, cleaned, and secure prior to installation of cable.

D. All wiring shall test free from opens, grounds, or shorts. All cable shall be supported from the building structure and bundled. Do not attach any supports to joist bridging or other lightweight members.

E. All cable shall have a label on both ends utilizing self-laminating, flexible vinyl film, non-smear, machine printed labels.

F. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling.

G. Cable must not be fastened to electrical conduits, mechanical ductwork/piping, sprinkler pipes, or routed to obstruct access to hatches, doors, utility access panels, or service work areas. Do not route cables through fire doors, ventilation shafts, grates, or parallel with line voltage electrical conductors. Communication cables shall not be run loose on ceiling grid or ceiling tiles.

H. Cables shall be run in bundles above accessible ceilings and supported from building structure building structure by j-hooks, conduit or cable tray. Cabling shall be loosely bundled with cable Velcro hook ties randomly spaced at 30 to 48 inches on center, cable ties shall not be tight enough to deform cabling and shall not be used to support the cabling. Cables shall not be run loose on ceiling grid or ceiling tiles.

I. Do not mix different signal cables on the same J-Hook (i.e. fire alarm with audio video cable).

J. Cables shall be run in conduits, where stubs are provided, from wall or floor jacks to accessible areas above finished ceilings. Conduit shall be required only within walls and concealed spaces to provide access.

K. All work must be performed by workers skilled in their trade. The installation must be complete whether the work is concealed or exposed.

L. Provide bushings to protect the cable from damage for conduit ends, box openings, and passage through metal studs.

M. Each cable run shall include a three-foot service loop with Velcro hook ties located in the ceiling above the rack. This is to allow for future re-termination or repair.

N. All cabling shall be placed with regard to the environment, EMI/RFI interference, and its effect on communication signal transmission.

O. Non-conductive fiber optic cable is immune from EMI/RFI interference. Give priority when selecting a route to minimize exposure to possible cable damage from maintenance or service of all systems in the attic space.

P. Do not route any cable within two feet of any light fixture, HVAC unit, service access area, electric panel, or any device containing a motor or transformer.

Q. Cable will not be installed in the same conduit, raceway, tray, duct, or track with line voltage electrical cable without a metallic barrier meeting NEC requirements.

R. Maximum cable pulling tension should not exceed 25 pound-force (110 N) or the manufactures recommendation, whichever is less.

S. Any pulling compounds utilized must be approved by the cable manufacturer and shall not degrade the strength or electrical characteristics of the cable.

T. No terminations or splices shall be installed in or above ceilings, other than in designated end point housings.

U. Cable bends shall not be tighter that the manufacturers' suggested bend radius.

V. Mount all equipment firmly in place. Route cable in a professional, neat and orderly installation.

W. Provide for adequate ventilation to all equipment racks and take precautions to prevent electromagnetic or electrostatic hum.

X. Coordinate the actual locations of devices and outlets and equipment with building features and mechanical equipment as indicated on architectural, structural, and mechanical drawings. Review with the owners represenative any proposed changes in outlet or equipment location. Relocation of devices, before installation, of up to 3 feet from the position indicated, may be directed without additional cost. Remove and relocate outlets placed in an unsuitable location when so requested by the Architect.

Y. Mount equipment and enclosures plumb and level.

Z. Verify all locations of equipment in all rooms with Owner's Representative, Owner, and Consultant.

3.2 EQUIPMENT HOUSING CABLING AND WIRING

A. Lace, tie, or harness wire or cable as required herein, and in accordance with good engineering practices. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Install cable and wire neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag.

B. All system wire, except spare wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No unterminated wire ends shall be accepted. Heat-shrink type tubing shall be used to insulate and dress the ends of all wire and cables including a separate tube for the ground or drain wire.

C. Provide adequate service loops so that equipment mounted on rack slides may be pulled fully out, to their locked position without straining cable.

D. Neatly bundle excess AC power cable from housing mounted equipment with plastic cable ties.

E. Provide Velcro straps to bundle cabling and wiring.

F. Install with connections completely visible and labeled.

3.3 GENERAL INSTALLATION PRACTICES

A. Any structural alterations of the building structure must be approved by the Structural Engineer and owner represenative before any work can be performed. Once approved, the proper rigging contractor, erection contractor, steel contractor, or others need to perform the work. This does not relate to connecting unistrut, threaded rod, clamps, or similar devices to the structural steel. However, loads must be taken into account. Verify with the Architect that all loads have been reported to the Structural Engineer and have been approved prior to suspending equipment.

B. All installation hardware shall be Grade 5 or higher and must be rated for overhead rigging where applicable. Threadlocker and split washers shall be used for every connection.

C. All eyebolts or eye nuts must be forged steel, not turned or welded.

D. Shackles and Turnbuckles shall be used as necessary. All shackles and turnbuckles must be rated for overhead rigging and lifting. Secure shackle and turnbuckle pins with Threadlocker. Carabiners, Quick Links, and other similar devices are not to be used.

E. 3/16” Aircraft Cable/Wire Rope is to be used to mount speakers, unless otherwise noted. Aircraft cable is to be secured using aluminum 3-16” x 1” wire rope swage sleeves, not copper. Avoid using wire rope clips. 3/8-Inch chain may be used as an alternate.

F. Wrapping a beam, perlin, truss, or other structural element without using a Web Sling or Roundsling properly rated for the load being installed is not allowed. If a sling is not available, use Unistrut, Unistrut Beam Clamps, Forged Eyebolts, and other Grade 5 and Higher Hardware to properly attach to the structural element, and then attach the Wire Rope or Chain to the Eyebolt using proper Shackles and Turnbuckles. Connecting Links, Quick Links, Snap Links, Spring Clip Links, Snap Links, or any other type of non-welded or non-forged shall be accepted. If these are used, the contractor will be required to reinstall the equipment properly at the contractor’s expense.

G. Do not penetrate any steel structure to install bolts or other hardware. Attach unistrut to the steel, and attach the equipment to the unistrut.

3.4 TERMINATION PRACTICES

A. Use Neutrik standards for all stripping and soldering practices.

B. Preserve wire twists as closely as possible to point of termination (0.5" maximum) to keep signal impairment to a minimum.

C. Avoid twisting cable jacket during installation.

D. Install Teflon tubing on drain or ground wires.

E. Install Heat Shrink on the end of the PVC jacket surrounding the wire pairs.

F. The Contractor shall observe proper circuit polarity and loudspeaker wiring polarity meeting industry standards. Properly and clearly label all connections and wires as to function and polarity.

3.5 CUSTOM SOFTWARE (AS REQUIRED)

A. Proprietary software provided for the Technical Systems shall be subject to this software license between the Contractor and the Owner as an essential element of the system as defined in the system specification and associated documents, drawings and agreement.

B. Contractor shall agree that 3rd party proprietary software provided with the system shall be subject to this agreement.

C. Proprietary software shall be defined to include, but not be limited to, device and system specific software and firmware designed to run on conventional computer based operating platforms as well as all micro-processor-based hardware used to program, setup, or operate the system or its components.

3.6 LICENSE GRANT AND OWNERSHIP

A. Contractor hereby grants to Owner a perpetual, non-exclusive, site license to all software for Customer's use in connection with the establishment, use, maintenance and modification of the system implemented by Contractor. Software shall mean executable object code of software programs and the patches, scripts, modifications, enhancements, designs, concepts or other materials that constitute the software programs necessary for the proper function and operation of the system as delivered by the Contractor and accepted by the Owner.

B. Except as expressly set forth in this agreement, Contractor shall at all times own all intellectual property rights in the software. Any and all licenses, product warranties or service contracts provided by third parties in connection with any software, hardware or other software or services provided in the system shall be delivered to Owner for the sole benefit of Owner.

C. Owner may supply to Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by Contractor. All such intellectual property shall remain the exclusive property of Owner and shall not be used by Contractor for any purposes other than those associated with delivery of the system.

3.7 COPIES, MODIFICATIONS, AND USE

A. Source code shall be available to Owner for a period of not less than 10 years.

B. Owner may make copies of the software for archival purposes and as required for modifications to the system. All copies and distribution of the software shall remain within the direct control of Owner and its representatives.

C. Owner may make modifications to the source code version of the software, if and only if the results of all such modifications are applied solely to the system. In no way does this Software License confer any right for Owner to license, sublicense, sell, or otherwise authorize the use of the software, whether in executable form, source code or otherwise, by any third parties.

D. All express or implied warranties relating to the software shall be deemed null and void in case of any modification to the software made by any party other than Contractor.

3.8 CONTRACTOR REPRESENTS AND WARRANTS TO OWNER THAT;

A. It has all necessary rights and authority to execute and deliver this Software License and perform its obligations hereunder and to grant the rights granted under this Software License to Owner.

B. The goods and services provided by contractor under this Software License, including the software and all intellectual property provided hereunder, are original to Contractor or its subcontractors or partners.

C. The software, as delivered as part of the system, shall not infringe or otherwise violate the rights of any third party, or violate any applicable law, rule or regulation.

D. Contractor further represents and warrants that, throughout the System Warranty Period, the executable object code of software and the system shall perform substantially in accordance with the System Specifications and Agreement. If the software fails to perform as specified and accepted all remedies are pursuant to the policies set forth in the Specification and in the Agreement. No warranty of any type or nature is provided for the source code version of the software which is delivered as is, following final approval by Owner, Architect, and Engineer of design and function of the system at the end of the project.

E. Except as expressly stated in this Agreement, there are no warranties, express or implied, including, but not limited to, the implied warranties of fitness for a particular purpose, of merchantability, or warranty of no infringement of third-party intellectual property rights.

3.9 PROGRAMMING

A. The systems specified in this specification require custom programming. Custom programming is to be included in the bid price for the project. It is the responsibility of the bidding contractor to cover these costs during the bid phase. Change orders to allow for programming will not be allowed.

B. Include in bid 12 months of adjustments, fine tuning, additions, and subtractions by the Owner from the date of acceptance, for any changes the owner wishes to make.

C. Custom functionality for each system must be provided. Plan for Ease-of-Use for the end user.

D. All graphics, layouts, and functions must be approved by the Owner prior to final acceptance.

E. All graphics, programs, modules, and more, related to these systems shall be the property of the owner at final completion. These files shall be provided to the owner on USB Thumb Drives as part of the close out documents. Provide (3) copies of the final revisions. The owner shall have full access to all programming ability at the end of the warranty period. All information, Including passwords, pass keys, pass phrases, time-lockouts, “time-bombs”, and more, shall be turned over to the Owner at the end of the warranty period.

F. ENGRAVING
1. Text font: 1/8-inch block sans serif characters unless noted otherwise.

2. On dark materials, provide white characters; on stainless steel or brushed natural aluminum plates, or light-colored materials, provide black characters.
3. Provide at least two lines of text with first line listing the general device name, e.g., amplifier. Second line to include schematic reference of the device, e.g., AMP-1.
4. Equipment label: black with white characters except where indicated.
5. cutting and patching
    a. Notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, et cetera, of any openings that will be required for his work.
    b. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.
    c. All necessary cutting of walls, floors, partitions, ceilings, et cetera, as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor's expense in a neat and workmanlike manner, and as approved by the Owner Representative.
    d. Patching of openings and/or alterations shall be provided by the communications Subcontractor or at the Subcontractor's expense in an approved manner.
    e. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Owners Representative.
    f. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.
    g. All openings in exterior walls shall be sealed watertight.
    h. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.
6. FIRE OR DRAFT STOPPING, PENETRATIONS, AND CORING
    a. UL Listed fire stopping methods that match the fire rating of the wall or floor being penetrated are to be used at all fire barrier penetrations. Seal the interior of the conduit sleeve around the cables and around the outside of the sleeve on each side of the penetration with fire-stop caulk or putty, install according to the manufacturers’ instructions.
    b. All penetrations through fire rated walls or floors shall feature a suitable length of metal conduit. Hole diameter shall not exceed ½” larger than the conduit or sleeve to be installed. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor penetrations with ductwork, piping, line voltage electrical conduits, etc.
    c. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly.
    d. Draft/Noise Stopping - This Contractor prepares for and applies draft/noise stopping to all non-rated wall penetrations. Draft/Noise stopping shall minimize the movement of air and sound from enclosed areas to other parts of the building. This shall include but not limited to:
        1) Neatly cutting all non-rated wall/floor penetrations with a 1” maximum clearance. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor

penetrations with two types of ductwork, piping, line voltage electrical conduits, communications cabling, etc.

2) Provide and install non-combustible mineral wool, fiberglass, cellulose insulation, caulk, and sealant as required. Seal the interior of conduit sleeves around the cables and around the outside of the sleeve on each side of the penetration with caulk or putty, install according to the manufacturers' instructions.

e. Upon approval, the Contractor shall be required to supply all labor, equipment, tools, and materials to create any additional penetrations, and shall provide the sleeve, temporary and final fire stopping. Special care shall be taken not to stress, overheat, or penetrate any building support member. Coring shall be made with equipment appropriate for the dry penetration of concrete and block materials. Under no circumstances shall penetrations be made utilizing a chisel or percussion type equipment. Concrete, block, or plaster cores shall be made by dry saw/core methods only.

7. EXISTING SYSTEMS demolition, MODIFICATION AND EXPANSION FOR ADDITIONS AND RENOVATIONS
   a. This contractor shall be responsible for demolition as required of the existing systems, including demolition of any devices and cabling previously abandoned. Demolition shall include:
      1) Disconnection and removal of all devices not to remain in service in walls, floors, and ceilings.
      2) Removal of exposed abandoned conduit and supports including brackets, stems, hangers, and other accessories located on walls and above accessible finished ceilings. Cut abandoned conduit flush with walls, floors, etc., and patch surfaces.
      3) Provide a blank cover for abandoned device back boxes that are impractical to remove from masonry construction without unnecessary damage.
      4) Repair of any finishes or adjacent construction damaged during modification, extension, and demolition work.
8. EXAMINATION
   a. Verify field conditions including existing systems, equipment models, configurations, circuiting arrangements, cabling, and devices. Adjust all circuiting, cabling, and materials to be provided as required by job conditions.
   b. Project drawings are based on casual field observation and existing record documents when available, report any significant discrepancies to the Engineer before disturbing existing systems.
   c. The Contractor accepts the existing conditions when beginning demolition.
9. Cleaning and repair
   a. Clean and repair existing materials and equipment in areas of renovation that are to remain or be reused.
10. OPERATION OF NEW EQUIPMENT PRIOR TO PROJECT COMPLETION
    a. When the phasing of a project requires that data systems are operable in certain areas and the Owner needs to operate the equipment the contractor shall make such provisions. The warranty period shall commence on new equipment when it is operated for the beneficial use of the Owner. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, properly adjust, and complete all punch

list items before final acceptance by the Owner. In these cases, the date of acceptance and the start of the warranty may be different dates.

11. PROTECTION OF EQUIPMENT AND MATERIALS
    a. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.
    b. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.
    c. Failure to comply with the above to the satisfaction of the Owner's inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.
12. final observation
    a. It shall be the duty of the Contractor to make a careful observation trip of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Owner Representative to make a final observation.
    b. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, et cetera, called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Owners Representative at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, et cetera, before preparing for submission to verify that the terms check with the requirements of the specifications.
    c. The following and other provisions of Division 1 General Conditions will be required at time of final completion:
        1) Final clean up completed.
        2) All systems are fully operational, all material and devices installed.
        3) As-built (as installed) drawings and operations manuals.
13. TESTING
    a. Upon completion of installation, initial adjustments, tests as outlined in this specification, and submission and review of the results, a final observation and test shall be performed by the Owner or Owner's representative.
    b. Provide a minimum of one (1) person for observation and testing familiar with aspects of the System to assist the Owner.
    c. The process of testing the System may necessitate moving and adjusting certain components.
    d. Testing includes operation of each major system and any other components deemed necessary. Perform tests and provide required test equipment, tools and material required to make any necessary repairs, corrections, or adjustments.
    e. The following procedures shall be performed on each System:
        1) Observation of the methods and means employed to incorporate the System within the facility.
        2) Verification of proper operation, from controlling devices to controlled devices.
        3) Verification of proper adjustment, balance, and alignment of equipment for optimum quality and to meet the manufacturer's published

specifications. Establish and mark normal settings for each level control, and appropriately record these settings within the Record Documents.

4) Other tests on equipment or systems deemed appropriate.

f. In the event the need for further adjustment or work becomes evident during testing, the Contractor is to continue his work until the System is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications and any extension of the observation and testing period is required, the Contractor shall pay for additional time and expenses of the Owner at the standard rate in effect at that time.

14. Warranty, Service, Testing, Certification
    a. The Contractor must provide an extended warranty that is inclusive of the Manufacturer's warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship for a period of no less than one year (period as is customary for the Manufacturer) from the date of substantial completion. Any equipment or cabling shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner.
    b. The System Contractor shall make a thorough inspection of the complete installation to ensure the following:
        1) Complete and functional system.
        2) Installed in accordance with manufacturers' instructions.
        3) All cabling shall test free from all grounds, opens, and shorts.
        4) A representative of the Owner shall have an opportunity to be present for all final testing. Coordinate final testing with Owner, schedule as near as possible to acceptance date.
15. Drawings, Manuals, and Training
    a. As-built drawings and operating and maintenance manuals may be electronically transmitted in PDF file format.
    b. Upon completion of the installation, and prior to final inspection, the Contractor shall furnish as-built drawings.
    c. In addition, the contractor shall furnish complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets. Manuals shall include wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system. Provide a parts list with manufacturer and model number for commonly replaced parts. Include complete instructions for the inspection, testing, and maintenance of the system. Place final cable certification test results in manuals.
    d. All cable paths and wiring methodology shall be documented. All cables shall have both ends labeled and included in the as-built documentation. Provide an MS Excel worksheet compatible format spreadsheet file cross referencing all cable run numbers, architectural room number, and owners room number for the origin and destination of each cable run.

e. A formal on-site training session shall be provided by the Contractor to the Owners Representative / Maintenance personnel and shall include instruction on the documentation, location, inspection, maintenance, testing, and operation of all system components. Provide a minimum of two (2) hours of documented general instruction. It shall be the responsibility of the Contractor to coordinate time and location of training sessions with the Owner.

END OF SECTION

SECTION 27 51 41

INTERCOM COMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Provide an expansion of the existing intercom system as indicated on plans, schedules and specified in this section.

B. Provide all equipment, accessories, materials, tools, scaffolding, man lifts, labor, supervision, transportation and services necessary for or incidental to the installation and testing of the data cable plant.

C. Provide and install, prior to cable installation, plastic snap in bushings at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves to protect the cabling from damage.

D. It is the intent of these specifications to provide complete installations although every item necessary may not be specifically mentioned or shown.

E. Refer to System Schedules on plan for part numbers and additional information.

F. This project shall include preparation of construction plans locating the intercom devices and having the plans reviewed by Owner and the Owner's Representative.

G. Provide all training, as-built drawing and manual documents as outlined in these specifications.

H. Provide a warranty as outlined in these specifications.

I. It shall be the responsibility of the Division 26 Electrical Contractor to provide:
   1. Provide and install all conduit and standard electrical boxes for the audio video system as specified herein. The audio video contractor shall coordinate all conduit and box requirements and locations with, and provide special back boxes to, the electrical contractor prior to installation.
   2. Provide equipment grounding system, conductors, and bus bars as outlined in Division 26.
   3. Cabling in all open ceiling areas shall be enclosed in conduit.
   4. Furnishing and installation of all floor boxes, surface raceways, and other wireways which are detailed or specified under Division 26.
   5. Provide required conduit for accessibility to attic or plenum space.
   6. Provide 120-volt power and hook-up to equipment provided in Division 27.
   7. Installation of special back boxes supplied by intercom contractor.
   8. Provide equipment mounting boards as indicated on the drawings.
   9. Provide conduit to remote areas outside of the building as outlined on the drawings.
   10. Coordination of requirements of Division 27 with the Builder.

1.2 WORK NOT INCLUDED

A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services.

1.3 RELATED SECTIONS

A. Section 26 00 00 - Electrical

1.4 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) EQUIPMENT

A. Refer to Responsibility Matrix on drawings for equipment that applies.

B. The contractor shall verify that new and existing products and site conditions are satisfactory for installation or relocation of OFCI equipment. If unsatisfactory conditions exist or other discrepancies are identified, the contractor shall immediately document the conditions and notify the owner in writing.

C. The contractor shall coordinate all required equipment schedule quantities and any dimensions or variations required to adapt to field conditions with the owner at the earliest possible date.The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

D. The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

E. The owner shall coordinate delivery dates with the builder to meet the construction schedule.

F. The installation of items as identified in the plans and specifications as OFCI equipment shall conform to the provisions of the Contract Documents and shall be coordinated with the builder.

G. Installation shall be performed by competent and trained workers in accordance with all applicable codes and governing regulations.

H. Installation, testing, and startup shall comply with the manufacturer’s instructions.

I. The contractor shall provide all miscellaneous hardware, structural support, cabling, fittings, etc. that is not included by the manufacturer, but required for installation.

J. The contractor shall clean and adjust all relocated and new OFCI products as necessary.

K. All crating, packing materials, and debris shall be properly disposed of off-site.

L. Installation shall be subject to inspection by the owner representative, owner, and builder. The installer shall not proceed until any unsatisfactory conditions are corrected. Any damage caused by improper handling or installation procedures shall be corrected at no cost to the owner.

M. For drop shipped equipment, the builder shall be the consignee and shall have a representative on-site for coordination of delivery, receiving shipments, and inspect each shipment for obvious signs of damage or shortages. The builder shall be responsible for all shipping damage claims, including hidden damage, refusal of shipment, and Return Authorization procedures. The builder shall provide secure

storage, handling, and protection from the elements, prior to the contractors' acceptance for installation.

N. For equipment stored at an owner's facility, the contractor shall load the equipment and provide transportation to the work site. Prior to loading, the contractor shall inspect the equipment for obvious signs of damage and document all quantities, noting shortages from the project requirements, indicating acceptance of the merchandise as is and in good order.

O. The contractor shall conduct and properly document testing of all installed equipment to verify proper operation. When appropriate, on-site operation and maintenance instruction shall be provided to the owner's personnel. This instruction shall include demonstration of proper use, maintenance, and cleaning procedures.

P. The nature of the equipment procurement shall determine responsibility for resolving any claims with the manufacturer or supplier relating to defects in material or workmanship and warranty claims. The party that purchased the equipment shall resolve these issues.

1.5 PRESCRIPTIVE CODES, STANDARDS AND REGULATIONS

A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards, except when requirements are exceeded by the contract documents.

B. In addition to requirements outlined in other sections of the specifications these codes and standards are imposed as applicable to the work in each instance.

C. The equipment, materials, and installation shall confirm to the latest version of all applicable codes, standards and regulations, of authorities having jurisdiction.

D. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes and standards.

E. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.

F. The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.

G. The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

H. Where local codes and ordinances are not in writing or on record, but local precedence have been set, the Owner shall pay for any additional resulting cost.

1.6 PLANS AND SPECIFICATIONS

A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth, each item essential to the functioning of the system.

B. The drawings are generally diagrammatic and show approximate location and extent of work.

C. Install the work complete including minor details necessary to perform the function indicated. Provide audio video systems, including all connections, complete in every respect and ready to operate.

D. If clarification is needed, consult the Owner's Representative.

E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Owner's Representative for his interpretation.

F. The Owner's Representative reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.7 SITE VISIT

A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities and work to remote areas.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished, or the amount of work to be done. It being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans, or required by nature of the site of which may be fairly implied, as essential to the execution and completion of any and all parts of the work.

1.8 SUBMITTALS

A. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.

B. Submittal shall be electronically transmitted in PDF file format.

C. For each submittal provide a cover sheet with the name and location of the project, the name, address and telephone number of the Contractor, and the name, address and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.

D. Quality Assurance Submittal including special boxes, cable, and other material as requested by the Owner's Representative:
   1. Letter from manufacturer stating that the Contractor is an Authorized Factory Distributor for the area where the project is located.

E. Product Data Submittal to include:
   1. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
   2. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections

3. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list.
4. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
6. Submit a sample of the extended product warranty language.
7. Any resubmittals shall include a complete revised equipment list and any product data that is revised.

F. Shop Drawings Submittal to include:
1. Produce accurate to scale (min. 1/8” = 1’) drawings showing equipment and device layouts prepared using a CAD or BIM engineering drawing program. When CAD background files are not available for existing buildings the Contractor shall inspect the site and collect information to create a floor plan. Walls shall be double line showing the thickness, single line diagrams are not acceptable.
2. Other disciplines devices or equipment not relevant to this scope of work shall not be shown on shop drawings. Submitting modified contract documents shall not be permitted.
3. Full fabrication details of any custom enclosures and millwork indicating size, material, finish and openings for equipment.
4. Projector, loudspeaker, camera mounting details, include hardware types and load capacity.
5. Provide complete drawings on custom fabricated plates or panels. Drawings shall include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.
6. Labeling: Equipment and cabling labeling scheme - include font sizes and styles, explanation of scheme, and designator schedule.
7. Schedules: Wiring schedule showing source and destination of wiring and indicating which wiring is in conduit. Junction box schedule showing type of box, size, mounting, and location. Include this information with remainder of wiring diagrams.
8. Every room shall have a name and number identifying the use of the space with ceiling heights notated for each space or group of spaces throughout the design.
9. When multiple buildings make up the system, provide a block diagram of the project site showing all buildings to be covered by the system and detailing the route and type of connection between buildings. Note building entry points, conduit type and size, and routing pathway (underground or over canopy installation).
10. Shop or coordination drawings shall include information that will allow the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product.
11. Resubmittals shall include revision notation and clouded changes.

1.9 QUALIFICATIONS OF A PROPOSED CONTRACTOR

A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified

B. The Contractor shall employ full-time, factory-trained, licensed, local technicians and installers for product installation, maintenance, support, service and warranty.

C. The proposed contractor, as a business entity, shall be a local authorized distributor and designated representative of the equipment manufacturer, with full extended warranty privileges. The proposed contractor shall have been actively engaged in the business of selling, installing, and servicing of similiar systems for a period of at least 3 years. Selected contractor must be certified in specified system, subcontracting other companies certified in proposed product shall not be allowed.

D. Recently formed companies are acceptable only if specific pre-approval is requested, and granted by the owner represenative, based on experience of key personnel, current and completed projects, and all licensing requirements are met 10 working days prior to the contract proposal date.

E. The proposed Contractor shall have an office within 150-miles of the job site, staffed with factory-trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up, and perform a 100 percent operational audit of all installed devices. The technicians shall instruct the Owners' representatives in the proper operation of the system, and to provide service throughout the warranty period. The contractor shall be capable of dispatching technicians to repair a system within six (6) hours of a service request.

F. The proposed contractor shall be fully experienced in the design and installation of the type of system and manufacturer herein specified and shall furnish with the contract proposal an itemized list of the installations of the type specified herein.

G. The contractor shall employ factory-trained technicians capable of supporting the maintenance of the system. No contract employees are allowed. All installing technicians shall be employed by the proposed contractor.

H. The Owner's Representative or Owner may investigate, as they deem necessary to determine the ability of the proposed Contractor to perform the work. The proposed contractor shall furnish to the Owner with any information or data requested for this purpose.

I. The Owner's Representative or Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.

J. The Owner's Representative or Owner reserves the right to reject the proposal of any contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

1.10 ADDITIONAL MATERIALS: INCLUDE IN THE BASE CONTRACT PROPOSAL

A. All costs to provide 10 additional intercom speaker locations including all cable and devices as directed by the Architect. Conduit and standard back boxes by Division 26 Electrical Contractor.

PART 2 - PRODUCTS

2.1 GENERAL

A. All cable and wiring devices provided shall be listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.

B. Refer to System Schedule on plan for part numbers and additional information.

C. At each AV rack provide one 25/70 volt audio feed or one controlled relay closure for muting of AV system during Intercom activation. Coordinate with AV contractor.

D. Only equipment devices have been shown on the contract drawings. Specific wiring between equipment has not been shown.

E. All equipment and components shall be new, and the manufacturers' current model. All like devices shall be of the same manufacturer and model number.

F. Both ends of all cables shall be labeled utilizing self-laminating polymer film non-smear, machine printed labels.

G. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., cable shall not be supported by or lay on suspended ceilings). Fasteners and supports shall be adequate to support the required load.

H. Where required, provide manufacturer's rack mount adapter or one manufactured by Middle Atlantic unless specified elsewhere.

I. Remove or blank out all manufacturer's names, logos, or other symbols from loudspeakers or other objects placed in view of the public. If logos are removable, remove and repaint to the color of the adjacent surface reattach.

2.2 ACCEPTABLE MANUFACTURERS

A. Descriptions and details, acceptable manufacturers' names listed and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.

B. Proposed contractors wishing to propose any product substitution must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.

C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified.

D. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of alternate products shall be based on the decision of the Owner and Architect. Prior approval to make a

proposal for this project does not automatically ensure products will be an acceptable equivalent.

E. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

F. The selected contractor must be a certified Integrator/Installer authorized by one of the Manufacturers listed below to provide an extended warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship; provide a copy of contractor certification.

G. The model numbers used are those of _____. This shall constitute the quality and performance of the equipment to be furnished, no exceptions.

H. The following are acceptable manufactures; any other proposed suppliers must be pre-approved:

Bogen Communications, Inc.	Ramsey, New Jersey
Dukane Corporation CareHawk	Longwood, Florida
Rauland-Borg Corporation (Rauland)	Skokie, Illinois
Telecor Inc.	Mississauga, Ontario, Canada
Valcom Inc. Class Connection ES	Roanoke, Virginia
Valcom Inc. MultiPath	Roanoke, Virginia

2.3 WALL PLATE COLOR

A. Color of device/wall plates to best match project light switches and electrical outlets, coordinate with the Electric Contractor.

2.4 CABLES & WIRING

A. Cable shall have appropriate fire rating (CMR, CMP, OFNR, OFNP, etc.) and labeled on jacket of cable.

B. The Contractor shall provide and install new and unused ASTM bare solid copper conductor wire per ANSI/NEMA codes. Follow the manufacturer's instructions. All wire shall be UL listed for communication and control circuits.

C. All cable shall have labels on both ends utilizing self-laminating, flexible vinyl film and non-smear nylon marking pens.

D. Cabling between buildings shall be fully enclosed in rigid threaded conduit, including underground and over canopy installations. Cable used between buildings shall be rated for direct burial. Cable shall be moisture, abrasion, and crush resistant. Use shielded or unshielded cabling as recommended by the manufacturer. When recommended, shielded cable should be utilized to minimize electrical noise interference with signal transmission.

E. For RJ-45 modular cable system connections utilize data grade UTP eight conductor cabling, NEC type CM or MP, Category 6 minimum, at lengths up to 2700 feet using a single home run cable.

F. Each call button shall be wired with data grade Category 6 cable and punched down on 110 type blocks to allow flexibility for future equipment.

G. Where cables are run exposed through a return air plenum, provide plenum rated cable.

H. Furnish an insulated #6 copper ground wire run from the amplifier to an earth ground, attached securely to the amplifier case, and terminated at each end to bare metal.

I. Speaker Wiring:
   1. Provide shielded 18AWG cable minimum or as required for length.
   2. Jacket color: White

J. Microphone/Line Level Wire:
   1. Provide shielded 22 AWG cable
   2. Bonded jacket
   3. Jacket color: black

K. Ethernet/LAN Cable (UTP):
   1. Enhanced category 6
      a. 4 pair, 23-AWG Bare Copper
      b. Standard Termination T568B
      c. Color - Yellow
   2. Enhanced category 6A
      a. 4 pair, 23-AWG Bare Copper
      b. Standard Termination T568B
      c. Color - Yellow

L. Secondary Clock Wiring:
   1. Provide shielded 18AWG cable minimum or as required for length.
   2. Jacket color: White

M. Acceptable cable manufacturers

West Penn	Washington, PA
Windy City Wire	Bolingbrook, IL
Liberty	Colrado Springs, CO
Belden	St. Louis, MO
Commscope	Hickory, North Carolina

2.5 BUSHINGS

A. Provide a plastic snap in bushing at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves prior to cable installation to protect the cabling from damage:
   1. Box openings - Thomas & Betts Knockout Bushing Series 3210, or equivalent.
   2. Metal stud passage - Thomas & Betts Twist It Bushing Catalog Number SB1216-SC, or equivalent.
   3. Conduit ends - Thomas & Betts Anti-Short Bushing Series 390 or Tite-Bite Combination couplings Series 442, or equivalent.

2.6 J-HOOKS

A. All attachments shall be specifically designed for telecommunications cabling.

B. Attachments for cabling support shall be spaced at approximately 48 to 60 inches on center. Cable bundles shall not be allowed to sag down more than 12-inches mid-span between attachments.

C. Attachments shall be sized for 25% capacity to allow for future expansion.

D. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm with data and telephone cable). Multiple J-Hooks can be placed on the same attachment point, up to the rated weight load of the attachment device.

E. Acceptable manufacturers:
1. Erico.
2. Panduit
3. Cooper B-line.

2.7 COMMUNICATIONS CIRCUIT SURGE PROTECTION

A. Provide surge protection shall be provided for all exterior devices, communications service, or antenna entrance connections, and for each circuit that connects one building to another (i.e. any other portion of a building complex not under one continuous roof) at both entry/exit points to prevent damage to equipment.

B. Each surge protector shall be mounted in a standard grounded metallic electric box or equipment backboard with a separate ground wire ran directly to the ground bus bar or equipment panel ground stud, do not daisy chain ground wires.

PART 3 - EXECUTION

3.1 INTERCOM AND PUBLIC ADDRESS SEQUENCE OF OPERATION

A. Each classroom shall be equipped with an intercom ceiling speaker with a station call number.

B. Each office and special use area (conference room, gym, cafeteria, library, etc.) shall be equipped with intercom ceiling speaker(s) with a station call number.

C. Common zone intercom speakers shall serve all corridors, passageways, and janitors' closets.

D. Zone exterior speakers separately.

E. All speakers: classroom, office, corridor, exterior, gymnasium, cafeteria, and common areas shall produce clear human voice reproduction at 10 dBA over fully occupied ambient noise levels minimum (i.e. corridors at class change) but never less than 65 dBA or more than 110 dBA throughout all normally occupiable areas.

F. Provide as indicated on plans an Intercom Administrative Phone Desksets "AS" with digital readout to provide the following functions:
1. The digital readout displays shall identify incoming calls by their designated numbers. The display shall show visually, in the order received, three (3) calls at

a time. Emergency calls shall override normal calls and shall annunciate with the letters "EMER" and the calling station number. There shall be an audible indication of incoming intercom calls. Emergency calls shall initiate a distinctive audible alert and be indicated on the display.

2. Provide facilities for answering calls registered in the display by pressing a single "response" button on an authorized administrative telephone.
3. Provide the capability to broadcast all-call or zoned intercom announcements and class change time tones over all interior, exterior, and corridor speakers. Zone exterior speakers separately.
4. The system shall provide facilities for calling a staff (classroom) station or making page announcements from any administrative system telephone.

G. The system shall provide facilities for calling a staff (classroom) station by dialing the station number. User programmable room station numbers for any combination of 2 to 4 numeric digits.

H. The central microprocessor control equipment shall be of modular design, expandable to 250 stations. All programming shall be alphanumerical menu driven. The system shall be equipped with self-diagnostics.

I. The system shall provide the capability of assigning speaker locations to any one or more of the eight (8) software programmable zones for zone paging or time signal reception.

J. Systems amplifiers shall be capable of providing sufficient power for emergency paging of all speakers with a 30 percent reserved capacity for future expansion.

K. System central control equipment shall be Underwriters Laboratory listed under Commercial Audio Systems and Accessories UL 813 and installed in a 19" rack cabinets and located where shown on the drawings or as directed by the Architect.

L. Provide an Uninterruptible Power Supply (UPS) with sufficient standby battery capacity to operate the intercom clock system without AC power for two hours of normal operation (no announcements) and thirty minutes of all-call announcement operation (full load) at the end of this period.

3.2 TELEPHONE SYSTEM INTERFACE FUNCTIONS

A. In order for these functions to operate, the Owner must provide licensing and telephone system enrolment into the building telephone system for the below SIP Analog Telephone Adapter and programing it with a designated station number to allow each building system telephone set to access this port. If the Owner elects not to provide a telephone system with these capabilities, then provide a labeled intercom service jack at the main telephone backboard for future connection.

B. Provide one (1) Cisco SPA112 Two Port Phone Adapter, a SIP Analog Telephone Adapter (ATA) interface. This interface shall provide transparent access from the building telephone system to the intercom DTMF analog port. The intercom system shall feature a distinctive dial tone and DTMF touch tone recognition to provide this transparent interface.

C. Any administrative system telephone shall be able to answer normal or emergency calls initiated from a classroom call button.

D. Any administrative system telephone shall be able to page on an all-call, and zone basis to any of the eight paging zones.

E. Any administrative system telephone shall be able to initiate an emergency announcement to all locations. Emergency announcements override all other programs.

F. Any administrative system telephone shall be able to initiate manual time tones to any combination of time zones.

G. Any administrative system telephone shall be able to initiate emergency evacuation and signal tones.

3.3 EMERGENCY SIGNAL TONE OPERATION

A. Provide facility through both rack mounted switches and dial-up operation through the telephone system interface the ability to distribute various emergency signal tones through all intercom speakers. Verify exact requirements with Owner. Provide the following functions each with a distinctive signal:
   1. Take Cover (Hazardous Weather Conditions) European siren or similar.
   2. Evacuate (Hazardous Condition within Building) stutter tone or similar.
   3. Security Alert (Suspicious Person on Campus, keep students in class and lock doors) chime or similar.

3.4 CABLE ROUTING AND INSTALLATION

A. Cooperation with trades of adjacent, related or affected materials or operations, and or trades performing continuations of this work under subsequent contracts are considered a part of this work. In order to effect timely and accurate placing of work and to bring together, in the proper and correct sequence, the work of such trades, including work provided under a Division 1 allowance.

B. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical code requirements.

C. Cable pathways, conduit, and cable support systems shall be complete with bushings, de-burred, cleaned, and secure prior to installation of cable.

D. All wiring shall test free from opens, grounds, or shorts. All cable shall be supported from the building structure and bundled. Do not attach any supports to joist bridging or other lightweight members.

E. All cable shall have a label on both ends utilizing self-laminating, flexible vinyl film, non-smear, machine printed labels.

F. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling.

G. Cable must not be fastened to electrical conduits, mechanical ductwork/piping, sprinkler pipes, or routed to obstruct access to hatches, doors, utility access panels, or service work areas. Do not route cables through fire doors, ventilation shafts, grates, or parallel

with line voltage electrical conductors. Communication cables shall not be run loose on ceiling grid or ceiling tiles.

H. Cables shall be run in bundles above accessible ceilings and supported from building structure building structure by j-hooks, conduit or cable tray. Cabling shall be loosely bundled with cable Velcro hook ties randomly spaced at 30 to 48 inches on center, cable ties shall not be tight enough to deform cabling and shall not be used to support the cabling. Cables shall not be run loose on ceiling grid or ceiling tiles.

I. Do not mix different signal cables on the same J-Hook (i.e. fire alarm with audio video cable).

J. Cables shall be run in conduits, where stubs are provided, from wall or floor jacks to accessible areas above finished ceilings. Conduit shall be required only within walls and concealed spaces to provide access.

K. All work must be performed by workers skilled in their trade. The installation must be complete whether the work is concealed or exposed.

L. Provide bushings to protect the cable from damage for conduit ends, box openings, and passage through metal studs.

M. Each cable run shall include a three-foot service loop with Velcro hook ties located in the ceiling above the rack. This is to allow for future re-termination or repair.

N. All cabling shall be placed with regard to the environment, EMI/RFI interference, and its effect on communication signal transmission.

O. Non-conductive fiber optic cable is immune from EMI/RFI interference. Give priority when selecting a route to minimize exposure to possible cable damage from maintenance or service of all systems in the attic space.

P. Do not route any cable within two feet of any light fixture, HVAC unit, service access area, electric panel, or any device containing a motor or transformer.

Q. Cable will not be installed in the same conduit, raceway, tray, duct, or track with line voltage electrical cable without a metallic barrier meeting NEC requirements.

R. Maximum cable pulling tension should not exceed 25 pound-force (110 N) or the manufactures recommendation, whichever is less.

S. Any pulling compounds utilized must be approved by the cable manufacturer and shall not degrade the strength or electrical characteristics of the cable.

T. No terminations or splices shall be installed in or above ceilings, other than in designated end point housings.

U. Cable bends shall not be tighter that the manufacturers' suggested bend radius.

V. Mount all equipment firmly in place. Route cable in a professional, neat and orderly installation.

W. Provide for adequate ventilation to all equipment racks and take precautions to prevent electromagnetic or electrostatic hum.

X. Coordinate the actual locations of devices and outlets and equipment with building features and mechanical equipment as indicated on architectural, structural, and mechanical drawings. Review with the owners represenative any proposed changes in outlet or equipment location. Relocation of devices, before installation, of up to 3 feet from the position indicated, may be directed without additional cost. Remove and relocate outlets placed in an unsuitable location when so requested by the Architect.

Y. Mount equipment and enclosures plumb and level.

Z. Verify all locations of equipment in all rooms with Owner's Representative, Owner, and Consultant.

3.5 EQUIPMENT HOUSING CABLING AND WIRING

A. Lace, tie, or harness wire or cable as required herein, and in accordance with good engineering practices. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Install cable and wire neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag.

B. All system wire, except spare wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No unterminated wire ends shall be accepted. Heat-shrink type tubing shall be used to insulate and dress the ends of all wire and cables including a separate tube for the ground or drain wire.

C. Provide adequate service loops so that equipment mounted on rack slides may be pulled fully out, to their locked position without straining cable.

D. Neatly bundle excess AC power cable from housing mounted equipment with plastic cable ties.

E. Provide Velcro straps to bundle cabling and wiring.

F. Install with connections completely visible and labeled.

3.6 TERMINATION PRACTICES

A. Use Neutrik standards for all stripping and soldering practices.

B. Preserve wire twists as closely as possible to point of termination (0.5" maximum) to keep signal impairment to a minimum.

C. Avoid twisting cable jacket during installation.

D. Install Teflon tubing on drain or ground wires.

E. Install Heat Shrink on the end of the PVC jacket surrounding the wire pairs.

F. The Contractor shall observe proper circuit polarity and loudspeaker wiring polarity meeting industry standards. Properly and clearly label all connections and wires as to function and polarity.

3.7 ENGRAVING

A. Text font: 1/8-inch block sans serif characters unless noted otherwise.

B. On dark materials, provide white characters; on stainless steel or brushed natural aluminum plates, or light-colored materials, provide black characters.

C. Provide at least two lines of text with first line listing the general device name, e.g., amplifier. Second line to include schematic reference of the device, e.g., AMP-1.

D. Equipment label: black with white characters except where indicated.

3.8 CUTTING AND PATCHING

A. Notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, et cetera, of any openings that will be required for his work.

B. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.

C. All necessary cutting of walls, floors, partitions, ceilings, et cetera, as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor's expense in a neat and workmanlike manner, and as approved by the Owner Representative.

D. Patching of openings and/or alterations shall be provided by the communications Subcontractor or at the Subcontractor's expense in an approved manner.

E. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Owners Representative.

F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

G. All openings in exterior walls shall be sealed watertight.

H. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.

3.9 FIRE OR DRAFT STOPPING, PENETRATIONS, AND CORING

A. UL Listed fire stopping methods that match the fire rating of the wall or floor being penetrated are to be used at all fire barrier penetrations. Seal the interior of the conduit sleeve around the cables and around the outside of the sleeve on each side of the penetration with fire-stop caulk or putty, install according to the manufacturers' instructions.

B. All penetrations through fire rated walls or floors shall feature a suitable length of metal conduit. Hole diameter shall not exceed ½" larger than the conduit or sleeve to be installed. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor penetrations with ductwork, piping, line voltage electrical conduits, etc.

C. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly.

D. Draft/Noise Stopping - This Contractor prepares for and applies draft/noise stopping to all non-rated wall penetrations. Draft/Noise stopping shall minimize the movement of air and sound from enclosed areas to other parts of the building. This shall include but not limited to:
   1. Neatly cutting all non-rated wall/floor penetrations with a 1” maximum clearance. All gypsum board or plaster penetrations shall tool cut using an appropriate hole saw / mandrel or manufactured assembly. The hole shall be neatly cut, not oversize or irregular. Do not share wall/floor penetrations with two types of ductwork, piping, line voltage electrical conduits, communications cabling, etc.
   2. Provide and install non-combustible mineral wool, fiberglass, cellulose insulation, caulk, and sealant as required. Seal the interior of conduit sleeves around the cables and around the outside of the sleeve on each side of the penetration with caulk or putty, install according to the manufacturers’ instructions.

E. Upon approval, the Contractor shall be required to supply all labor, equipment, tools, and materials to create any additional penetrations, and shall provide the sleeve, temporary and final fire stopping. Special care shall be taken not to stress, overheat, or penetrate any building support member. Coring shall be made with equipment appropriate for the dry penetration of concrete and block materials. Under no circumstances shall penetrations be made utilizing a chisel or percussion type equipment. Concrete, block, or plaster cores shall be made by dry saw/core methods only.

3.10 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.

B. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

C. Failure to comply with the above to the satisfaction of the Owner's inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.

3.11 FINAL OBSERVATION

A. It shall be the duty of the Contractor to make a careful observation trip of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Owner Representative to make a final observation.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, et cetera, called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Owners Representative at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, et cetera, before preparing for submission to verify that the terms check with the requirements of the specifications.

C. The following and other provisions of Division 1 General Conditions will be required at time of final completion:
   1. Final clean up completed.
   2. All systems are fully operational, all material and devices installed.
   3. As-built (as installed) drawings and operations manuals.

3.12 TESTING

A. Upon completion of installation, initial adjustments, tests as outlined in this specification, and submission and review of the results, a final observation and test shall be performed by the Owner or Owner's representative.

B. Provide a minimum of one (1) person for observation and testing familiar with aspects of the System to assist the Owner.

C. The process of testing the System may necessitate moving and adjusting certain components.

D. Testing includes operation of each major system and any other components deemed necessary. Perform tests and provide required test equipment, tools and material required to make any necessary repairs, corrections, or adjustments.

E. The following procedures shall be performed on each System:
   1. Observation of the methods and means employed to incorporate the System within the facility.
   2. Verification of proper operation, from controlling devices to controlled devices.
   3. Verification of proper adjustment, balance, and alignment of equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and appropriately record these settings within the Record Documents.
   4. Other tests on equipment or systems deemed appropriate.

F. In the event the need for further adjustment or work becomes evident during testing, the Contractor is to continue his work until the System is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications and any extension of the observation and testing period is required, the Contractor shall pay for additional time and expenses of the Owner at the standard rate in effect at that time.

3.13 WARRANTY, SERVICE, TESTING, CERTIFICATION

A. The Contractor must provide an extended warranty that is inclusive of the Manufacturer’s warranty to the Owner covering all network cable and connectivity hardware products comprising this installation site. The Contractor and Manufactured shall jointly provide the Owner an extended warranty of the installed system against defects in material or workmanship for a period of no less than five years (period as is customary for the Manufacturer) from the date of substantial completion. Any equipment or cabling shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner.

B. The System Contractor shall make a thorough inspection of the complete installation to ensure the following:
   1. Complete and functional system.

2. Installed in accordance with manufacturers' instructions.
3. All cabling shall test free from all grounds, opens, and shorts.
4. A representative of the Owner shall have an opportunity to be present for all final testing. Coordinate final testing with Owner, schedule as near as possible to acceptance date.

3.14 DRAWINGS, MANUALS, AND TRAINING

A. As-built drawings and operating and maintenance manuals shall be electronically transmitted in PDF file format.

B. Upon completion of the installation, and prior to final inspection, the Contractor shall furnish as-built drawings.

C. In addition, the contractor shall furnish complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets. Manuals shall include wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system. Provide a parts list with manufacturer and model number for commonly replaced parts. Include complete instructions for the inspection, testing, and maintenance of the system. Place final cable certification test results in manuals.

D. All cable paths and wiring methodology shall be documented. All cables shall have both ends labeled and included in the as-built documentation. Provide an MS Excel worksheet compatible format spreadsheet file cross referencing all cable run numbers, architectural room number, and owners room number for the origin and destination of each cable run.

E. A formal on-site training session shall be provided by the Contractor to the Owners Representative / Maintenance personnel and shall include instruction on the documentation, location, inspection, maintenance, testing, and operation of all system components. Provide a minimum of two (2) hours of documented general instruction. It shall be the responsibility of the Contractor to coordinate time and location of training sessions with the Owner.

END OF SECTION

SECTION 28 21 23

VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDES

A. This specification and the drawings provides requirements for the expansion to an existing IP based, video surveillance system that shall serve the areas as indicated on the project drawings.

B. The video surveillance system shall provide for video monitoring and recording of entrances, exits, and sensitive areas.

C. Provide all equipment, accessories, materials, tools, scaffolding, man lifts, labor, supervision, transportation and services necessary for or incidental to a complete and operating networked IP communication based video surveillance system as shown or indicated on the drawings and/or as specified.

D. Refer to the video surveillance system schedule on drawings for part numbers and additional information.

E. Provide, configure for network connection, mount, and align IP network cameras as herein specified and as indicated on the plans.

F. Provide Building Access Control System integration. See Section 28 13 27 - Building Access Control System.

G. Equipment specified herein is designed to provide specific functional and operational characteristics. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications.

H. It is the intent of these specifications to provide complete installations although every item necessary may not be specifically mentioned or shown.

I. This project shall include preparation of construction plans locating the fire alarm system devices and having the plans reviewed by Owner, the Owner's Representative, and local AHJ for permitting.

J. Provide all documentation and training as outlined in these specifications.

K. In shall be the responsibility of the Video Surveillance System Contractor to obtain all required approvals and certifications from authorities having jurisdiction.

L. It shall be the responsibility of the Division 26 Electrical Contractor to provide:
   1. Dedicated 120VAC power to the video surveillance units maximum 20 amps each. Each electrical disconnect device shall be labeled "VIDEO SURVEILLANCE SYSTEM".
   2. Provide and install all conduit and standard electrical boxes for the video surveillance system as specified herein. The video surveillance system contractor shall coordinate all conduit and box requirements and locations with, and provide special back boxes to, the electrical contractor prior to installation.
   3. Cabling in all open ceiling areas shall be enclosed in conduit.
   4. Provide required conduit for accessibility to attic or plenum space.
   5. Installation of special back boxes supplied by Division 28 contractor.
   6. Provide equipment mounting boards as indicated on the drawings.
   7. Provide conduit to remote areas outside of the building as outlined on the drawings.

8. Coordination of requirements of Division 28 with the Builder.

1.2 WORK NOT INCLUDED

A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services.

B. Contractors shall not make selection, purchase, or installation of interconnect instruments and/or equipment to be used on this project.

1.3 RELATED SECTIONS

A. Section 26 00 00 - Electrical

B. Section 27 10 30 - Data and Telephone Cable Plant

1.4 PRESCRIPTIVE CODES, STANDARDS AND REGULATIONS

A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards, except when requirements are exceeded by the contract documents.

B. In addition to requirements outlined in other sections of the specifications these codes and standards are imposed as applicable to the work in each instance.

C. The equipment, materials, and installation shall confirm to the latest version of all applicable codes, standards and regulations, of authorities having jurisdiction.

D. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes and standards.

E. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.

F. The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.

G. The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

H. Where local codes and ordinances are not in writing or on record, but local precedence have been set, the Owner shall pay for any additional resulting cost.

1.5 PLANS AND SPECIFICATIONS

A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth, each item essential to the functioning of the system.

B. The drawings are generally diagrammatic and show approximate location and extent of work.

C. Install the work complete including minor details necessary to perform the function indicated. Provide video surveillance systems, including all connections, complete in every respect and ready to operate.

D. If clarification is needed, consult the Owner's Representative.

E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Owner's Representative for his interpretation.

F. The Owner's Representative reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.6 SITE VISIT

A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities and work to remote areas.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished, or the amount of work to be done. It being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans, or required by nature of the site of which may be fairly implied, as essential to the execution and completion of any and all parts of the work.

1.7 SUBMITTALS

A. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.

B. Submittal shall be electronically transmitted in PDF file format.

C. For each submittal provide a cover sheet with the name and location of the project, the name, address and telephone number of the Contractor, and the name, address and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.

D. Quality Assurance Submittal including special boxes, cable, and other material as requested by the Owner's Representative:
   1. Letter from manufacturer stating that the Contractor is an Authorized Factory Distributor for the area where the project is located.
   2. The Contractor and Manufacturer shall supply sufficient information to indicate that the proposed system is based on the latest hardware, software technology available.
   3. Current copy of the Contractors Video Surveillance System Company license issued by the governing authority.

E. Product Data Submittal including special boxes, cable, and other material as requested by the Owner's Representative including:
   1. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
   2. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections.
   3. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list.
   4. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
   5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
   6. Resubmittal shall include a complete revised equipment list and any product data that is revised with revision notation and clouded changes.

F. Shop Drawings Submittal to include:
   1. A cover page that includes project name and address, index of drawings, scope of work description, code editions designed under, local AHJ information, a sequence of operation

input/output matrix, bill of material, device and cable legends, typical device connections and installation height details, schedules and location map.

2. Produce accurate to scale (min. 1/8” = 1’) drawings showing equipment and device layouts prepared using a CAD or BIM engineering drawing program. When CAD background files are not available for existing buildings the Contractor shall inspect the site and collect information to create a floor plan. Walls shall be double line showing the thickness, single line diagrams are not acceptable.
3. Other disciplines devices or equipment not relevant to this scope of work shall not be shown on shop drawings. Submitting modified contract documents shall not be permitted.
4. Every room shall have a name and number identifying the use of the space with ceiling heights notated for each space or group of spaces throughout the design.
5. Indicate and/or notate door swings, glass walls, half walls, floor to ceiling windows, skylights, and other openings, projections, ceiling features, elevation changes, et cetera that affect the placement of alarm devices.
6. Locate and label all components of the system, label and indicate circuit routing, cable type, and gauge. The system panels location and all device locations shall be clearly identified by symbols matching the symbol legend. The labeling of circuits and devices shall correspond with the riser diagram.
7. Riser diagrams showing all components of the system. Show control panels, power supply panels, and network interfaces. Partial or typical riser diagrams are not acceptable.
8. When multiple buildings make up the system, provide a block diagram of the project site showing all buildings to be covered by the system and detailing the route and type of connection between buildings. Note building entry points, conduit type and size, and routing pathway (underground or over canopy installation).
9. Shop or coordination drawings shall include information that will allow the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product.
10. Resubmittals shall include revision notation and clouded changes.

1.8 QUALIFICATIONS OF A PROPOSED CONTRACTOR

A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified.

B. The contractor and employees shall be licensed, by the governing authority, sell, install, and service video surveillance security systems.

C. The Contractor shall not have any grievances or complaints of record regarding workmanship, code compliance, or service response with a licensing authority. A proposed contractor that has any prior finding(s) of a code or license violation, or has any litigation in process concerning the installation of a system is unacceptable.

D. The Contractor shall employ full-time, factory-trained, licensed, local technicians and installers for product installation, maintenance, support, service and warranty.

E. All work associated with the installation of the video surveillance system shall be under the direct supervision of a licensed and factory-trained technician. A certificate of this training shall be provided with the contractor's submittal.

F. The proposed contractor, as a business entity, shall be an authorized distributor and designated representative of the video surveillance and camera system manufacturer, with full warranty privileges, and shall have been actively engaged in the business of selling, installing, and servicing commercial building video surveillance systems for a period of at least 5 years.

G. Recently formed companies are acceptable only if specific pre-approval is requested, and granted by the Owner's Representative, based on experience of key personnel, current and

completed projects, and all licensing requirements are met ten (10) working days prior to the contract proposal date.

H. No contract employees are allowed unless they have been to the factory-training school within the last eighteen (18) months. A certificate of this training shall be provided with the Contractors submittal.

I. The proposed Contractor shall have an office within 150-miles of the job site, staffed with factory-trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up, and perform a 100 percent operational audit of all installed devices. The technicians shall instruct the Owners' representatives in the proper operation of the system, and to provide service throughout the warranty period. The contractor shall be capable of dispatching technicians to repair a system within six (6) hours of a service request.

J. The proposed contractor shall be fully experienced in the design and installation of the type of security system, herein specified, and shall furnish with the contract proposal an itemized list of the installations of the type specified herein. The list shall include the name of two (2) projects, date of completion, the amount of the contract, the name, and telephone number of a qualified person to contact for reference. Each reference project listed must utilize equipment by the same manufacturer as the proposed system.

K. The ability of a proposed Contractor to obtain plans and provide a performance bond shall not be regarded as the sole qualification of the Contractors' competency and responsibility to meet the requirements and obligations of the contract.

L. The Builder shall be satisfied that a proposed contractor meets all the requirements expressed herein before including the Contractor's proposal in the project.

M. The Owner's Representative or the Owner may investigate, as they deem necessary, to determine the ability of the proposed Contractor to perform the work. The proposed Contractor shall furnish to the Owner with any information or data requested for this purpose.

N. The Owner's Representative or the Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.

O. The Owner's Representative or the Owner reserves the right to reject the proposal of any Contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide a complete and satisfactorily operating Video Surveillance System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form a functional system, with components and interconnections matched for optimum performance of specified functions.

B. The system provided shall be fully compatible and integrated with the Owners existing system hardware and software.

C. Refer to Video Surveillance System schedule on drawings for part numbers and additional information.

D. All equipment and components shall be installed in strict compliance with manufacturers` recommendations and the requirements of the components UL listing. Consult the manufacturer`s installation manuals for all wiring diagrams, schematics, electrical requirements, cable types, and physical equipment sizes, etc., before beginning system installation. Refer to the manufacturers` riser / connection diagrams for all specific system installation/termination/wiring data.

E. The control units, power supplies, batteries, subassemblies, software, firmware, cable, and all accessories provided shall be listed and labeled by Underwriters Laboratories, Inc. for commercial security system use under the latest appropriate testing standard. Provide all equipment and components required to provide a complete and operating system.

F. All date keeping hardware, firmware, and software provided shall be fully compliant with the calendar year designated in four-digit date format. Any time equations must function normally, leap year, and daylight savings time must be supported.

G. The system and all components shall be tested and found suitable for the specified purpose as part of a commercial building security system by a nationally recognized approvals agency acceptable to the AHJ.

H. All equipment and components shall be new, and the manufacturer`s current model. All like devices shall be of the same manufacturer and model number.

I. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., cameras shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

J. Equipment devices, make/model numbers, accessories, and comments have been shown on the contract drawings. Specific wiring between equipment has not been shown.

2.2 VIDEO SURVEILLANCE SYSTEM INSTALLATION REQUIREMENTS

A. Contractor shall provide all material, labor, tools, and equipment required to perform the work described and make complete, safe, and functional systems.

B. Contractors shall pay for and acquire all permits and inspections required by the Authority Having Jurisdiction and/or other controlling authorities.

C. All work shall be installed in accordance with state, local, and national codes.

D. All work shall be done by mechanics skilled in the particular trade involved, under responsible supervision.

E. Contractors shall warrant his workmanship and materials for a period of one year from the date of acceptance upon completion of the project.

F. No surface mounted raceway or conduit will be accepted on any new construction job.

G. Seal all wall and floor penetrations with approved sealant at a fire rating equal to, or better, than the original or current fire rating.

H. All cabling must be suspended up off the ceiling grid.

I. The Video Surveillance Contractor shall provide and install all required parts and local cabling to get the system online and operational; this includes power supplies required.

J. The Video Surveillance Contractor must provide the Owner with all security equipment MAC addresses and network drop information.

2.3 RELATED WORK - NETWORK CONNECTIVITY

A. The system shall be utilizing the customer’s Ethernet system backbone for all security devices communications.

B. No Ethernet cabling, network RJ-45 jacks, or patch cords are included in the scope of this Specification Section.

C. The Owner will provide this Contractor with a terminated network drop at security devices, and the required TCP/IP configuration settings: static IP address, domain, gateway, and subnet mask.

D. This contractor will program and test all video surveillance system devices for connection to the network.

E. This contractor will provide complete programming of all device parameters in accordance with the Owners requirements.

2.4 ACCEPTABLE MANUFACTURER

A. Descriptions and details, acceptable manufacturers` names listed, and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer`s product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.

B. Proposed contractors wishing to propose any product substitution must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.

C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified.

D. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of alternate products shall be based on the decision of the Owner and Architect. Prior approval to make a proposal for this project does not automatically insure products will be an acceptable equivalent.

E. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

F. The manufacturers model numbers, functions, and features described in this specification section are those of Salient Systems and this shall constitute the quality, compatibility, and performance of the equipment to be furnished, no exceptions.

2.5 LICENSE AND SUPPORT

A. Provide licensing for software and all new IP cameras.

B. The VMS manufacturer shall license the software on a per video channel basis only, in such a way that there are no license fees associated with client applications, site installation, user accounts, add-on features or other license fees. The licensing program characteristics are:
   1. IP camera license shall not be tied to a hardware address (MAC Address).

2. The VMS Server software shall not be tied to the server hardware.
3. Camera licenses may be moved between servers.
4. All server and camera licenses are moveable without requiring manufacturer action of any type.
5. All VMS Client software modules shall be included in the base VMS software cost.
6. Client applications can be installed an unlimited number of times and may be running simultaneously without additional licensing cost.

2.6 NETWORK VIDEO MANAGEMENT SOFTWARE

A. Provide open platform, intelligent streaming video management fully licensed solution. The system shall feature end-to-end data security and privacy using secure real-time transport protocol (SRTP) across web and mobile apps that allow sharing of video and to monitor alarms and activate threat levels.

B. The IP network based security digital Video Surveillance System, hereafter “System”, shall allow the display of live, record and playback of digital video streams from multiple video surveillance IP cameras, simultaneously, on the System’s operator console software and/or on other display and control platforms including clients, virtual matrix display and cellular telephone.

C. The Network Video Management Software (NVMS) shall be an enterprise level software solution that shall be scalable from one client, server, and camera to hundreds of clients, servers, and cameras.

D. The System shall authenticate users before granting access to the system. Access rights for each user shall be able to be defined individually for each user group.

E. The Contractor shall provide a System consisting of server software applications and client software applications with all necessary software modules and licenses required to provide complete and fully functional integration, including:
   1. Server Software Applications
      a. Control Center Server
      b. Control Center Admin Tool
      c. Control Center Gateway software application that connects mobile devices and other thin clients to the NVMS.
   2. Client Software Applications
      a. Control Center Remote Windows PC Client
      b. Control Center Web Client
      c. Control Center Player
      d. Control Center Camera Installation Tool
   3. Mobile software applications.
      a. Viewing client for Android mobile devices
      b. Viewing client for Apple mobile devices.

F. The System shall be installed and commissioned on hardware that meets or exceeds the manufacturer’s recommended requirements by an authorized integrator trained and certified by the manufacturer. Certification and training for authorized integrators shall be available from the manufacturer.

G. The manufacturer shall have a dedicated professional services group that can provide Integrators and End Users the following fee-based services; including but not limited to training, installation, commissioning, remote diagnostics, and integration with 3rd party software and hardware systems.

H. The System shall have the ability to control PTZ cameras and the capability to support traditional analog cameras via optional video server adapters using IP protocol.

I. The System shall support industry standard H.264, MPEG-4, or equivalent compression formats for recording and monitoring video streams from sources with bandwidth up to 90 Mbit/sec, frame rates up to 60 fps, and video resolutions up to 16MP (4872 x 3248).

J. The System shall feature High Definition Stream Management (HDSM) architecture that reduces the required client bandwidth and processing power by only transmitting what is necessary to view the video stream at full quality for cameras ranging from 1 MP to 29 MP.

K. The System shall support the decompression of compressed video through the client graphics card in lieu of using the client processing power.

L. The System shall not limit the storage capacity and shall allow for upgrades of recording capacity.

M. The System shall digitally sign recorded and exported video using 256-bit encryption providing for video to be authenticated for evidentiary purposes.

N. The system shall support the ability to create a map that represents the physical location of cameras and other devices throughout the surveillance system. Maps shall be created from images stored in JPEG, BMP, PNG, or GIF image formats. Maps shall have the ability to contain links so as to create a hierarchy of interlinked maps, including the ability to highlight a camera on a map when an alarm linked to the camera is triggered.

O. The System shall:
1. Detect if the video signal is lost and alert the system administrator.
2. Record video streams based on a recording schedule that can be defined individually for each video source, including recording on motion or continuously, without affecting the settings on the other video sources, including the scheduling of time periods for full, one-half, or one-quarter of the source image rate.
3. Perform dynamic bandwidth management to ensure that the total bandwidth does not overload the system.
4. Provide the ability to manually trigger recording.
5. Provide pre-event and post-event recording options.
6. Provide the ability to perform motion detection on individual video sources with adjustable sensitivity, threshold, and detection zones.
7. Provide the ability to create alarm events and the ability to email users and system administrators when an event or system health error occurs.
8. Provide the ability to save and restore the window layout.
9. Provide the ability to import and export client settings such as maps, views, and web pages.
10. Shall support live or recorded video monitoring of 1 to 36 video streams simultaneously on a single monitor.
11. Shall support monitoring live and recorded video streams simultaneously on the same monitor.
12. Shall support viewing the same live or recorded video stream at different zoom levels.
13. Support the ability to drag and drop a video source from a tree of video sources into a window for live or recorded video monitoring and save viewing setup.
14. Shall support digital zooming and panning on live and recorded video streams.
15. Shall support forward and reverse playback of recorded video at variable speeds.
16. Shall synchronously playback recorded video from selected video sources.
17. Shall support navigation of recorded video via calendar, timeline, or events.
18. Shall support a timeline that displays all connected video sources and the corresponding motion and recording events.
19. Shall support creating bookmarks for recorded video, displaying the bookmarks on the timeline, and searching for bookmarks.
20. Shall support monitoring of alarm events.
21. Shall support searching through recorded video based on various search criteria including time, date, video source, and events.

22. Shall support searching through recorded video based on motion in user defined areas (pixel search).
23. Shall support searching through recorded video based on time, date, video source, and image region, and have the results displayed as series of thumbnail images.
24. Shall support searching through recorded video based on alarm events.

P. The System shall utilize a fully licensed software solution. Provide all required software, programming, and licenses for all cameras furnished. Provide the viewing client software and licenses` at least four locations to simultaneously view video from all system servers. Coordinate with owner to identify designated workstation computers and install and test the viewing client software.

Q. Provide licensing packages for camera channels as required and unlimited client connections.

R. Camera locations and NVR assignments: Note that any variations or changes from the originally issued plan locations and camera types will require adjustment of the licensing packages to be provided by the installer.

2.7 HARDWARE

A. Utilize Owner furnished data storage devices.

2.8 ALL EQUIPMENT SHALL BE LOCATED AND INSTALLED AS FOLLOWS

A. Mount all equipment firmly in place. Route cable in a professional, neat, and orderly installation.

B. All equipment shall be placed with regard to the environment, EMI/RFI interference, and its effect on communication signal transmission.

C. Do place any equipment within two feet of any light fixture, HVAC unit, service access area, electric panel, or any device containing a motor or transformer.

D. No terminations, splices, or equipment shall be installed in or above ceilings.

E. Provide for adequate ventilation for all equipment and take precautions to prevent electromagnetic or electrostatic hum.

PART 3 - EXECUTION

3.1 OPERATION OF NEW EQUIPMENT PRIOR TO PROJECT COMPLETION

A. When the phasing of a project requires that electronic safety and security systems be operable in certain areas and the Owner needs to operate the equipment the contractor shall make such provisions. The warranty period shall commence on new equipment when it is operated for the beneficial use of the Owner. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, properly adjust, and complete all punch list items before final acceptance by the Owner. In these cases, the date of acceptance and the start of the warranty may be different dates.

3.2 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.

B. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

C. Failure to comply with the above to the satisfaction of the Owner`s inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.

3.3 FINAL OBSERVATION

A. It shall be the duty of the Contractor to make careful observation of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Owner's Representative to make a final observation.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, etc., called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Owner's Representative at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, etc., before preparing for submission to verify that the terms check with the requirements of the specifications.

C. The following and other provision of Division 1 General Conditions will be required at time of final completion:
1. Final clean up completed.
2. All systems are fully operational, all material and devices installed.
3. As built (as installed) drawings and operations manuals.

3.4 CUTTING AND PATCHING

A. The video surveillance system contractor shall notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, etc., of any openings that will be required for his work.

B. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.

C. All necessary cutting of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor`s expense in a neat and workmanlike manner, and as approved by the Owner's Representative.

D. Patching of openings and/or alterations shall be provided by the video surveillance system contractor or at the subcontractor`s expense in an approved manner.

E. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Owner's Representative.

F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

G. All openings in exterior walls shall be sealed watertight.

H. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.

3.5 TESTING, WARRANTY, SERVICE

A. A factory trained representative of the manufacturer shall supervise the final connections and testing of the system and it shall be subject to the final acceptance of the Architect/Engineer and Owner.

B. The Video Surveillance System Contractor shall make a thorough inspection and test of the complete installed system including all components such as motion detectors, and controls, to ensure the following:
   1. Complete and functional system.
   2. Installed in accordance with manufacturer`s instructions.
   3. Confirm at the headend, with an ohmmeter, that each cable run is not open or shorted prior to connection of equipment.
   4. Confirm that each camera is located, properly aimed, and focused for the intended coverage area.
   5. Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
   6. Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor`s expense.
   7. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

C. The Contractor shall provide a single written document outlining the warranty of the manufacturers products to be free from defects in materials and workmanship for a period of no less than three (3) years, starting with the date of substantial completion.

D. The manufacturer shall provide any software maintenance patches and version updates or upgrades at no-additional cost to Owner for a period of at least five (5) years, starting with the date of substantial completion.

E. The contractor shall provide a warranty of the installed system against defects in material or workmanship for a period of one (1) year from the date of substantial completion. Any equipment or wiring shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner. All equipment will carry a one year warranty or manufacturer’s warranty whichever is greater.

3.6 DRAWINGS, MANUALS, AND TRAINING

A. As-built drawings and operating and maintenance manuals may be electronically transmitted in PDF file format (preferred) or paper copies may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.

B. Upon completion of the installation, and prior to final inspection, the Contractor shall furnish as-built drawings.

C. In addition, the contractor shall furnish complete operating and maintenance manuals listing the manufacturer`s name(s), including technical data sheets. Manuals shall include wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system. Provide a parts list with manufacturer and model number for commonly replaced parts. Include complete instructions for the inspection, testing, and maintenance of the system. Include copies of all programming sheets used to configure the system.

D. Provide the Owner a copy of the system software including the licensed program, site specific data file, and passwords that the Owner may require to maintain the system.

E. Formal on-site training sessions shall be conducted by the Video Surveillance System contractor. It shall be the responsibility of the Contractor to coordinate time and location of training sessions with the Owner. Provide documented general instruction as follows:
   1. Provide instruction to the maintenance personnel to include the location, inspection, normal maintenance, testing, and operation of all system components. Provide a minimum of four (4) hours-two 2-hour sessions separated by a minimum of two weeks.

2. Provide instruction to designated personnel on the functions and operation of the system provided including capabilities, limitations, and the meaning of status messages. State the proper procedure for testing, routine maintenance, and request for service. Provide detailed instruction on the operation of the system operation. Provide a minimum of four (4) hours-two 2-hour sessions separated by a minimum of two weeks.

END OF SECTION

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SECTION 31 10 00

SITE CLEARING

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 this Section.

1.2 SUMMARY

A. This Section includes the following:

i) Protection of existing trees.

ii) Removal of trees and other vegetation.

iii) Topsoil stripping.

iv) Clearing and grubbing.

v) Removing above-grade improvements.

vi) Removing below-grade improvements.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

i) Protect improvements on adjoining properties and on Owner's property.

ii) Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation:_Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

i) Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

ii) Provide protection for_roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

iii) Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ a licensed arborist to repair damages to trees and shrubs.

iv) Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

D. Improvements on Adjoining Property: Authority for performing removal and alteration work on property adjoining Owner's property will be obtained by Owner prior to award of contract.

i) Extent of work on adjacent Property is indicated on Drawings.

E. Savable Improvements: Carefully remove items indicated to be salvaged, and store on Owner's premises where indicated or directed.

PART 2 – PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar Items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Topsoil: Topsoil is defined as friable day loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, day lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

a. Remove heavy growths of grass from areas before stripping.

b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

i) Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

ii) Dispose of unsuitable or excess topsoil same as specified for disposal of waste material.

C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.

i) Completely remove stumps, roots, and other debris protruding through ground surface.

ii) Use only hand methods for grubbing inside drip line of trees indicated to remain.

iii) Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

(1) Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

i) Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings, and is included under work of related Division 15 and 16 sections. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

1. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION 31 10 00

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31 23 00

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing of sub-grade for building slab, walks, and pavements.

2. Excavating and backfilling of trenches within building lines.

3. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances within building lines.

4. Final Grading, together with placement and preparation of topsoil for lawns and planting, is specified in Division 2 Section, "Landscape Work."

1.3 SUBMITTALS

A. Test Reports: The independent testing laboratory shall submit the following reports directly to Architect/Engineer with copy to others as designated in accordance with the provisions of section 01400 "Quality Control Services." State in each report whether or not the test specimens comply with the specified requirements, and indicate any deviations.

1. Test reports on soil material properties.

2. Verification of suitability of each pier bearing material, in accordance with specified requirements.

3. Field reports; in-place soil density tests.

4. 'One optimum moisture-maximum density curve for each type of soil encountered.

B. Testing Laboratory Qualifications: To qualify for acceptance, the geo-technical testing laboratory must demonstrate to Architect/Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

1.4 DEFINITIONS

A. Borrow consists of off-site material.

B. Excavation consists of removal of all materials encountered to obtain the required subgrade elevations indicated and subsequent disposal of materials removed.

C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.

D. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect/Engineer, who will make an inspection of conditions. If Architect/Engineer determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Architect/Engineer. The Contract Sum may be adjusted by an appropriate Contract Modification.

Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

E. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase or topsoil materials.
Structure: Buildings, foundations, slabs, curbs, or other man-made stationary features occurring above or below ground surface.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Soil properties: Test in accordance with the requirements of Part 2 - Products, article "Soil Materials."

1.6 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities indicated to remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for direction. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.

3. Provide minimum of 48-hour notice to Architect/Engineer, and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

5. Use of Explosives: Use of explosives is not permitted.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP, and meeting the requirements of the General Notes on the structural drawings.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Subbase Material: Clean naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag or crushed sand.

D. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter. Refer to the general notes on the drawings for acceptable soil properties as determined by ASTM D4318.

E. Other Materials: All other materials not specifically described, but required for the proper completion of the work of this section, shall be as selected by the Contractor subject to the approval of the Architect/Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. STABILITY OF EXCAVATIONS

C. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
D. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion *of* backfilling.

E. Shoring and Bracing: Provide materials for shoring and bracing, such as, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches. Do not allow water to stand near the foundation of any structure at any time.

3.3 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

C. Dispose *of* excess excavated soil material and materials not acceptable for use as backfill or fill.

3.4 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

B. When excavation exceeds five (5) foot in depth, the soil on all sides of the excavation shall be laid back at a slope not to exceed two (2) horizontal to one (1) vertical.

C. Removal of Unsatisfactory Soil Materials: Excavate unsatisfactory soil materials encountered that extend below the required elevations, to the additional depth directed by the Architect/Engineer. Such additional excavation, provided it is not due to the fault or neglect of the Contractor, will be measured as directed by the Architect/Engineer and paid for by the Owner as a change in the work. Where the removal of unsatisfactory soil materials, is due to the fault or negligence of the Contractor in his performance of earthwork and site grading operations, excavate the resulting unsatisfactory soil material and replace with compacted satisfactory soil material as required.

3.5 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit. When excavation exceeds five (5) foot in depth, the soil on all sides of the excavation shall be laid back at a slope not to exceed two (2) horizontal to one (1) vertical.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or co it on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

C. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

D. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads. Ensure continuous bearing of pipe barrel on bearing surface.

3.6 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.7 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

1. Under grassed areas, use satisfactory excavated or borrow material.

2. Under walks and pavements, use subbase material, satisfactory excavated or borrow material, or a combination.

3. Under steps, use subbase material.

4. Under building slab , use fill material.

5. Under piping and conduit and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

6. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing and waterproofing.

2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

5. Removal of trash and debris from excavation.

3.8 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than I vertical to 4 horizontals so that fill material will bond with existing surface.

1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

B. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

C. Before compaction, moisten or aerate each lave as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated.

F. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 698:

G. Under building slabs on joists. compact top 6 inches of subgrade and each layer of backfill or fill material at a minimum of 90 percent maximum density, and a maximum of 100 percent maximum density.

H. Under Pavements, compact top 12 inches of subgrade and each layer of backfill or fill material at a minimum of 95 percent maximum density, and a maximum of 100 percent maximum density.

I. Under lawn or unpaved areas, compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum density.

J. Under walkways, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

K. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. Acceptable moisture content shall be from optimum to plus 5% from optimum as determined by ASTM D 698.

L. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

M. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.9 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross section as shown on the drawings.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0. 10 foot above or below required subgrade elevations.

2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

3. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 1 0-foot straightedge.

4. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification

3.10 PAVEMENT SUBBASE COURSE

A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

1. Refer to other Division 2 sections for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross- section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

1. When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.11 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Independent testing laboratory shall inspect and approve each subgrade and fill layer before further backfill or construction work is performed. The testing laboratory will be responsible for verbally informing the Contractor of the test results immediately upon completion, so unnecessary delay is eliminated and unsatisfactory work is not covered up. Continued progress of the work shall not relieve the Contractor of the responsibility of complying with specification requirements.

B. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

C. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

D. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect/Engineer.

E. Paved Area and Building Slab Subgrade: Perform at least one field density test of subgrade per the frequency listed below, but in no case fewer that three tests. In each compacted fill layer, perform one field density test per the frequency listed below, but in no case fewer than three tests.

1. Structures and building slabs: 7500 sq. ft.

2. Pavements: 10,000 sq ft for the subgrade and layer of fill, and 5000 sq ft for the top layer of fill.

3. Site Utilities: Every 300 lineal foot of trench, or in accordance with the local governing authority.

F. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.

G. If in opinion of Architect/Engineer, , based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.12 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

B. Use all means necessary to control dust on and near the work and on and near all off-site borrow areas if such dust is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site.

C. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

3.13 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface, add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.14 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

B. Remove excess excavated material, trash, debris, and waste materials and dispose of it off Owner's property.

END OF SECTION 31 00 00

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SECTION 31 23 12

SELECT MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section consists of required excavation, removal and proper utilization of materials secured from sources provided by the Contractor.

PART 2 - PRODUCTS

2.01 SELECT MATERIAL

A. Select Material shall consist of a poor grade sand or other suitable free draining granular material, free from vegetation or other objectionable matter, reasonably free from lumps of earth, and shall meet the following requirements.

1. The Liquid Limit shall not exceed 45.
2. The Plasticity Index shall not be less than 4 nor more than 15.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Use selected material in the installation of backfill material as indicated on the Drawings. The completed work shall conform to the established alignment, grades and cross sections.

B. The required density of the select material is 95 percent of maximum density at approximately optimum moisture content as determined by ASTM D-698.

END OF SECTION 31 23 12

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SECTION 31 23 14

SUBGRADE PREPARATION

PART 1 – GENERAL

1.1. DESCRIPTION

A. The work as specified in this section shall consist of preparing the top 6 or 8 inches of the finished grade for pavement and/or curb and gutters. Sub grade preparation will be considered for that portion of sub grade under pavements and 2 feet outside the back of curbs, and under concrete channel sections.

B. Sub grade soils shall be classed for this purpose under three classifications; namely inert, active, and very active. Inert soils shall be those soils having a plasticity index of 10 or less. Active soils shall be those soils have a plasticity index of 10 to 20. Very active soils shall be those soils having a plasticity index of 20 or more.

1.2. MEASUREMENT AND PAYMENT

A. Preparation, manipulation and compaction of sub grade either with no additions, with lime, or with cement will be measured by the square yard complete in place and will be required 2 feet outside of the back of curbs. Payment for sub grade preparation shall be paid for at the unit price as shown in the bid proposal for the applicable bid item.

B. If cement or lime is required, it will be measured by the ton (2000 lbs.) based on the actual delivered and incorporated material complete in place. Payment for cement or lime for sub grade shall be paid for at the unit price shown in the bid proposal for the applicable bid item.

PART 2 - MATERIALS AND EXECUTION

2.1. SUBGRADE PREPARATION FOR INERT SOILS

This item shall consist of preparing the 6 inch sub grade in those soils having a plasticity index of 10 or less.

A. When the excavation or fill has been constructed to sub grade elevation, the City will have the laboratory take samples and determine the characteristics of the soil and the density requirements at optimum moisture.

B. The sub grade shall then be scarified and wetted to optimum moisture or above. The moisture shall be thoroughly mixed into the 6 inch sub grade by discing, blading or other methods approved by the Engineer.

C. The Contractor shall then proceed to compact the 6 inch sub grade by means of sheep foot, pneumatic or other type of compaction equipment to 95 percent of Standard Proctor.

D. When density tests have been made and it is determined that the sub grade is to the proper required density, the Contractor will smooth the sub grade by means of motor grader or other approved blading equipment and rolled with a 10 ton flat wheel roller to obtain smooth densely compacted finish at grade + 1/4 inch.

E. The Contractor may now proceed to set forms for concrete pavement, curb and gutter, or concrete channel, whichever has been previously agreed upon with the City of Irving.

2.2. SUBGRADE PREPARATION FOR ACTIVE SOILS

This item shall consist of preparing the 6 inch sub grade in those soils having a plasticity index between 10 and 20.

A. If the Contractor and the Owner do so desire, the existing 6 inch sub grade may be removed and replaced by suitable soils of inert characteristics having a plasticity index of 10 or less.

B. If the Contractor and Owner so desire, soil admixture may be used such as the addition of sand or friable material which when mixed with existing soils will reduce the plasticity index to 10 or less.

C. If the Contractor and Owner so desire, hydrated lime or lime slurry may be added to the existing soils which when thoroughly mixed will result in a sub grade with a plasticity index of 10 or less.

1. Hydrated lime and lime slurry shall meet the requirements of THD Specification No. Item 264.

2. When the laboratory has decided the optimum percentage of lime, the Contractor shall scarify the sub grade and spread the required amount of lime or lime slurry thereon. He shall then thoroughly mix and blade the lime uniformly throughout the 6 inch sub grade with the addition of water to insure thorough mixing.

Next, the Contractor shall begin mixing operations with approved pulvimixers which are in good working condition. This operation shall continue until lime is thoroughly incorporated in the sub grade, water being added as required.

3. The sub grade thus prepared shall be left to cure a minimum of 3 days while moisture is being added as needed and directed. After the 3 day curing period the Contractor will be required to mix the sub grade soil again until it is thoroughly fluffed and of uniform consistency.

4. After the sub grade has been left to cure and removed, the Contractor shall begin compacting the sub grade, being sure that at least optimum moisture is incorporated, by means of sheep foot, pneumatic or other approved compaction equipment to 95 percent Standard Proctor density at optimum moisture or above.

5. When the sub grade has been thoroughly stabilized and compacted, the finished sub grade shall be carefully bladed to within 1/4 inch of finished grade and compacted and rolled with a 10 ton flat wheel roller.

6. The sub grade now having been prepared, the Contractor may proceed with setting the pavement or curb and gutter forms.

2.3. SUBGRADE PREPARATION FOR VERY ACTIVE SOILS

This item shall consist of preparing the 8 inch sub grade in those soils having a plasticity index of 20 or more.

A. Sub grade shall be prepared by mixing Portland cement, 8% by weight, thoroughly into the top eight inches of soil.

B. Portland cement shall meet the requirements of THD specification NO. Item 272.

C. When the laboratory has decided the optimum percentage of cement, the Contractor shall scarify the sub grade and spread the required amount of cement in slurry form thereon. The slurry shall be agitated to prevent the cement from settling, and shall be distributed evenly across the site.

D. The Contractor shall then thoroughly mix and blade the cement uniformly throughout the 8 inch sub grade. The Contractor shall begin mixing operations with approve pulvimixers which are in good working condition.

E. Add water as necessary to achieve optimum moisture and for ease of pulverization. Continue processing until the gradation requirements have been met.

F. Compact the cement modified sub grade to 95% Standard Proctor Density at optimum moisture by means of sheep foot, pneumatic or other approved compaction equipment.

G. The sub grade thus prepared shall be left to cure a minimum of 7 days while moisture is being added as needed.

H. After 7 day curing has been achieved, carefully blade the sub grade to within 1/4 inch of finished grade and compacted and rolled with a 10 ton flat wheel roller.

I. The sub grade now having been prepared, the Contractor may proceed with setting the pavement or curb and gutter forms.

END OF SECTION 31 23 14

SECTION 31 32 00

LIME SOIL STABILIZATION

PART I - 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 SUMMARY

A. This section includes the materials, mixing, placement, and compaction required for the stabilization of soils by pulverizing, adding lime, and finishing to the lines and grades shown on the drawings. Scope of the work shall be as described in the contract drawings.

1.3 SUBMITTALS

A. Test Reports: The independent testing laboratory shall submit the following reports directly to Architect/Engineer with copy to others as designated in accordance with the provisions of section 01400" Quality Control Services." State in each report whether or not the test specimens comply with the specified requirements, and indicate any deviations.

i. Field reports; in-place soil density and moisture content tests.

ii. Field reports; pulverized soil gradation tests.

1.4 QUALITY ASSURANCE

A. Coordination: If separate contractors are involved with the lime stabilization and the general fill operations, the General Contractor shall be responsible for the proper coordination of the work to insure full compliance with all portions of the specifications, and shall be the single source of responsibility.

B. Existing Conditions: If conditions are other than shown on the drawings or contract documents, notify the Architect/Engineer immediately.

C. Precautions Extreme precautions shall be taken to prevent contamination of areas of the site where existing trees or other vegetation is to remain and where future planting is to be placed which is not sufficiently covered with additional topsoil material to prevent contamination. Similar precautions shall be taken to protect adjacent property and traffic.

D. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

i. Texas State Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets, and Bridges (SDHPT).

1. Item 260 - Lime Treatment for Materials in Place
2. Item 264 - Hydrated lime and Lime Slurry

PART 2-PRODUCTS

2.1 MATERIAL

A. Hydrated Lime: SDHPT, Item 264, Commercial Lime, Type B, Grade 1.

B. Hydrated lime shall be a dry powder obtained by treating quick-lime with enough water to satisfy its chemical affinity for water under the conditions of Its hydration. This material should consist essentially of calcium hydroxide, magnesium oxide, and magnesium hydroxide, which are the active constituents of lime.

C. Lime Concentration Two alternative requirements based on different tests are permissible:

i. Total Oxides: For either high calcium or dolomitic hydrated lime, a minimum of 95% total oxide content (CaO + MgO) on a non-volatile basis is required.

ii. If this test is elected, the hydrate must contain no more than 5% carbon dioxide content, if sampled at lime plant, or no more than 7%, if sampled at destination. Determination of total oxide and carbon dioxide contents shall conform to ASTM Specification C 25, "Chemical Analysis of Limestone, Quicklime, and Hydrated Lime."

iii. Available Lime: For high calcium hydrated lime a minimum available lime (CaO) content of 90% is required, on a non-volatile basis (corresponding to a minimum of 68.1 % on a volatile basis).

iv. Determination of available lime shall conform to either the "Rapid Sugar" test in ASTM Specification C 25 or any equivalent test, such as AASHO T219-72, "Testing Lime for Chemical Constituents and Particle Size."

D. Particle Size: All hydrated lime shall conform to the following gradation requirement: At least 85% passing a #200 sieve. Determination of particle size shall conform to the provision for wet sieving in ASTM C 110, "Methods of Physical Testing for Quicklime and Hydrated Lime."

E. Water: Clean, potable, and free of impurities.

F. Other Materials: All other materials not specifically described but required for the proper completion of the work in this section, shall be as selected by the Contractor, subject to the approval of the Architect/Engineer.

PART 3 - EXECUTION

3.1 GENERAL

A. Under drives and parking areas the top six inches of subgrade shall be stabilized to a distance of two feet beyond the edge of the paving.

B. The hydrated lime shall be applied only in the area where the first mixing operations can be completed during the same working day.

C. The hydrated lime shall be placed by the slurry method.

D. Construction methods shall conform to the applicable sections of the SDHPT specification, Item 260, Lime treatment for Materials in Place."

3.2 APPLICATION

A. The percent of hydrated lime to the dry weight of the soil shall be seven percent (7%). The Contractor shall be responsible for calculating the number of square yards in each area and the amounts (pounds) per truck load, so that the rate of application can be checked very closely.

B. The distribution of lime shall be uniformly placed in such quantity that all soil to be treated receives the minimum percentage of lime and successive passes made until the proper moisture and lime content is obtained.

C. Slurry Method: The hydrated lime shall be mixed with water in trucks or in tanks and applied as a thin water suspension or slurry. The distributor truck or tank shall be equipped with an agitator which will keep the lime and water in a uniform mixture.

3.3 MIXING

A. The soil material and hydrated lime shall be thoroughly mixed by a rotary mixer or other device to obtain a homogeneous, friable mixture of soil material and lime, free from all clods or lumps.

B. Immediately after the first mixing operation, the mixture shall be sealed with a light pneumatic rubber tire roller and left to cure 48 to 72 hours, as directed by the Architect/Engineer. During the curing period the material shall be kept moist.

3.4 FINAL MIXING:

A. After the required curing time, the material shall be uniformly mixed with a rotary mixer capable of reducing the size of the particles so that when all non-slaking aggregates (asphalt particles) retained on the No. 4 sieve are removed, the remainder of the material shall meet the following requirements when tested dry by laboratory sieves:

   i. minimum passing 1 3/4" sieve -100%
   ii. minimum passing No. 4 sieve -60%

B. During the interval of time between application and mixing, the hydrated lime should not be exposed to the open air for a period of over six (6) hours.

3.5 COMPACTION:

A. General Compaction of the mixture shall begin immediately after final mixing, and in no case later than 3 calendar days after final mixing. The material should be aerated or sprinkled as necessary to provide the optimum moisture. Compaction shall begin at the bottom and continue until the entire depth of mixture is uniformly compacted. All irregularities, depressions, or weak spots which develop must be corrected immediately by scarifying the areas affected, adding or removing material, and reshaping and recompacting by sprinkling and rolling. The surface should be maintained in a smooth condition - free from undulations and ruts.

B. Control soil compaction, providing minimum percentage of density specified for each area classification indicated.

   i. Percentage of Maximum Density Requirement Compact soil to not less than 95 percents of maximum density, in accordance with ASTM D 698.

   ii. Moisture Control: The percentage of moisture in the mixture based on oven-dry weights, shall not be below or more than three percentage points above its optimum moisture content as determined by ASTM D 698.

3.6 FINISHED GRADING:

A. After the required compaction is reached, the subgrade should be brought to the required lines and grades and finished by rolling with a pneumatic tire or other suitable roller sufficiently light to prevent hairline cracking.

B. Surface of the subgrade shall not show any deviation in excess of 1/8 inch above or one inch below established subgrade elevation.

3.7 CURING:

A. The compacted section shall be moist-cured for a minimum of three (3) days. To prevent damage from traffic, the completed section shall not be opened to traffic for two (10) days after compaction.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction Independent testing laboratory shall inspect and approve each subgrade and fill layer before further backfill or construction work is performed. The testing laboratory will be responsible for verbally informing the Contractor of the test results immediately upon completion, so unnecessary delay is eliminated and unsatisfactory work is not covered up. Continued progress of the work shall not relieve the Contractor of the responsibility of complying with specification requirements.

B. Subgrade Density Tests: Perform at least one field density test of the subgrade for every 5,000 sq ft for the subgrade and each layer of fill, and 5000 sq ft for the top layer of fill, but in no case fewer that three tests. Perform tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

   i. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

ii. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect/Engineer.

C. Subgrade Pulverization Sieve Tests: Perform at least one sieve test of the subgrade for every 10,000 sq ft for the subgrade and each layer of fill, and 5000 sq ft for the top layer of fill, but in no case fewer than three tests.

i. Provide standard ASTM No. 4 and 1 inch sieves, and select sample size in accordance with ASTM C 136. The percent of passing shall be determined by weight.

END OF SECTION 31 32 00

SECTION 32 01 90

LANDSCAPE GROUNDS MAINTENANCE

The Contractor is to render the following Landscape Maintenance Services during the term of the initial construction contract for all areas of the site that are disturbed by construction or utilized for construction purposes. Maintenance shall continue per the schedule until all landscape and irrigation is completed and accepted. Provide for new plantings only.

PART 1 - GENERAL

1.1 SCOPE

A. Work included in project: Perform all work necessary utilizing acceptable horticultural practices for the exterior landscape maintenance of the project as required herein. Such work includes, but is not limited to the following:

1. Monitoring adjustment and minor repair of the landscape irrigation system.
2. Protection of vacuum breakers against freeze damage.
3. Mowing, edging and trimming of lawn areas.
4. Pruning and trimming of trees and shrubs.
5. Restaking and adjustment of stakes and guying if required.
6. Application of fertilizers, insecticides and herbicides.
7. Replacement of plant material (extra service if not under warranty).
8. General site clean up; removal of trash, and products of maintenance.

B. Extra Services: The intent of the contract is to provide a comprehensive maintenance program to include all required services, except those services specifically excluded, to perform the work for the stated time period.

1. All services not included in the base bid shall be considered “extra services” and will be charge for separately according to the nature of the item of work. The written consent and authorization of the Owner or their authorized representative must be obtained prior to the performance or installation of such “extra service” items and prior to purchase of any chargeable materials.

2. Such work may include replacement of dead plant materials or major repairs of irrigation system created by acts of vandalism or other contractors working on other site related work.

3. The Owner is not bound by the specification or contract to utilize the landscape maintenance contractor in the performance of “extra services work”.

4. The landscape maintenance contractor shall coordinate his activities with other contractors on the site so as to not hinder the performance of any work.

1.2 SCHEDULE

All work under this Contractor shall be performed in accordance with the Schedule included.

1.3 CONTRACTOR'S PERFORMANCE

A. The Contractor's workmen shall be neat in appearance, perform their work in a professional manner, keep noise to a minimum and stage their work from a location on the site out of the way of the mainstream of the users.

1.4 NEGLECT AND VANDALISM

A. Turf, trees or plants that are damaged or killed due to Contractor's operations, negligence or chemicals shall be replaced at no expense to the Owner. If plant damage or death is caused by conditions beyond the Contractor's control, replacement shall be at the Owner's expense.

B. Sprinklers or structures that are damaged due to the Contractor's operations must be replaced by the Contractor promptly.

C. All water damage, either natural or man-made, resulting from Contractor's neglect shall be corrected at the Contractor's expense.

D. All damage to or thefts of landscaping and irrigation installations not caused or allowed by the Contractor shall be corrected by the Contractor.

1.5 JOB CONDITIONS

A. Contractor shall acquaint himself with all site conditions. Should excavation be required the Contractor shall promptly notify the utility coordination committed for utility locations. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations.

B. Contractor shall take necessary precautions to protect site conditions, irrigation and plants. Should damage be incurred, this Contractor shall repair damage to its original condition or furnish and install equal replacement at this expense.

1.6 EMERGENCIES

A. The Contractor shall answer emergency or complaint calls within twelve (12) hours and corrective action shall be complete within 24 hours.

B. The Contractor shall answer emergency calls regarding the landscape irrigation system failure or need of repair and take corrective action within eight (8) hours. Such work, unless caused due t neglect on the part of the Landscape Maintenance Contractor, shall be considered "Extra Services".

1.7 RESTRICTION

A. Do not use growth regulators or growth retardants on this job.

PART 2 - MATERIALS AND MACHINERY

2.1 IRRIGATION SYSTEM MATERIALS

Replacement materials throughout the system shall be as specified and/or noted on the “Contract Documents”, new and in perfect condition.

2.2 MATERIALS

Materials listed under this Section are expressly specified for use but does not prohibit or restrict the Contractor from providing other approved materials not listed in order to complete the work required herein. All materials shall be new and in perfect condition.

A. Pre-Emergence Weed Control: Contractor option (granular).

B. Post-Emergence Weed Control: Contractor option.

C. Herbicide, Insecticide, Fungicide: Contractor option.

D. Fungicide: Contractor option.

E. Fire Ant Control: Shall be slow release applied at six (6) week intervals. Spot treat weekly with a contact product where mounds appear. Alternate products for effective control.

F. Lawn Fertilizer: 15-5-10 with 50% sulphur coated urea and 4% iron.

G. Mulch: Shredded Hardwood mulch.

PART 3 - EXECUTION

3.1 LANDSCAPE IRRIGATION SYSTEM (FOR NEW AFFECTED IRRIGATION)

The Contractor shall monitor and program the automatic controlling device a total of 18 times a year to provide optimum moisture levels in all planted areas. The contractor is only responsible for this until final acceptance.

A. Irrigation cycles shall be set to take place prior to sunrise (usually 4:00 - 5:00 am unless otherwise instructed by the Owner.

B. Do not program controllers operating on the same water meter to water during the same time period so as to prevent over-draft of water meters. Do not switch controller to “off” at any time, except as required for testing and for maintenance operations.

C. Complete sprinkler system servicing shall be performed as required to maintain sprinklers in correct operating condition, including all required labor. April through September the operation of sprinklers shall be inspected and monitored on a twice-per-month basis to assure proper cover and operation. October through March monitor and inspect sprinklers once per month or upon the request of the Owner. This check shall include visual “inspection” of all accessible components of the irrigation system including but not limited to

controllers, remote control valves, quick couplers and heads.

D. Adjust sprinklers to avoid damage to windows, buildings and sign walls, also adjust heads to keep water off the street. Make repairs and alterations to the sprinkling system and water lines. All sprinkler repairs such as cleaning of heads or breaks caused by the Contractor shall be the Contractor's responsibility.

3.2 TREE MAINTENANCE (FOR NEW TREES ONLY)

A. Trees that may require guys, stakes or special care during the winter winds and rains shall received the required care prior to the time of rains and high winds to insure that no damage results to the plant material.

B. Contractor shall maintain staking and guying of trees at all times and shall be responsible for any damage to trees or plant materials caused by chafing or breakage of foliage or limbs coming in contact with stakes or guys. Replace broken plant stakes and ties as needed. If ties are too tight, they must be replaced or adjusted.

C. All suckers shall be continually removed from trees. Grass shall be trimmed at the base of trees in a manner that shall protect tree trunks from cutting of bark.

D. Annual tree pruning and/or shaping as needed. Always prune out dead wood. Refer to schedule. CONTACT OWNER PRIOR TO COMMENCING ANY PRUNING OR SHAPING WORK.

E. Spray all trees four times per years to control foliar feeding insects. The spray shall consist of alternately spraying 2 time (s) with an insecticide spray and 2 time (s) with a fungicide beginning in March, with the last spray in September.

3.3 SHRUB AND GROUNDCOVER BED MAINTENANCE (FOR NEW SHRUBS ONLY)

A. Weeding of all shrub, groundcover beds and seasonal color beds shall be performed twice monthly (total 24 times).

B. All shrub and groundcover beds shall be pruned 8 times a year March - October in an attempt to develop the natural form of the plant.

C. Pre-emergent weed control shall be applied 1 time in early spring and 1 time in late fall in planter beds only after careful thought of what is to occur in planters during the growing season.

D. All shrub, groundcover beds and seasonal color areas shall be fertilized 3 times per year at a rate of 2 pounds of fertilizer per 1,000 square feet.

April 1 - 22-0-6 / July 1 - 15-5-10 / October 1 - 22-0-6

3.4 TURF MAINTENANCE

A. Mowing: All common Bermuda and/or St. Augustine grass shall be mowed approximately every seven days March - October. During periods of mild weather the cut should not be lower than two (2") inches from the soil. Never

scalp the lawn or cut more than one-half (½) the existing top growth in one mowing. On irrigated areas, remove the clippings, never allowing visible clippings to remain on lawn surface more than four (4) hours. All sidewalks and curbs shall be edged as well as other objects (non-living) in the grass zone.

Allow grass to grow up to but not over sprinkler heads. Trim grass around heads with a circular sprinkler head trimmer. DO NOT USE “WEED-EATERS” TO TRIM AROUND SPRINKLER HEADS.

B. Watering: Provide a regular, deep watering program. The established turf should not be kept wet but should dry out somewhat between waterings. A twice weekly watering is good under regular conditions, but if it is hot or windy, water more often. In very hot weather, a fast watering with fine spray will cool the turf zone and can supplement the regular, deeper watering program. In shaded areas caused by trees, water more frequently because of the competition for soil moisture. If lawn wilts (shows grey-brown) water more frequently.

C. Lawn Fertilizer:

April 1	22-0-6 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.
May 15	24-6-12 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.
July 1	15-5-10 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.
August 15	15-5-10 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.
October 1	22-0-06 analysis applied at rate of 10# per 1,000 square feet. No sulphur coated urea, no iron.

D. Fertilizer: Trace elements in fertilizer shall be based on the recommendations of the soil laboratory.

The fertilization program will be closely monitored by the Owner. The Contractor shall prepare submittals prior to each application showing the area to be covered. The quantity of fertilizer to be applied and the rates of application.

E. Weed Control and Undesirable Grass - General:

1. Contractor shall use extreme care in the use of chemicals for weed

control. Before such applications are made, the turf should be well established and in a vigorous conditions. All chemical applications shall be properly licensed with the proper governing authorities.

3. The contractor shall carry the insurance required by the governing authority.

4. Apply chemicals at the manufacturer's recommended rate to achieve complete control of weeds and undesirable grasses.

5. All products utilized on this project must be labeled for turf use. Spot treatment of weeds and undesirable grasses shall be achieved without damaging the surrounding turf.

F. Weed and Undesirable Grass Control Schedule:

All Bermuda grass turf shall be sprayed 2 time(s) in early spring for preemergent control of crabgrass, dallasgrass, and other broadleaf grasses, and 2 time(s) in June-August for pre emergent control of winter weeds, for a total of 4 cycles.

NOTE: IF PERMANENT TURF ESTABLISHMENT IS NOT COMPLETE, DO NOT APPLY PRE-
EMERGENT HERBICIDE.

Summer/Fall Spot treat turf areas to achieve a minimum 98% pure stand of turf.

G. Insects: Control insects with regular applications of commercial insecticides at the manufacturer's recommended rate.

H. Diseases: When they first appear, spray for diseases with an approved commercial fungicide strictly according to the manufacturer's recommendations.

I. Maintain mulched saucers around all trees until establishment. Trim grass as required to prevent grass from encroaching into the saucer area. No "Weedeaters" shall be used around the trunk of any tree now, or at any time in the future.

J. If initial installation (any or all) of the project site is in winter rye, the Contractor will at that time change the mowing and trimming rate to 45 times a year. Contractor shall also during the 1 year maintenance period and at the appropriate season, chemically kill out Winter Rye and Hydromulch Bermuda.

K. One application of herbicide will be applied to overseeded turf to aid in the eradication of Rye Grass.

3.5 USE OF HERBICIDES, INSECTICIDES, STERILANTS, POISON, AND ANIMAL TRAPS

A. The Contractor is hereby granted permission to use such herbicides, insecticides, poison, and animal traps as it may find necessary and advantageous in its grounds maintenance activities. Herbicides, insecticides, sterilants, and animal traps must be used responsibly and in conformance with Federal, State and Local laws and regulations. The Contractor assumes all

liability for damage and/or injury resulting from accident or misuse of these products and/or equipment.

B. Product leaving an undesirable residue or odor (i.e., weed oil shall not be used.

C. The Owner shall be notified prior to application and advised of any danger associated with the use of these product (i.e., to avoid personal contact with sprayed areas, etc.

D. Apply insecticides as needed to protect all plant materials from damage. The insect control program shall include slugs and snails and advance preventive spraying for twip borers. The Contractors shall be responsible for the choosing of chemicals and insecticides he uses and shall be accountable for any misuse of same.

E. Apply the proper fungicide, herbicide and pesticides for the control of pests, weeds and plant diseases or treat cuts on turf, plants and trees.

3.6 GENERAL CLEAN UP

A. The Contractor shall dispose of all waste materials or refuse from his operations off the property.

B. All plant growth shall be prevented in any cracks in walks or within paved areas. Leaves, papers, grass clippings or other debris shall be removed at least weekly or at each visit from all areas.

C. Sweep site for refuse, dirt and other materials which may be deposited as a result of the maintenance operation.

D. Contractor will evaluate mulch 4 after installation. Mulch must be per specification at acceptance.

PART 4 - SCHEDULE

The Schedule as included herein shall govern the Work. Should the Contractor require an alteration of the Schedule, contact the Owner.

PART 5 - MAINTENANCE SCHEDULE (NEW SHRUBS/TREES ONLY)

ITEM	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
Mow			2	4	4	5	5	5	5	4	2		36
Edge/Trim			2	4	4	5	5	5	5	4	2		36
Clean/Weed beds/Trash	2	2	2	2	2	2	2	2	2	2	2	2	24
Sprinkler	1	1	1	2	2	2	2	2	2	1	1	1	18
Fertilize (lawn)				1	1		1	1		1			5
Post-Emergent (lawn)			1	1		1		1					4

	Post emergent of winter weeds						Post emergent of crabgrass and other broadleaf grasses						
Fertilize (beds, Incl. ground cover			1		1		1						
Cultivate beds			1			1	1	1	1				
Prune (shrubs)			1	1	1	1	1	1	1	1			
Prune (ground cover)			1	1	1	1	1	1	1	1			
Insect/Disease control (lawn and beds)													As needed
Trees (insecticide)			1			1							
Trees (fungicide)				1					1				

END OF SECTION

SECTION 32 13 13

PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

SUMMARY

1. Extent of portland cement concrete paving is shown on drawings, including curbs, gutters, walkways, and pavement.

2. Prepared subgrade is specified in "Lime Stabilization" Section 02241.

3. Concrete and related materials are specified in Division 3.

4. Joint fillers and sealers are specified in Division 7.

SUBMITTALS

1. Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

2. Pavement marking plan indicating lane separations and defined parking spaces. Note dedicated handicapped sapces with international graphics symbols in accordance with requirements of Article 601b, Vernon’s Texas Civil Statues, Article 7.

QUALITY ASSURANCE

1. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

JOB CONDITIONS

1. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

MATERIALS

1. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

2. Use flexible spring steel forms or laminated boards to form radius bends as required.

3. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.

4. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.

5. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

6. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

7. Expansion Joint Materials: Comply with requirements of applicable Division 7 sections for preformed expansion joint fillers and sealers.

8. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

9. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.

10. Epoxy Adhesive: ASTM 881, 2-componenet material suitable for use on dry or damp surfaces. Provide material “Type”, “Grade”, and “Class” to suit project requirements.

11. Lane Marking Paint: Alkyd-resin type, ready-mixed complying with AASHto M 248, Type I.

CONCRETE MIX, DESIGN, AND TESTING

1. Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control and as herein specified.

2. Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:

    a. Compressive Strength: 3000 psi, minimum at 28 days, unless otherwise indicated.

    b. Slump Limit: 8 inches minimum for concrete containing high- range water-reducing admixture (superplasticizer); 3 inches for other concrete.

    c. Air Content: 5 to 8 percent.

PART 3 - EXECUTION

SURFACE PREPARATION

1. Remove loose material from compacted treated subbase surface immediately before placing concrete.

2. The top 6-inches of subgrade shall be treated with six percent (6%) lime (THD Item 260). Mixture to be uniformly compacted to a minimum of ninety-five percent (95%) of its maximum standard Proctor dry density (ASTM D-698) near its optimum moisture content. Lime treated subgrade shall extend 1’-0” minimum beyond back of curb.

FORM CONSTRUCTION

1. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

2. Check completed formwork for grade and alignment to following tolerances:

3. Top of forms not more than 1/8 inch in 10 feet.

4. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

5. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

6. Slope step treads at 1/4 inch per foot to drain.

REINFORCEMENT

1. Locate, place, and support reinforcement as specified in Division 3 sections, unless otherwise indicated.

CONCRETE PLACEMENT

1. General: Comply with requirements of Division 3 sections for mixing and placing concrete, and as herein specified.

2. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

3. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

4. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

5. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

6. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.

JOINTS

1. General: Construct expansion, and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

2. When joining existing structures place transverse joints to align with previously placed joints, unless otherwise indicated.

3. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas at 25 foot on centers. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

    a. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

    b. Tooled Joints: Form weakened plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

4. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.

    a. Construct joints as shown or, if not shown, use standard metal keywaysection forms.

    b. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

5. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.

    a. Locate expansion joints at 50 feet o.c. for each pavement lane unless otherwise indicated.

    b. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface.

    c. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

    d. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

6. Fillers and Sealants: Comply with requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

CONCRETE FINISHING

1. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

2. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

3. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

4. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

5. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect.

6. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.

7. Burlap finish by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture acceptable to Architect.

8. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

CURING

1. Protect and cure finished concrete paving in compliance with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

2. Antispalling Treatment: Apply treatment to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt, and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 s.f. per gallon. Apply antispalling compound in two (2) sprayed applications. The first application shall be at a rate of 40 sq. yds. per gallon; second application, 60 sq. yds. per gallon. Allow complete drying between applications.

REPAIRS AND PROTECTIONS

1. Repair or replace broken or defective concrete, as directed by Architect.

2. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with

3. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

4. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 32 13 13

SECTION 32 13 14

WHEELCHAIR RAMP

PART 1 - GENERAL

1.1. DESCRIPTION

The work as specified in this section includes all labor, materials, and equipment necessary to complete the wheel chair ramp installation as shown on the plans, directed by the Engineer and specified herein. Refer to City of Rockwall standard details provided in the construction plans.

1.2. MEASUREMENT AND PAYMENT

The installation of wheel chair ramps shall be measured per each and shall be paid for at the unit price shown in the proposal for the specified item. The bid price for each wheel chair ramp shall be full compensation for all materials, equipment, labor, and incidental work, including excavation and backfill, necessary to complete the work.

Wheel chair ramps as completed for payment shall conform to the details as shown on the plans and in the specifications and shall meet the requirements of the City

PART 2 - MATERIALS

2.1. MATERIALS

The concrete for this section shall be Class "A" as defined in Item 530, "Concrete Curb, Gutter Sidewalks and Driveways", of the 1982 Standard Specifications for Construction of Highways, Streets, and Bridges, adopted by the State Highway Department of Texas of September 1, 1982.

PART 3 - EXECUTION

3.1. EXECUTION

Wheel chair ramps shall be constructed as shown on the plans or as directed by the Engineer. All wheel chair ramps shall be constructed in accordance with the details and shall match adjacent surfaces with respect to materials, finished elevations and grades, and depth as shown on the plans or as directed by the Engineer.

END OF SECTION 32 13 14

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SECTION 32 13 15

CONCRETE CURB AND GUTTER

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work, as specified in this section, includes all labor, equipment, materials and incidentals necessary to remove existing curb and gutter and to construct reinforced concrete curb and gutter to the size, shape, lines and grade as shown on the plans or as directed by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The concrete for this section shall be Class "A" as defined in Item 421, "Concrete for Structures", of the *1982 Standard Specifications for Construction of Highways, Streets, and Bridges*, adopted by the State Highway Department of Texas on September 1, 1982.

PART 3 - EXECUTION

3.1 EXCAVATION

A. The subgrade shall be excavated and shaped to line, grade and cross section, and, if considered necessary in the opinion of the Engineer, hand tamped and sprinkled. If dry, the subgrade material shall be sprinkled lightly immediately before concrete is deposited thereon. Curb and Gutter construction shall not begin until the subgrade has been prepared in accordance with the City's Specifications, and has been accepted by the Engineer.

3.2 REINFORCING STEEL

A. All steel reinforcement shall be accurately placed as shown on the plans and held in place during progress of concreting by such effective means that it shall not be moved out of true position. All bars shall be wired at their intersections and at all laps or splices. All bars at splices shall be lapped a minimum of 20 diameters of the bar or 12 inches, whichever is greater.

B. All reinforcement necessary for a section of concrete shall be placed and approved by the Owner before any concrete is deposited in the section. All steel must be free from paint and oil; and all loose scale, rust, dirt and other foreign substances shall be completely removed before using.

3.3 FORMS

A. All forms shall be made of wood or steel and framed, braced or staked in a substantial and approved manner so as to insure true alignment and grade. All forms shall be clean and shall be oiled immediately before concreting. Care shall be taken in removing forms to prevent marring or spalling of the concrete. Forms shall extend the full depth of the concrete and be a minimum of 1-5/8 inches in thickness or equivalent when wooden frames are used or be of a gauge that shall provide equivalent rigidity and strength when metal forms are used.

3.4 EXPANSION JOINTS

A. Expansion joints shall be constructed using expansion joint material of an approved type. Expansion joints shall be placed in the curb and gutter, at 40 feet intervals or as specified by the Owner. Tooled joints shall also be placed at five-foot intervals or matching abutting sidewalk joints. Expansion joints shall be placed at all intersections with concrete driveways, curbs and

other curb and gutter. All expansion joints shall be a minimum of 1/2 inch in thickness, extending the full depth of the concrete; and shall be perpendicular and at right angles to the face of the curb. Any expansion joint material extending above the finished work shall be neatly trimmed to the surface of the finished work. Longitudinal dowels, across the expansion joints in the curb and gutter shall be required. Dowels shall be supported by an approved method to provide true horizontal and longitudinal alignment. All joints shall be constructed in a neat and workmanlike manner, with edges rounded, in conformity with the plans and specifications; and at locations as shown on the plans or as directed by the Engineer.

3.5 CONCRETE PLACEMENT

A. No concrete shall be placed when the air temperature is less than 35 degrees Fahrenheit unless permission is granted by the Engineer. Concrete shall be deposited so as to maintain a horizontal surface and shall be

B. thoroughly and continuously worked into all spaces and around all reinforcement so as to form a dense voidless mass. The coarse aggeregate shall be worked away from contact with the forms so as to form a smooth, hard exposed concrete surface. The concrete for curb and gutter shall preferably be placed continuously between expansion joints.

3.6 FINISHING

A. After the concrete has been struck off and while it is still plastic, the exposed surfaces may be plastered with a 1/4 inch mortar topping. The mortar topping shall be applied with a steel "mule", or finishing tool or method which produces results equivalent to that obtained with the mule. All exposed surfaces shall then be floated or troweled and lightly brushed as required by the Owner to produce a smooth and uniform finish. Excess working of the surfaces shall be avoided. Excess water, laitance and inert materials shall be removed from the surface. All honeycombed areas disclosed by removal of forms shall be immediately chipped out and patched with portland cement mortar.

3.7 CURING

A. After finishing operations are completed, the concrete surface shall be sprayed with concrete curing compound. The surface of the concrete shall be kept thoroughly damp between the completion of the finishing operations and the application of the curing compound. The curing compound shall be applied under pressure, by means of a spray nozzle, at a rate not to exceed 200 square feet per gallon.

B. A minimum of 72 hours curing time shall be required. Should the Contractor elect to remove the forms before the minimum curing time has elapsed, he shall apply curing compound to the newly exposed vertical surfaces. Forms shall remain in place at least 24 hours after completion of the concrete placement for the curb and gutter. The curb and gutter shall be backfilled to the full height of the concrete, tamped and sloped as directed.

END SECTION 32 13 15

SECTION 32 14 05

TRACK CONSTRUCTION AND SURFACING

PART 1 – GENERAL

1.01 DESCRIPTION

Specifications for preparation of existing track to be constructed and surfaced.

1.02 DIMENSION INFORMATION

Reconstruct and Resurface Facility
Track: 6-8 LANE
400 Meter Track - Construct and Surface
North Chute: Construct and Surface
South Chute: Construct and Surface
Field Events: 1 - Long Jump. 1 – High Jump 1 – Pole Vault resurfaced

CONTRACTOR TO FIELD VERIFY EXISTING TRACK DIMINSIONS AT THE SITE PRIOR TO SUBMITTING BID.

PART 2 – EXECUTION

2.01 SITE PLAN

Contractor will be responsible for establishing a grading plan for proper drainage of track for resurfacing reconstruction and resurfacing.

2.02 PRIME COAT

A. Contractor shall remove existing track and surface material and dispose of properly. Contractor shall install new track per the details in the plans and protect existing concrete curbs.

2.05 NEW COURSE

A. Install new track per details in the plans.
B. Existing drainage slope as shown on the detail drawing will be maintained.
C. After compaction, the asphalt should be level with existing inside curb and elevation correction should be achieved on the outside edge of existing concrete curb.
D. Contractor shall be responsible for establishing and maintaining proper grade elevation.
E. Drainage slope as established in subgrade across the track area to the inside shall be followed. Drainage slope shall be uniform for the track area, and shall be a minimum of 2% slope across the track from outside to inside.

PART 3 – OTHER

3.01 GRADES

Contractor shall be responsible for establishing all grades as required for installation of materials.

3.02 TESTING

Testing is required and shall be the responsibility of the OWNER.

END OF SECTION

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SECTION 32 14 08

POLYURETHANE TRACK SURFACING

PART 1 - GENERAL

1.01 DESCRIPTION

Track surface system shall be a synthetic, homogeneous, resilient material of gradated rubber chips and proprietary rubber binding agents designed as a resilient surfacing for competitive athletic running tracks. Standards from materials and applications of materials are set herein and will be strictly adhered to for purposes of this installation. For purposes of standards, Hellas 300, by Hellas Construction, Inc. or an approved equal that meets standards will be considered.

PART 2 - MATERIALS

2.01 BASE RUBBER GRANULES

Processed SBR rubber granules chipped and gradated to 1 to 3 mm, containing less than 4% dust. They shall meet the following standards:

Material	Content Standard
Rubber hydrocarbon	40%
Carbon black	30%
Acetone extract	15%
Ash	8%
Moisture	1%

2.02 STRUCTURE RUBBER GRANULES

Processed rubber granules chipped and gradated to exact specifications 0.5 to 1.5 mm gradation meeting the following standards:

	Standard
EPOM rubber	30% content
Pigment	10% content
Density	.08 (1.6)
Elongation at break	350%
Tensile strength	200 psi minimum

2.03 BINDER

A proprietary, elastic polyurethane prepolymer pure MDI based, none to low odor, and ozone resistant capabilities to provide outstanding binding and resilient characteristics. The binding agent must be specially formulated for compatibility with EPDM rubber granules. It shall not contain TDI.

2.04 STRUCTURE COAT BINDER

Structure coat binder shall be a proprietary elastic, two-component pigmented synthetic polyurethane with unusually high ultraviolet resistance to minimize fading.

2.05 LINE PAINT

Lane stripes and event markings will be only aliphatic single component line paint approved by manufacturer of track surfacing material. Under no conditions will other types of paint be substituted.

2.06 SYSTEM INFORMATION

A. Color: Black

B. Composition: Porous
C. Materials: 10 mm BASIC (black mat) contents shall be 80% SBR rubber granules, 20% single component polyurethane by weight with a structure spray coating of pigmented 2-component MDI polyurethane and high resistant .5 to 1.5 mm EPDM rubber granules. The spray coating shall be applied to a total of approximately 3.6 lbs. per square yard in two applications. Total depth of surface shall be 13 mm.

PART 3 - EXECUTION

3.01 PRIMER

To ensure the bonding of the synthetic surface to the asphalt leveling course, the leveling course shall be prepared with a single component high track polyurethane primer to a two-component epoxy primer. Apply at the rate of 0.4 lbs. per square yard using an airless spray machine. Allow 20 to 30 minutes for solvent in the tack coat to evaporate.

3.02 MIXING

Quantities of materials determined by proven formulas of manufacturer shall be thoroughly mixed in an approved mechanical mixer to produce a homogeneous blend. Components shall be mixed to totally encapsulate the rubber granules in binder to ensure bonding.

3.03 PLACEMENT

Surface shall be placed utilizing a special paver designed for installation of such sport surfaces. To ensure good compaction and bond in the joints, the screed of the machine shall be heated to 160 degrees Fahrenheit.

Installation of surfacing shall not be done in temperatures lower than 50 degrees Fahrenheit. As polyurethane prepolymer needs humidity to react to an elastic binder, it is essential to have a minimum humidity of 35%. If the humidity is less than 35%, within one hour after application, a dome of humidity shall be created by spraying an extremely fine mist of water over the area of application.

3.04 STRUCTURE COAT

The surface coat shall be a structural spray coating made from a pigmented two component polyurethane mixed with EPDM granules applied by a spray coating machine capable of handling the dense mixture.

3.05 CURING

Surface application shall receive adequate curing as determined by manufacturer. This time shall require two weeks, unless otherwise specified.

PART 4 - LIMITATIONS

4.01 TEMPERATURE

Applications shall not be applied if outside temperature is below 50 degrees Fahrenheit.

4.02 WEATHER

Applications shall not be applied during adverse weather conditions.

4.03 APPLICATION

Applications shall be supervised by personnel trained and qualified to perform such applications.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SCOPE: Provide pavement markings and signs as described on the plans and as detailed in this section.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

PORTLAND CEMENT CONCRETE PAVING	SECTION 32 13 13

1.03 SUBMITTALS: Submit complete manufacturer's product data sheets for marking paint.

PART 2 - PRODUCTS

2.01 MATERIAL: Reflectorized Pavement Marking Paint: Traffic marking paint TXDOT Specifications Item 666, Type II, white, yellow, blue or red in color as called for:

2.02 EQUIPMENT: Equipment shall be pressurized, self-contained paint machine capable of applying a straight line from tow (2") to six (6") inches wide, with consistent coverage of a minimum of one hundred (100) square feet per gallon.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Locate markings and signs as required by drawings and details in this section. Provide qualified technician to supervise equipment and application of markings. Lay out markings using guide lines, template, and forms.

B. Thoroughly clean surfaces free of dirt, sand, gravel, oil, and other foreign matter prior to application of paint.

3.02 APPLICATION OF PAINT:

A. Surfaces shall be dry. Application shall not be made when weather if foggy or rainy, or ambient or pavement temperatures are below 50 degrees Fahrenheit, nor when such conditions are anticipated during eight hours after application.

B. Apply marking paint at a rate of one gallon per 100 square feet, apply markings straight and even in accordance with approved layout. Stripes shall be four (4") inches wide, except where noted otherwise.

C. Refer to TxDOT Specification Item No. 666 for application of Glass Beads.

3.03 FIRE LANE STRIPING: Stripe fire lane as shown on the plans and as required meeting city requirements.

3.04 FIRE HYDRANTS: A blue Stimsonite, Fire-Life reflector, or approved equal, shall be placed in the center of streets opposite all fire hydrants upon completion of paving operations per requirements of the city.

END OF SECTION 32 17 23

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SECTION 32 17 24 - TRACK MARKING

PART 1 - GENERAL

1.01 DESCRIPTION

Specifications are for the marking of the track for standards required for running all races in a Texas high school track meet as defined by the governing body for such institution. Markings shall conform to specifications as listed in the official rule book of the National Federation of State High School Associations or other such governing body for track and field rules.

PART 2 – MATERIALS

2.01 LINE MARKING PAINT

Line marking paint shall meet manufacturer's specifications for type of running surface installed (polyurethane - aliphatic). **Under no conditions will oil or alkyd base paints be substituted on any type of track surfacing material.**

PART 3 – EXECUTION

3.01 LINES

Lines shall be two-inch wide lines, accurately located and marked by snapping a chalked line, and painted by an approved mechanical line marking machine. **Ragged lines will not be accepted.**

3.02 MARKINGS

Track marking shall include but not limited to lane striping; start and finish lines; exchange zones; international tabs; all stagger starts; hurdle tabs; lane numbers; and other markings necessary for running all standard track and field event races.

3.03 VERIFICATION

Track shall be marked with chalk for equal lanes and for accurate metric distances. Prior to application of lane marking paint, OWNER will verify all markings.

PART 4 – OTHER

4.01 MEASUREMENTS

All measurements shall be perfomed by personnel who are competent, experienced and fully qualified to perform measurements for marking tracks for track and field events. Contractor shall be responsible for verification and certification of track markings to OWNER.

4.02 RADIUS AND CONTROL POINTS

Contractor shall locate and establish radius points and set all control points necessary for the accurate construction and markings of the track.

4.03 COLOR CODING

Contractor shall provide OWNER with a color coded chart that identifies all starting lines, exchange zones, etc. Color coding of starting lines shall be standard colors as allowed (depending on color of track surface).

4.04 CLEAN-UP

The contractor is responsible for all debris and clean-up.

END OF SECTION 32 17 24

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SECTION 32 17 33

JOINT SEALERS

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 SUMMARY:

A. Extent of each form and type of joint sealer is indicated below and supplemental information shall be found on the drawings.

B. This Section includes joint sealers for the following locations:

1. Exterior joints in horizontal traffic surfaces as indicated below:

i. Control, expansion, and isolation joints in cast-in-place concrete paving.
ii. Joints between different materials listed above.
iii. Other joints as indicated.

1.3 SYSTEM PERFORMANCES:

A. Provide joints sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.4 SUBMITTALS:

A. Product Data from manufacturer's for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples for Initial Selection Purposes: Manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.

C. Samples for verification purposes of each type and color of joint sealer required. Install joint sealer samples in 1/2 inch wide joints formed between two 6 inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealers.

D. Certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

E. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project name, addresses, names of Architects and Owners, plus other information specified.

F. Product test reports for each type of joint sealers indicated, evidencing compliance with requirements specified.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this Project.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

C. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division-1 section covering this activity.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi component materials.
B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS:

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40 deg F (4.4 deg C).

2. When joint substrates are wet due to rain, frost, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 SEQUENCING AND SCHEDULING:

A. Sequence installation of joint sealers to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

C. Warranty Period: Two years from date of Substantial Completion.

D. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

E. Warranty Period: 5 years from date of Substantial Completion for urethanes and 20 years for exterior silicones.

F. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

G. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.

H. Disintegration of joint substrates from natural causes exceeding design specifications.

I. Mechanical damage caused by individuals, tools, or other outside agents.

J. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide a color of exposed joint sealer as selected by Architect from manufacturer's standard colors.

2.2 ELASTOMERIC JOINT SEALANTS:

A. One-Part Nonsag Urethane Sealant for Use T: Type S; Grade NS; Class 25, and complying with the following requirements for Uses:

1. Uses T, NT, A, and, as applicable to joint substrates indicated, O.

2. Application: Exterior horizontal joints subject to vehicular and pedestrian traffic. Interior horizontal joints subject to vehicular and pedestrian traffic and not indicated to receive expansion control assemblies.

B. Single Part Pourable Urethane Sealant for Use T (at exterior paving): Type S; Grade P; Class 25, and complying with the following requirements for Uses:

1. Uses T, A, and, as applicable to joint substrates indicated, O.

2. Application: Exterior horizontal joints subject to vehicular and pedestrian traffic.

C. Available Products: Subject to compliance with requirements, elastomeric sealants which may be incorporated in the Work include, but are not limited to, the following:

1. One-Part Nonsag Urethane Sealant for Use T:

"Chem-Calk 900"; Bostik Construction Products Div. 800-523-2678 www.bostik.com/bostikusa.com
"Permapol RC-1"; Products Research & Chemical Corp.
"Sikaflex-1a"; Sika Corp. 800-933-7452 www.sika.com
"Sikaflex-15LM";Sika Corp. 800-933-7452 www.sika.com
“NP 1”; Sonneborn Building Products Div., Chemrex Inc. 800-243-6739 www.chemrex.com
“Vulkem 116”; Tremco, Inc. 800-321-7906 www.tremcosealants.com

2. One Part Pourable Urethane Sealant for Use T (at exterior paving):

"Vulkem 45, Vulkem 45SSL"; Tremco, Inc. 800-321-7906 www.tremcosealants.com
"NR-201 Urexpan"; Pecora Corp. 800-523-6688 www.pecora.com
"SL 2"; Sonneborn Building Products Div., Chemrex Inc. 800-243-6739 www.chemrex.com
"Stonflex SN6"; Stonhard, Inc. 800-257-7953

3. Multicomponent Pourable Urethane Sealant for Use T:

"THC 900-901"; Tremco, Inc. 800-321-7906 www.tremcosealants.com

2.3 COMPRESSION SEALS:

A. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellant agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:

1. Properties: Permanently elastic, mildew- resistant, non-migratory, non-staining, compatible with joint substrates and other joint sealers.

    a. Impregnating Agent: Manufacturer's standard.
    b. Density: Manufacturer's standard.

2. Backing: Where required, provide backings suitable for intended use, compatible with joint substrates and other joint sealers, designed to work in conjunction with primary sealants in dual- sealant systems.

3. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

    "Emseal"; Emseal Corp. 800-972-3677 www.emseal.com
    "Emseal Greyflex"; Emseal Corp. 800-972-3677 www.emseal.com
    "Polytite R"; Polytite Manufacturing Co., Inc. 800-776-0930 www.polytite.com
    "Polytite Standard"; Polytite Manufacturing Co., Inc. 800-776-0930 www.polytite.com
    "Will-Seal 150"; Will-Seal Construction Foams Div., Illbruck. +49-2171-391-258
    "Will-Seal 250"; Will-Seal Construction Foams Div., Illbruck. +49-2171-391-258
    "York-Seal 100"; York Manufacturing, Inc. 800-551-2828 www.yorkflashings.com
    "York-Seal 200"; York Manufacturing, Inc. 800-551-2828 www.yorkflashings,com

B. Preformed Hollow Neoprene Gasket: Manufacturer's standard preformed polychloroprene elastomeric joint seal of the open-cell compression type complying with ASTM D 2628 and with requirements indicated for size, profile and cross-sectional design.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

    a. The D.S. Brown Co. 419-257-3561 www.dsbrown.com
    b. Watson-Bowman & Acme Corp. 770-509-1460 www.watsonbowman.com

2.4 JOINT SEALANT BACKING:

A. General: Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam of material indicated below; nonabsorbent to water and gas; and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

1. Install only closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer, for cold-applied sealants only.

C. Elastomeric Tubing Joint-Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F (-15 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS:

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturer of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.

C. Masking Tape: Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

2.6 JOINT FILLERS FOR CONCRETE PAVING:

A. General: Provide joint fillers of thickness and widths indicated.

B. Bituminous Fiber Joint Filler: Preformed strips of composition below, complying with ASTM D 1751: Asphalt saturated fiberboard.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine joints indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply

primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALERS:

A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint-fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

2. Do not leave gaps between ends of joint-fillers.

3. Do not stretch, twist, puncture or tear joint fillers.

i. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.

4. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

5. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.

2. Provide flush joint configuration per Figure 6B in ASTM C 962, where indicated.

F. Use masking tape to protect adjacent surfaces of recessed tooled joints.

1. Provide Recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

G. Installation of Preformed Foam Sealants **(use at expansion joints, joints larger than 1/2" and as indicated in drawings)**: Install each length of sealant immediately after removing protective wrappings, taking care not to pull or stretch material, and complying with sealant manufacturer's directions for installation methods, materials and tools which produce seal continuity at ends, turns,

and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

H. Installation of Preformed Hollow Neoprene Gaskets: Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gaskets together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8 inch to 1/4"inch.

3.4 CLEANING:

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.5 PROTECTION:

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION 32 17 33

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SECTION 32 31 14

PREMANUFACTURED STEEL FENCING

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 this Section.

1.2 SUMMARY

A. This section includes the following:

1. Pre manufactured Fencing.

B. Related Sections include the following:

2. Division 2 Section "Site Grading" for filling and for grading work.
3. Division 3 Section "Cast-in-Place Concrete" for concrete equipment bases/pads for gate operators, drives, and controls post footings.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install the following metal fencing to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 250 lbf applied at any point non concurrently, vertically downward, or horizontally.

b. Uniform load of 50 lbf per linear ft. Applied non concurrently, vertically downward or horizontally.

c. Concentrated and uniform loads above need not be assumed to act concurrently.

B. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.

1. Above load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guard.

1.4 SUBMITTALS

A. Product data for each type of fencing specified, with installation instructions for each unit built-in or connected to other construction. Include methods of installation for each type of substrate.

B. Shop drawings showing installation details of fencing, including full scale installation details of special conditions.

C. Where installed metal fencing is indicated to comply with certain design loadings, include structural computations, material properties, and other information presenting the complete structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.

D. Samples for initial selection purposes consisting of manufacturer's standard size samples showing full range of colors, textures, and patterns available for each type of fencing and accessory required.

E. Samples representative of materials and finished products as may be requested by Architect.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.

B. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fencing similar in material, design, and extent to that indicated for this Project.

C. Single Source Responsibility: Provide material produced by a single manufacturer.

1.6 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fencing must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

B. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

B. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

1.8 SEQUENCE AND SCHEDULING

A. Inserts and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

B. Sequence outdoor metal fencing installation with other work to minimize possibility of damage and soiling during remainder of construction period.

1.9 MAINTENANCE

A. Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under

anticipated use conditions. Include precautions against materials and method which may be detrimental to finishes and performance.

1.10 WARRANTY

A. Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace units that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:

1. Structural failures, including excessive deflection.

2. Faulty operation.

3. Deterioration of metals, metal finishes and other materials beyond normal weathering.

B. Warranty Period: 10 years after the date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURER: Ameristar. 1-800-321-8724 www.ameristarfenceproducts.com

2.2 MATERIALS:

2.3 FERROUS METALS

A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Steel Tubing shall be manufactured from coil steel having yield strength of 42,000 psi and tensile strength of 58,000 psi.
1. Provide tubing with hot-dip galvanized coating per ASTM A 526.

C. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

E. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.4 GROUT AND ANCHORING CEMENT

A. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include but are not limited to the following:

2. Nonshrink Nonmetallic Grouts:

"Bonsal Construction Grout"; W.R. Bonsal Co.
"Diamond-Crete Grout"; Concrete Service Materials Co.
"Euco N-S Grout"; Euclid Chemical Co. 1-800-321-7628 www.euclidchemical.com
"Kemset"; Chem-Masters Corp.
"Crystex"; L & M Construction Chemicals, Inc.
"Masterflow 713"; Master Builders. 1-800-628-9990 www.masterbuilders.com
"Sealtight 588 Grout"; W.R. Meadows, Inc. (817) 834-1969 www.wrmeadows.com
"Sonogrout"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.952-496-6000 www.chemrex.com/sonneborn/so_abo.htm
"Stoncrete NM1"; Stonhard, Inc. (856) 779-7500 www.stonhard.com
"Five Star Grout"; U.S. Grout Corp.
"Vibropruf #11"; Lambert Corp. 800-432-4746

2.5 PAINT:

A. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing damaged surfaces in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.

2.6 FASTENERS

B. General: Provide zinc-coated fasteners with polymer coating to match the fencing system. Select fasteners for the type, grade, and class required. Equip items with theft-proof fasteners where accessible to tampering.

1. Pop-rivets shall not be used.

2.7 METAL FENCING, GUARDRAIL, AND GATES:

A. Design Criteria: The drawings indicate the size, profile, and dimensional requirements of metal fencing work required and are based on the specific types and models indicated. Metal fencing by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

B. Design Basis: "Majestic" Commercial Class ornamental fencing, Ameristar. 1-800-321-8724 www.ameristarfenceproducts.com

1. Pattern: Quadrail, #205.

2. Provide Class 2-A fencing with 3/4-inch square 18 gauge pickets, 1-1/2-inch square 15 gauge rails, and 2-1/2-inch square 14 gauge posts.

3. Provide "Monarch" style fittings unless otherwise indicated.

4. Post Cap: Provide ball-top post caps, typical.

a. Provide pressed steel post cap where indicated.

5. Gate: Provide manufacturer's standard fully welded gate construction with wrap-around frame hinges, fully pad-lockable fork latch, and cane bolt.

2.8 FABRICATION, GENERAL

A. Provide metal fencing and accessory items, both free standing and permanently installed, equipped with functions as specified. Fabricate units with tight seams and joints, exposed metal edges rolled. Manufacturer or product identification on exposed surfaces is unacceptable. Provide products with smooth welds, consistent finish with no evidence of wrinkling, chipping, uneven coloration, dents, or other imperfections.

1. Pickets, rails, and posts shall be pre-cut to specified lengths. Posts shall be pre-punched to accept rails and fasteners; rails shall be pre-punched and pre-drilled to accept pickets and fasteners.

2. Gates shall be fabricated using the same materials as for the complete fencing system. Gate frames shall be made from tubing having the same cross-section as that for the fence rails. Provide number of hinges as recommended by the manufacturer, but in no case less than three hinges per gate.

2.9 FINISHES

A. Galvanizing: All iron and steel fencing components shall be galvanized. Apply zinc-coating by the hot-dip process in compliance with the following requirements:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 526 for galvanizing all other iron and steel products, with minimum zinc coating weight of 0.60 oz. per square foot (Coating Designation G-60)

B. Provide manufacturer's polyester powder coating on all metal exposed to view. The coating material shall be thermoset glycidal-polyester supplied as a homogeneous free-flowing powder applied by electrostatic spray. Cured coating shall be capable of withstanding 500 hours of salt spray without creep when tested according to ASTM B117. Coating shall achieve a dry film thickness of 2 to 4 mils.

1. Color: As selected by Architect from manufacturer's standard and custom colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

B. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing premanufactured fencing to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of premanufactured fencing. Set fencing accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

    a. Obtain fusion without undercut or overlap.
    b. Remove welding flux immediately.

2. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.3 INSTALLATION OF PREMANUFACTURED FENCING

A. Adjust fencing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts in concrete by means of tube sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

    a. Nonshrink, nonmetallic grout.

    b. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch build-up, sloped away from post. Seal anchoring material to comply with grout manufacturer's directions.

3.4 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.

1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 32 31 14

SECTION 32 31 15
CHAIN LINK FENCE
PVC COLOR COATED CHAIN LINK FABRIC ON GALVANIZED FRAMEWORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Poly Vinyl Chloride (PVC) coated chain link fabric with galvanized steel framework and accessories for commercial or industrial applications.

1.02 RELATED SECTIONS

01 33 13 Certifications
01 33 23 Shop drawings, product data
01 43 13 Manufacturers Qualifications
01 43 13 Installer qualifications
01 45 00 Quality control
01 65 00 Product delivery requirements
03 30 00 Cast-In-Place Concrete
25 50 00 Integrated automation, gate operators/access control
32 31 13.23 Recreational Court Fences and Gates
32 31 13.26 Tennis Court Fences and Gates
32 31 13.33 Chain Link Backstops
32 1 13.53 High-Security Chain Link Fences and Gates

1.03 REFERENCES [delete references not applicable to project]

A. ASTM A36 Standard Specification for Carbon Structural Steel

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings

C. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, Wire Profiles and Tubes

D. ASTM F552 Standard Terminology Relating to Chain Link Fencing

E. ASTM F567 Standard Practice for Installation of Chain Link Fence

F. ASTM F626 Standard Specification for Fence Fittings

G. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric

H. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates

I. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials

J. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework

K. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

L. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates

M. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

N. ASTM F1665 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used With Chain Link Fence

O. ASTM F1910 Standard Specification for Long Barbed Tape Obstacles

P. ASTM F1911 Standard Practice for Installation of Barbed Tape

Q. ASTM F2200 Standard Specification for Automated Vehicular Gate Construction

R. UL 325 Door, Drapery, Gate, Louver and Window Operators

S. WLG2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing

1.04 SUBMITTALS

A. Changes in specifications may not be made after the bid date.

B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: If requested, samples of materials (e.g., fabric, wires, color, and accessories).

1.05 QUALITY ASSURANCE

A. Manufacturer: Company having manufacturing facilities in the United States with 5 years experience specializing in manufacturing of chain link fence products.

B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.

C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

D. Substitutions: Alternate chain link products may be acceptable by the architect as equal if approved in writing ten days prior to bidding provided that the items submitted meet the specifications contained in this document.

E. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

PART 2 - PRODUCTS

2.01 MANUFACTURER

Approved Manufacturer: Master Halco, Inc.
One City Blvd., Suite 900
Orange, CA 92868
Phone (800) 229-5615 Fax (714) 385-0107
www.masterhalco.com, E-mail: spec@fenceonline.com

2.02 CHAIN LINK FENCE FABRIC

A. Poly Vinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class _____
[Class 1 Extruded over metallic coated steel wire]
[Class 2a Extruded and adhered to metallic coated steel wire]
[Class 2b Fused and adhered to metallic coated steel wire]

[see Fabric Selection Table for mesh size, wire gauge, break load and selvage, knuckle (K) or twist (T), to fit application]

B. Size and height: Chain link fabric (in.) (mm) mesh, ( ) gauge, (in.) (mm) diameter steel core wire having a break load of ( ) lbf (N), height (in.) (mm).

C. Selvage of fabric _____at top and _____ at bottom.

D. Color of chain link fabric per ASTM F934 [Dark Green] [Brown] [Black]

2.03 STEEL FENCE FRAMEWORK

[select post specification that best fits application]

A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface.
Regular Grade: Minimum steel yield strength of 30,000 psi (205 MPa) [all sizes]
Intermediate Strength Grade: Minimum steel yield strength of 50,000 psi (344 MPa) [in sizes 6.625" and 8.625" (168.3, 219.1 mm) OD only]
High Strength 83000 Grade: Minimum steel yield strength 83,000 psi (572 MPa) [all sizes up to and including 4.00" OD (101.6mm)] [special order]

B. Steel pipe Type II: Cold formed electric resistance welded steel pipe complying with ASTM F1043 Group IC having minimum steel yield strength of 50,000 psi (344 MPa). External protective coating F1043 Type B, 0.9 oz/ft² (270 g/m²) minimum hot-dip zinc coating plus a chromate conversion and a clear polymer coating. Internal coating F1043 Type D, 81% nominal zinc pigmented coating minimum 3 mils (0.0076 mm) thick or Type B, minimum 0.9 oz/ft² (275 g/m²) zinc.

C. Formed steel "C" sections: Roll formed steel shapes complying with ASTM F1043, Group II, 50,000 psi (344 MPa) minimum steel yield strength. External coating, ASTM F1043 Type A, minimum average zinc coating of 2.0 oz/ft² (610 g/m²) in accordance with ASTM A 123.

Wind load caution: Fences containing windscreens or privacy slats, all fences greater than 12 ft. (3.7 m) in height and fences 8 feet (2.4 m) in height using 1 in. (25 mm) or smaller mesh require a wind load force analysis for post size and post spacing. A fence post wind load calculator is available at www.chainlinkinfo.org or www.wheatland.com.

[select post size and spacing from Framework Selection Table or as calculated to withstand wind load]

D. Pipe End and Corner Post _____ OD (_____ mm) _____ lbs/ft (_____ kg/m)

E. Pipe Line Post _____ OD (_____ mm) _____ lbs/ft (_____ kg/m)

[Alternate Line Post:]
[Rolled Formed _____C" (_____ mm) _____ lbs/ft (_____ kg/m)]

F. Pipe Rail and Braces, 1.660 in. OD (42.2 mm) _____ lbs/ft (_____ kg/m)

2.04 FITTINGS

A. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. "C" shaped line post without top rail do not require post caps. When top rail is specified provide line post loop tops to secure top rail.

B. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.

C. Top rail sleeves: 7” (178 mm) galvanized steel sleeve per ASTM F626. [If expansion and contraction of the rail is of concern add a 0.137” (3.48 mm) wire diameter by 1.80” (45.72 mm) long expansion spring between the adjourning rails]

D. Wire ties: 9 gauge (0.148”) (3.76 mm) galvanized steel wire for attachment of fabric to line posts and rails. [Alternate double wrap 13 gauge (0.092”) (2.324 mm) galvanized steel wire for rails and braces] Pre-formed hog ring ties to be 9 gauge (0.148”) (3.76 mm) galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings PVC coated and in compliance with ASTM F626. Color to match fabric color.

E. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105”) (2.67mm) pressed steel by 3/4” (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16” (7.94 mm) galvanized carriage bolt and nut.

F. Tension (stretcher) galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16” x 3/4” (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.

G. Truss rod assembly: Galvanized steel minimum 5/16” (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626

H. Barbed wire supporting arms: Galvanized pressed steel barb arm per ASTM F626 with provisions for attaching barbed wire. Provide arms with loop hole for applications using top rail. Arms shall withstand 250 lb. (113.5 kg) downward pull at outermost end of arm without failure. Arms add an additional of 13 in (330 mm) in height. [Type I, 45° 3 strand single arm] [Type III, 6 strand “V” arms].

I. Carriage bolts and nuts: Galvanized of commercial quality

2.05 TENSION WIRE

A. Tension wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664 [7 gauge steel core wire, 0.177” (4.50 mm)] [9 gauge steel core wire, 0.148” (3.76 mm)] PVC coating class and color to match chain link fabric

2.06 BARBED WIRE AND BARBED TAPE [add when application requires additional security]

A. Barbed wire: PVC coated barbed wire in compliance with ASTM F1665, coating class and color to match chain link fabric. Double strand twisted 14 gauge 0.80” (2.03 mm) PVC coated strand wire, 14 gauge 0.80” (2.03 mm) zinc coated or aluminum alloy 4 point barbs spaced [Type I standard 5” (127 mm) on center] [Type II High Security 3” (76mm) on center].

B. Barbed tape: Stainless steel barbed tape shall comply with ASTM F1910.

2.07 CHAIN LINK SWING GATES

A. Swing gates [double leaf] [single leaf] _____ opening by ____ high [plus 1’ 0” (304.8 mm) - 3 strands barbed wire]. Fabricate chain link swing gates in accordance with ASTM F900. Gate frame to be of welded construction. Weld areas to be protected with zinc-rich paint per ASTM A780. The gate frame members are to be spaced no greater than 8’ 0” (2.44 m) apart horizontally or vertically. Exterior members to be 1.900” (48.3 mm) OD pipe, interior members when required shall be 1.660” (42.2 mm) OD pipe. Pipe to be [Grade 1 ASTM F1083] [Grade 2 ASTM F1043 Group IC] per section 2.03. Chain link fabric to match specification of fence system. Fabric to be stretched tightly and secured to vertical outer frame members using tension bar and tension bands spaced 12” (304.8 mm) on center and tied to the horizontal and interior members 12” (304.8 mm) on center using 9 gauge galvanized steel ties per section 2.04.

B. Hinges, hot dip galvanized pressed steel or malleable iron, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (3.14 rad)

C. Latch: Galvanized forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate.

D. Double gates: Provide galvanized drop rod with center gate stop pipe or receiver to secure inactive leaf in the closed position. Provide galvanized pressed steel locking latch, requiring one padlock for locking both gate leaves, accessible from either side.

E. Keeper to secure open leafs: Provide galvanized gate hold back keeper for each gate leaf over 5' (1524 mm) wide. Gate keeper shall consist of mechanical device for securing free end of gate when in full open position.

F. Gate posts: [Grade 1 pipe ASTM F1083] [Grade 2 pipe ASTM F1043 Group IC] per section 2.03, _____OD [select gate post from table below]

Gate fabric height up to and including 6 ft. (1.2m)		
Gate leaf width		Outside Diameter
up to 4 ft.	(1.2 m)	2.375 in. (60.3 mm)
over 4 ft. to 10 ft.	(1.2 to 3.05 m)	2.875 in. (73.0 mm)
over 10 ft. to 18 ft.	(3.05 to 5.5 m)	4.000 in. (101.6 mm)

Gate fabric height over 6 ft. to 12 ft. (1.2 to 2.4m)		
Gate leaf width		
up to 6 ft.	(1.8 m)	2.875 in. (73.0 mm)
over 6 ft. to 12 ft.	(1.8 to 3.7 m)	4.000 in. (101.6 mm)
over 12 ft. to 18 ft.	(2.4 to 5.5 m)	6.625 in. (168.3 mm)
over 18 ft. to 24 ft.	(5.5 to 7.3 m)	8.625 in. (219.1 mm)

2.08 CHAIN LINK INTERNAL TRACK ALUMINUM CANTILEVER SLIDE GATE

A. Aluminum cantilever slide gate [double leaf] [single leaf] _____ opening by ____ high [plus 1' 0" (304.8 mm) 3 strands of barbed wire] shall be of the internal roller design per ASTM F1184 Type II Class 2. Cantilever slide gate to be constructed of ASTM B221 aluminum members welded and designed for maximum structural integrity. Vertical external and internal members minimum 2" (50 mm) square spaced maximum 8' 0" (2.44 m) on center. Gates having fabric greater than 8' 0" (2.44 m) in height require a horizontal member. The top horizontal member shall be a one-piece precision extruded structural framing member having an integral enclosed track. Bottom horizontal member to be minimum 2" x 4" (50 x 100 mm). Adjustable diagonal X trusses shall be installed in each gate panel to transfer the alternating forces as the gate slides. The gate opening portion shall be filled with chain link fabric stretched taut and secured to the frame members. Chain link fabric shall match the fence system specification. The overall gate structure shall be a minimum of 40% larger than the gate opening to support the cantilevered portion of the gate in the closed position with minimum deflection per ASTM F1184. The minimum 40% back frame does not require the installation of chain link fabric for those gates not to be electrically operated. [Electrically operated gates per ASTM F2200 and UL 325 required the back frame to be filled with fabric.] Single leaf cantilever design for openings larger than 30' 0" (9.15 m) up to 40' 0" (12.2 m) shall be fabricated by welding together two horizontal top structural/track members creating a dual track system. Single track gates up to 30' 0" (9.15 m) opening require two support posts and two internal truck assemblies. Dual track gates over 30' 0" (9.15 m) up to 40' 0" (12.2 m) require two sets of dual posts and four internal truck assemblies.

B. Internal truck assemblies shall be capable of swiveling to accommodate gate movement and ensure full contact of the four support wheels and two guide wheels to the internal track surface. The galvanized steel truck assembly post bracket, truck assembly vertical support axle as well as the support wheels shall be designed to handle static and dynamic forces required to support and operate the gate. The truck assembly, support axle and internal wheels shall be comprised of stainless steel or galvanized steel components.

C. Galvanized steel bottom guide roller brackets containing two 3" (75 mm) rubber wheels shall be supplied to keep the bottom of the gate plumb and in proper alignment.

D. Single gates shall be supplied with a galvanized steel latch mechanism capable of securing the gate with a padlock accessible from either side. Double gates to have galvanized drop rod to hold inactive leaf and a

latch mechanism capable of securing the gate with a padlock accessible from either side. Provide drop rod pipe or receiver to engage center drop rod. [Electrically operated gates per ASTM F2200 and UL325 shall not contain any latch or locking mechanism]

E. Cantilever gate posts shall be 4.00" (101.6 mm) OD [Grade 1 pipe ASTM F1083] [Grade 2 pipe ASTM F1043 Group IC] per section 2.03. Single leaf cantilevers up to 30' 0" (9.15 m) require three 4" (101.6 mm) OD posts, dual track single leaf cantilevers over 30' 0" (9.15 m) up to 40' 0" (12.2 m) require two sets of pre fabricated dual 4.00" (101.6 mm) OD support posts and a 4" (10.6 mm) latch post.. Gate is supported in the center of the dual posts.

SAFETY ALERT! Electrically operated cantilever slide gates are for use in controlling vehicular traffic only and are not intended to be used by pedestrians or control pedestrian traffic. Always specify a separate swing walk gate for pedestrian use. The design of electrically operated slide gates must comply with ASTM F2200 and UL 325.

2.09 POST SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,000 psi (20 MPa).

B. Drive Anchors: Galvanized ASTM A36 steel drive anchor angle blades, [1" x 1" (25 mm x 25 mm)] [1.25" x1.25" (31.8 mm x 31.8 mm)] x 30 " (762 mm) long secured to post with a pressed steel galvanized shoe clamp. [drive anchors are limited to post size 2.785" (73.0 mm) OD or less]

2.10 ACCESSORIES

A. Privacy Slats: Slats to be manufactured from a combination of color pigments, quality high density virgin polyethylene and ultraviolet inhibitors, having a 25 year limited warranty against either color fading or breakage of slats and locking-channel used under normal climactic extremes experienced In North America and Hawaii. Color: [Beige] [Rustic Brown] [Snow White] [Black] [Redwood] [Sky Blue] [Forest Green] or [Cape Cod Gray]. [Select design] [Standard PDS self- locking using horizontal bottom channel locking system] [FIN/SLAT '1000' (self-locking slats) (see fence detail)]

PART 3 EXECUTION

3.01 SITE EXAMINATION

A. Ensure property lines and legal boundaries of work are clearly established.

B. Survey of fence location to be provided by [general contractor] [fence contractor] [owner]

C. Verify areas to receive fencing are completed to final grade.

3.02 CHAIN LINK FRAMEWORK INSTALLATION

A. Install chain link fence system in accordance with ASTM F567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly [8' (2438 mm) on center] [maximum 10' (3048 mm) on center] [maximum _____ ft. (_____mm) on center, as determined by wind load post selection calculations]

D. Concrete set posts: Dig holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" (152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts.

Drive Anchor set line posts: With protective cap, drive post 36" (914 mm) into ground. Excavate a 6" (152.4 mm) diameter by 6" (152.4 mm) deep section around post to accommodate the drive anchor shoe clamp. Drive the 2 diagonal drive anchor angle blades into the soil and securely tighten the angle blades to post using the shoe clamp, bury shoe clamp. [post setting can be a combination of both, drive anchors for line posts, concrete for terminal posts, delete reference to drive anchors if not specified]

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6' (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.

G. Tension wire: Install tension wires so that it will be located 4" (101.6 m) up from bottom the fabric. If top rail is not specified, install the tension wire so that it will be located 4" (101.6 mm) down from the top of the fabric. Stretch and Install tension wire before installing the chain link fabric and attach it to each post using wire ties.

H. Top rail: Install in lengths of 21' (6.4 m). Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.

I. Center Rails: Install mid rails between line posts and attach to post using rail end or line rail clamps. [A center rail is required for fabric height 12' (3658 mm) and over.]

J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.

3.03 BARBED WIRE AND BARBED TAPE INSTALLATION [include when specified]

A. Uniformly space and stretch barbed wire between terminal posts. Attach barbed wire to the terminal posts using brace bands and snap and secure barbed wire into each line post barb arm slot.

B. Install barbed tape in accordance with ASTM F1911.

3.04 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15" (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2" (50 mm) +/- 1" (25 mm) above finish grade.

B. Secure fabric using wire ties to line posts at 15" (381 mm) on center and to rails and braces 24" (610 mm) on center, and to the tension wire using hog rings 24" (610 mm) on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.05 **CHAIN LINK GATE INSTALLATION**
[add applicable gate installation section when specifying chain link gates]

A. Swing gates: Installation of swing gates and gate posts shall be per ASTM F567. Direction of swing shall be [inward] [outward] [as shown on drawings] Gates shall be hung plumb in the closed position with minimal space from grade to bottom of gate leaf. Double gate drop bar receiver shall be set in a minimum concrete footing 6" (152 mm) diameter by 24" (610 mm) deep. Gate leaf holdbacks shall be installed on all double gates and all gate leafs greater than 5' (1524 mm) in width. [Electrically operated gates shall comply with ASTM F2200 and UL 325].

B. Horizontal slide gates: Install cantilever and overhead horizontal slide gates and gate posts in accordance with ASTM F567. Horizontal sliding gates shall be plumb in the closed position with minimal ground clearance and slide with an initial force of 40 lbs. (18.14 kg). Double gate drop bar receiver shall be set in a minimum concrete

footing 6” (152 mm) diameter by 24” (610 mm) deep. Install top and bottom safety roller covers and adjacent safety guide posts on ASTM F1184 Type II Class 2 external roller cantilever.

SAFETY ALERT! Electrically operated cantilever slide gates are for use in controlling vehicular traffic only and are not intended to be used by pedestrians or control pedestrian traffic. Always specify a separate swing walk gate for pedestrian use. The design of electrically operated slide gates must comply with ASTM F2200 and UL 325.

3.06 ACCESSORIES [include when applicable]

A. Privacy slats: Install and lock in privacy slats in the fabric in accordance with manufacturer’s instructions.

3.07 ELECTRICAL GROUNDING

A. Grounding when required shall be the responsibility of a licensed electrical contractor and included in Contract Section 33 79 00.

3.08 SITE CLEAN UP

A. Clean up area adjacent to fence line from debris and unused material created by fence installation.

END OF SECTION 32 31 14

SECTION 32 31 19

DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Decorative metallic coated steel fences.
2. Swing gates.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data including construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Submit plans, elevations, sections, gate locations, post spacing, and mounting details , and grounding details.

C. Samples: Provide sample 12 inches (300 mm) in length for linear materials.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality control reports.

B. Product Test Reports: Submit reports for decorative metallic coated steel tubular picket fences, including finish, indicating compliance with referenced standard and specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit data for gate operators to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer having minimum 5 years documented experience who is the fabricator of decorative metal fences and gates.

B. Preinstallation Conference: Conduct conference at site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Wind Loading: As indicated in Drawings.

B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

2.2 DECORATIVE METALLIC COATED STEEL TUBULAR PICKET FENCES

A. Decorative Metallic Coated Steel Tubular Picket Fences: Comply with ASTM F 2408 for light industrial (commercial) application (class) unless otherwise indicated.

1. Basis-of-Design: Subject to compliance with requirements, provide Ameristar; Montage Plus Majestic 3-Rail or comparable products by one of the following:

    a. Ameristar Fence Products; an ASSA ABLOY company.
    b. BetaFence USA LLC.
    c. Builders Fence Company, Inc.
    d. Fortress Iron.
    e. Iron Eagle Industries, Inc.
    f. Iron World Manufacturing, LLC.
    g. Master Halco.
    h. Merchants Metals.
    i. Virginia Railing and Gates, LLC.
    j. Xcel Fence.

B. Fence Description:

1. Material: Galvanized steel.
2. Height: As indicated in Drawings.

C. Posts:

1. End and Corner Posts: Square tubes 2-1/2 inches by 2-1/2 inches (64 mm by 64 mm) formed from 0.108 inch (2.74 mm) nominal thickness, metallic coated steel sheet or formed from 0.105 inch (2.66 mm) nominal thickness steel sheet and hot dip galvanized after fabrication.
2. Posts at Swing Gate Openings: Square tubes 3 inches by 3 inches (76 mm by 76 mm) formed from 0.108 inch (2.74 mm) nominal thickness, metallic coated steel sheet or formed from 0.105 inch (2.66 mm) nominal thickness steel sheet and hot dip galvanized after fabrication.

D. Post Caps: Formed from steel sheet and hot dip galvanized after forming.

E. Rails: Double wall channels.

1. Size: 1-1/2 inches by 1-1/2 inches (38 mm by 38 mm).

2. Metal and Thickness: 0.079 inch (2.01 mm) nominal thickness, metallic coated steel sheet or 0.075 inch (1.90 mm) nominal thickness, uncoated steel sheet, hot dip galvanized after fabrication.

F. Pickets: Square tubes.

1. Terminate tops of pickets at top rail for flush top appearance.
2. Picket Spacing: 3 inches clear, maximum.

G. Fasteners: Corrosion resistant, color coated fasteners matching fence components.

H. Metallic Coated Steel Sheet: Galvanized steel sheet or aluminum zinc, alloy coated steel sheet.

I. Interior surface of tubes formed from uncoated steel sheet shall be hot dip zinc coated same as exterior.

J. Galvanizing: For components indicated to be galvanized and for which galvanized coating is not specified in ASTM F2408, hot dip galvanize to comply with ASTM A123/A123M. For hardware items, hot dip galvanize to comply with ASTM A153/A153M.

K. Finish: Powder coating.

2.3 SWING GATES

A. Basis-of-Design: Subject to compliance with requirements, provide Ameristar; Montage Plus Majestic 3-Rail Single and Double Swing Gates or comparable products by one of the following:

1. Ameristar Fence Products; an ASSA ABLOY company.
2. BetaFence USA LLC.
3. Builders Fence Company, Inc.
4. Fortress Iron.
5. Iron Eagle Industries, Inc.
6. Iron World Manufacturing, LLC.
7. Master Halco.
8. Merchants Metals.
9. Virginia Railing and Gates, LLC.
10. Xcel Fence.

B. Gate Configuration: As indicated.

C. Gate Frame Height: As indicated.

D. Gate Opening Width: As indicated.

E. Galvanized Steel Frames and Bracing: Fabricate members from square tubes 1-1/2 inches by 1-1/2 inches (38 mm by 38 mm) formed from 0.108 inch (2.74 mm) nominal

thickness, metallic coated steel sheet or formed from 0.105 inch (2.66 mm) nominal thickness steel sheet and hot dip galvanized after fabrication.

F. Frame Corner Construction: assembled with corner fittings.

G. Additional Rails: Provide as indicated, complying with requirements for fence rails.

H. Infill: Comply with requirements for adjacent fence.

I. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.

1. Treillage: Provide iron castings of pattern indicated between each pair of pickets. Finish as specified for adjacent fence.

J. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet (1.52 m) wide. Provide cane bolts for pairs of gates. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

K. Standard Hinges: Unless indicated otherwise, BHMA A156.1, Grade 1, suitable for exterior use.

1. Function: 39 - Full surface, triple weight, antifriction bearing.
2. Material: Wrought steel, forged steel, cast steel, or malleable iron; galvanized.

L. Gates with Exit Devices:

1. Hinges: Proved hydraulic gate closer/hinge. 180 degree operation. Size for weight of gate.

a. Acceptable Product: Locinox; Mammoth series.

2. Exit Devices: BHMA Grade 1 and tested over 1,000,000 cycles. Warranty not voided exposure to weather. Cylinders per Section 08 71 00. Unless scheduled otherwise in Section 08 71 00, provide the following:

a. Storeroom function with fixed trim.
b. Cylinder dogging.
c. Acceptable Product: Detex; Advantex series.

M. Cane Bolts: Provide for inactive leaf of pairs of gates. Fabricated from 3/4 inch (19 mm) diameter, round steel bars, hot dip galvanized after fabrication. Finish to match gates. Provide galvanized steel pipe strikes to receive cane bolts in both open and closed positions.

N. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.

O. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot dip galvanize to comply with ASTM A 153/A 153M.

P. Metallic Coated Steel Finish: Galvanized finish.

2.4 MATERIALS

A. Steel and Iron:

1. Plates, Shapes, and Bars: ASTM A36/A36M.
2. Bars (Pickets): Hot rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
3. Tubing: ASTM A 500/A 500M, cold formed steel tubing.
4. Bar Grating: NAAMM MBG 531.

    a. Bars: Hot rolled steel strip, ASTM A1011/A1011M, Commercial Steel, Type B.
    b. Wire Rods: ASTM A510/A510M.

5. Galvanized Steel Sheet: ASTM A653/A653M, structural quality, Grade 50 (Grade 340), with G90 (Z275) coating.

2.5 COATING MATERIALS

A. Epoxy Primer for Galvanized Steel: Epoxy primer recommended in writing by topcoat manufacturer.

2.6 MISCELLANEOUS MATERIALS

A. Concrete: Normal weight, air entrained, ready mix concrete complying with requirements in Section 03 30 01 with a minimum 28 day compressive strength of 3000 psi (20 MPa), 3 inch (75 mm) slump, and 1 inch (25 mm) maximum aggregate size or dry, packaged, normal weight concrete mix complying with ASTM C387/C387M mixed with potable water according to manufacturer's written instructions.

B. Nonshrink Grout: Factory packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M and specifically recommended by manufacturer for exterior applications.

2.7 GROUNDING MATERIALS

A. Grounding Conductors: Size as indicated on Drawings. Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.

1. Material above Finished Grade: Copper.
2. Material on or below Finished Grade: Copper.
3. Bonding Jumpers: Braided copper tape, 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.

B. Grounding Connectors and Grounding Rods: Comply with UL 467.

1. Connectors for Below Grade Use: Exothermic-welded type.
2. Grounding Rods: Copper clad steel.

    a. Size: 5/8 by 96 inches (16 by 2440 mm).

2.8 FINISHES

A. Steel Finishes:

1. Powder Coating: Immediately after cleaning, apply two coat finish consisting of epoxy primer and TGIC polyester topcoat to a minimum total dry film thickness of not less than 8 mils (0.20 mm). Comply with coating manufacturer's written instructions.

    a. Color and Gloss: Selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and conditions affecting performance of the work.

B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 DECORATIVE FENCE INSTALLATION

A. Install fences according to manufacturer's written instructions.

B. Post Excavation: Drill or hand excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches (600 mm) plus 3 inches (75 mm) for each foot (300 mm) or fraction of a foot (300 mm) that fence height exceeds 4 feet (1.2 m).

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Exposed Concrete: Extend 2 inches (51 mm) above grade. Finish and slope top surface to drain water away from post.

3. Posts Set in Concrete: Extend post to within 6 inches (150 mm) of specified excavation depth, but not closer than 3 inches (75 mm) to bottom of concrete.

3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper resistant or concealed means. Install ground set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 GROUNDING AND BONDING

A. Fence Grounding: Install at maximum intervals of 1500 feet (450 m) except as follows:

1. Fences within 100 Feet (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet (225 m).

a. Gates and Other Fence Openings: Ground fence on each side of opening.

1) Bond metal gates to gate posts.
2) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches (460 mm) below finished grade.

B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet (45 m) on each side of crossing.

C. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches (150 mm) below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.

D. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

E. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot tin coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum to steel connections with stainless steel separators and mechanical clamps.
4. Make aluminum to galvanized-steel connections with tin plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

F. Bonding to Lightning Protection System: If fence terminates at lightning protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor, complying with NFPA 780.

3.6 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 32 80 00

IRRIGATION

PART 1 - GENERAL

1.1 SCOPE

A. Installation of the irrigation system shall be by a Texas Licensed Landscape Irrigation contractor. It is intended that the cost of all work incidental to the completion of the system as shown or indicated on the plans or in these specifications, be included in the bid except as specifically noted herein.

B. There is a functioning existing irrigation in place in all areas proposed for construction. All areas shall be new or repaired per the plans and specs.

1.2 CODES AND PERMITS

All work shall be done in accordance with all applicable ordinances of the City. The contractor shall take out all required permits, arrange for all necessary inspections, and shall pay all fees and expenses in connection with same as part of the work under this contract.

1.3 WORK BY OTHERS

A. Electric power: Existing at existing controllers.

B. Sleeves shall be installed by the general contractor. The irrigation contractor shall be responsible for locating sleeves as they are shown on the plans or directed by the owner.

C. Water meters, and all associated costs shall be as called for on the plans.

1.4 LAY OUT

The contractor shall lay out and stake the system according to the plans provided, making minor adjustments as required by the site to provide a complete system with uniform coverage. Any discrepancies, including required static water pressure, unanticipated obstructions, or site conflicts shall be brought to the attention of the owner's representative before authorization can be given to proceed with corrective measures.

PART 2 – MATERIALS

2.1 MATERIALS

A. Plastic PVC Pipe: All lateral pipe and mainline pipe shall be class 200, SDR-21 solvent weld type. All pipe shall conform to National Sanitation Foundation Standard 14 for Thermoplastic pipe and shall bear the NSF seal. ASTM standard D2241 shall apply. Pipe shall be free from visible cracks, holes, foreign materials, blisters or dents. 3" AND LARGER TO HAVE THRUST BLOCKS.

B. PVC Pipe Fittings: All solvent weld pvc fittings shall be type I, medium weight Schedule 40, as manufactured by LASCO Manufacturing Company, or equal. Swing joint assemblies for rotary heads and quick coupling valves shall be as manufactured by LASCO.

C. Solvents: Pvc solvent cement shall be clear and primer shall be purple.

D. Valve Boxes: Valve box enclosures for electric valves shall be rectangular. Use rectangular box for all remote and ball valves. All boxes to be made of polypropylene with a snap lid as manufactured by Highline (Formerly Brooks or Armor) and shall be a minimum of 12” x 17”. Box lids shall be green except for quick couplers.

E. Wire: Wiring from the electric controller to the control valves shall be type UF 600 volt solid copper single conductor with 4/64” insulation which is Underwriters Laboratory approved for direct underground burial when used in National Electric Code Class II Circuits, (30 Volts AC, or less). Wire connections shall be encased in a water-proof compound or gel. 3-M or Weathermatic dry splice.

F. Automatic Controller: As shown on the plans.

G. Electric Valves: Shall be as shown on the plans. All electric valves shall have a ball valve upstream from electric valve in the same valve box.

H. Ball Valves: Shall be of PVC construction. Use LASCO (COLONIAL) or SPEARS.

I. Spray Heads: Shall be as shown on the plans. Reference legend on irrigation note sheet.

J. Quick Coupling Valves: Shall be as shown on the plans. All quick coupling valves shall have a ball valve upstream from quick coupler valve in the same 12” x 17” valve box. Box lids shall be purple.

K. Backflow Preventor: Shall be as shown on the plans.

2.2 MATERIALS AND WORKMANSHIP

All materials shall be new and without flaws or defects and shall be the best of their class and kind. All materials and equipment shall be installed in a neat and workmanlike manner. The architect or the owner’s representative reserves the right to direct the removal and replacement of any items, which in their opinion shall not present an orderly and reasonably neat appearance. Such removal and replacement shall be done, when directed, at the contractor’s expense without additional cost to the owner. The contractor shall be responsible for full and complete coverage of all irrigated areas and shall make any necessary minor adjustments at no additional cost to the owner. The contractor shall visit the site prior to bidding to acquaint himself with all conditions requiring consideration to provide a complete system.

2.3 SUBSTITUTIONS

A. Contractors desiring to substitute materials shall submit to the landscape architect the following:

1. actual samples of each equipment item

2. manufacturer's catalog sheet showing complete specifications

3. detailed pressure loss computations based upon use of the proposed item

The decision of approval will be based on the comparative ability of the equipment to perform fully all purposes and functions of mechanics and general design. Approval of a substitute must be obtained before the bid is submitted. Approval shall not relieve the contractor of his responsibility to demonstrate that the final installed system will operate according to the intent of the original design.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Plastic Pipe and Fittings: Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by the manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent with a non-synthetic bristle brush. Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench to allow for expansion and contraction. Make all connections between plastic and metal items with threaded plastic male adapters. Teflon tape or other non-oil based thread sealant shall be used to seal threads. Oil based sealants will not be allowed.

B. Mainline pipe shall be solvent welded installed at a minimum depth of 18" and a maximum depth of 24". Lateral pipe shall be installed between 12" and 18". Multiple pipes in the same trench shall not rest directly against each other. Crosses shall not be allowed. Use multiple tees. A 4" minimum wide trench is required for pipe up to 2" size. A 6" trench is required for pipe up to 3"size. All mainline pipe 3" and larger to have thrust blocks at all direction changes.

C. Thrust Block: (For 3" size pipe and large) Quantity of concrete may vary due to amount of soil removed at fitting location. A minimum of one sack shall be used. Form thrust block so as not to prevent removal of fitting or wiring. Shall be place at fitting where a change of direction occurs, i.e., 45 and 90 degree fittings, tee, ball valves, and at reduction of pipe size. Place non-porous material between concrete and pipe to prevent concrete from sticking to pipe. Thrust blocks must be shaped so as to not encase pipe or electrical wiring for ease of maintenance. Thrust block shall be installed against pipe and non-disturbed soil. All debris shall be removed prior to installation.

D. Trenching and Backfill: All excavation in this contract shall be unclassified and is to include earth, loose rock, solid rock, or any combination thereof, in a wet or dry state. All trenches shall be backfilled with the material removed except for rocks larger than 1". Backfill shall be flooded and tamped to prevent settling. Should solid rock be encountered, contractor shall remove such rock within 4" of contact with pipe and bed trenches with clean sand fill. Removal of excavated rock shall be included in the cost of this contract.

E. Wire: All wiring shall be installed under lateral pipes and to the side of mainline piping. Expansion coils shall be provided every 100', and at all changes in direction. Wires shall be bundled and taped together, by controller, every 20'. All splices shall be located in a valve box. No field splices shall be allowed. Label each wire at the controller terminal strip.

F. Valves: Valves shall be installed as per detail shown. Valves shall be grouped in orderly arrangement. No valves shall be within 36" of another, or within 5' of a curb or 3' of a sidewalk. Valve boxes shall be grouped in straight lines at the same grade. Hand tamp and fill if necessary around all valve boxes. Valve boxes shall be flush with grade or no final acceptance will be given. All remote valves shall have a ball valve installed upstream in same valve box.

G. Heads: Install all spray heads and rotary heads as per detail. Allow a 4" space between all spray heads and any hardscape edge. Thoroughly flush all debris from lines before installing spray head nozzles or rotary internal assemblies. Filters are required as supplied by the manufacturer on all spray heads. Hand tamp and fill if necessary around all heads after nozzle installation. All heads shall be plumb, level, and flush with grade unless noted otherwise.

H. Controllers: Automatic controllers are existing to rmain in place. These shall be used for all existing and new valve wires. Assign zone numbers in a logical sequence around the site. Each valve wire end shall be labeled within the controller with zone number tape markers.

3.2 COORDINATION

The irrigation contractor shall coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible.

3.3 "AS-BUILT DRAWINGS"

Prepare an "as-built" drawing on a reproducible print which shall show deviations from the bid documents made during construction affecting the mainline pipe, controller location, remote control valves, quick coupling valves and all sprinkler heads. The drawing shall include dimensions from two separate landmarks to locate all electric, manual, and quick coupling valves. The drawing shall be delivered to the owner before final acceptance will be given.

3.4 FINALIZATION:

Contractor to complete the following before requesting a final acceptance inspection.

A. Clean Up: Contractor shall remove from the site all debris resulting from work of this section.

B. Adjustment: Contractor shall test entire system for proper operation of all functions. Adjust all spray nozzles and rotary arcs for complete coverage with minimum overspray onto walls, walks, and streets. Repair any leaks. Refill and compact any settled areas.

C. Submittals: Contractor to deliver “as-built” drawings, quick coupler keys, and any required additional materials to the owner’s representative along with a detailed list of such material items. A typed zone chart shall be included within the controller cabinet with a description of the location of each section. A colored zone map is required showing all zones.

3.5 ACCEPTANCE:

The date of final acceptance shall be the date when any “punch items” are completed to the satisfaction of the owner’s representative. Until the date of final acceptance, it shall be the responsibility of the contractor to maintain and protect the system by all means within his control.

3.6 WARRANTY:

The contractor shall guarantee for a period one full year from substantial completion date, that the entire system shall be free from defects in materials and workmanship. Any such defects shall promptly be repaired or replaced at no cost to the owner. Any after-settling of trenches shall be refilled and compacted within the warranty period at no additional cost to the owner. Repairs required due to abuse, misuse, or neglect of the system are not included in this warranty.

END OF SECTION

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SECTION 32 80 01 - TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SUMMARY

A. This Section includes the protection and trimming of trees that interfere with, or are affected by, execution of the Work, whether temporary or new construction.

B. Related Sections include the following:

1. Division 1 Section "Summary of Work" for limits placed on Contractor's use of the site.
2. Division 1 Section "Construction Facilities and Temporary Controls" for temporary tree protection.
3. Division 2 Section "Site Clearing" for removal limits of trees, shrubs, and other plantings affected by new construction.
4. Division 2 Section "Earthwork" for building and utility trench excavation, backfilling, compacting and grading requirements, and soil materials.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Certification: From a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

D. Maintenance Recommendations: From a qualified arborist for care and protection of trees affected by construction during and after completing the Work.

1.3 QUALITY ASSURANCE

A. Tree Service Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site on a full-time basis during execution of the Work.

B. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where Project is located.

C. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated.

D. Pre installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

E. Before starting tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities. Review tree protection and trimming procedures and responsibilities. Notify participants at least three working days before convening conference. Record discussions and agreements and furnish a copy to each participant.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches or more; do not obtain from bogs or marshes.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

D. Chain Link Fence: Metallic-coated steel chain link fence fabric, 0.120-inch diameter wire size; 48 inches high, minimum; line posts, 1.9 inches in diameter; terminal and corner posts, 2-3/8 inches in diameter; top rail, 1-5/8 inches in diameter; bottom tension wire, 0.177 inch in diameter; with tie wires, hog ring ties, and other accessories for a complete fence system.

PART 3 - EXECUTION

3.0 PREPARATION

A. Temporary Fencing: Install temporary fencing located as indicated, but no less than a minimum of 5’ outside the drip line of trees to protect remaining vegetation from construction damage.

B. Install chain link fence according to ASTM F 567 and manufacturer's written instructions.

C. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

D. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.

E. Do not allow fires under or adjacent to remaining trees or other plants.

3.1 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

D. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.

E. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

F. Where utility trenches are required within drip line of trees, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

G. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.2 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond drip line of trees. Maintain existing grades within drip line of trees.

B. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by qualified arborist, unless otherwise indicated.

C. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.

D. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

F. Moderate Fill: Where existing grade is more than 6 inches, but less than 12 inches, below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:

1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.

2. Place filter fabric with edges overlapping 6 inches minimum.

3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.3 TREE PRUNING

A. Prune remaining trees affected by temporary and new construction.

B. Prune remaining trees to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by qualified arborist.

C. Pruning Standards: Prune trees according to ANSI A300 as follows:

1. Type of Pruning: Crown cleaning.
2. Type of Pruning: Crown restoration.

D. Cut branches with sharp pruning instruments; do not break or chop.

E. Chip branches removed from trees. Spread chips where indicated or as directed by Architect.

3.4 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the qualified arborist.

B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.

C. Provide, plant, and maintain new trees of the same size and species as those being replaced.

E. Provide new trees of 6-inch (150-mm) caliper size and of a species selected by Architect when trees more than 6 inches in caliper size, measured 12 inches above grade, are required to be replaced.

F. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.5 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property.

END OF SECTION 32 80 01

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SECTION 32 92 00

LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SCOPE

Furnish all labor, tools, transportation, materials, equipment, supervision, etc., required to adequately establish a dense lawn of permanent grasses, free from lumps and depressions as indicated by plans and specifications.

Redo any part of the area failing to show uniform cover until a dense lawn is established. The cost of miscellaneous labor and materials for topsoil, weeding, tilling, pest control, fertilizing, etc., are not separate pay items and shall be includes in the bid price for grassing.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Irrigation System

B. Landscaping

1.3 MAINTENANCE OF GRASS

The Contractor shall maintain the grass until final acceptance. Such maintenance shall include spraying, weeding, cultivation, fertilizing, watering, disease and insect control, top dressing low spots, plus any procedures consistent with horticultural practice necessary to insure normal, vigorous, and healthy grass.

1.4 JOB CONDITIONS

A. Water: Will be available on site. Provide necessary hoses and other watering equipment required to complete work. Not all areas shown to have grass will be receiving automatic irrigation.

B. Lawn areas will be left within 1/10 of a foot of finish grade by other trades. Fine grading, raking and smoothing will be the responsibility of the contractor.

1.5 SCHEDULE

A. Sodding: Sod Bermuda year-round under favorable conditions.

B. Seeding/hydromulching - Bermuda grass: Complete only between May 1 to August 31 under favorable conditions. (warm season)

1.6 ACCEPTANCE

The work will be accepted when a completed, undamaged stand of grass is achieved, as approved by the Owner’s Representative. A stand of grass is defined as full, thick, vigorously growing grass in all turf areas. Any given square foot of grass shall have no

more than one square inch of area where soil is visible. If there are any large areas of bare soil or areas where grass is just starting to emerge the entire job will be considered as not having a stand of grass. Soil should not be readily visible in any areas of turf.

PART 2 - MATERIALS

2.1 TOPSOIL (Verify 6” in all landscape areas, 12” over solid rock with existing topsoil):

A. No topsoil shall be removed from the site. General contractor shall excavate and stockpile topsoil on site if the soil is of good quality. The soil shall be tested at a lab and the results, including suggested treatments for soil, sent to the landscape architect. A minimum of two soil samples shall be taken on site. These shall be spread out evenly throughout the site. These samples shall be tested by a certified institution and the institution shall provide recommendations (for the turf specified for this project) for any adjustment in the soils condition. The landscape contractor shall be responsible for any soil amendments as recommended. The contractor shall forward two copies of all the soil reports, recommendations, and a list of soil amendments to the owner and architect.

B. General contractor shall be responsible for distributing the stockpiled soil back to all areas of the site if the top soil is of good quality. The general contractor shall be responsible for providing 6” of top soil in all landscape areas. If there is not enough topsoil stockpiled on site the general contractor shall be responsible for purchasing and transporting quality top soil to the site including the distribution throughout the site.

C. In the event that there is more stockpiled top soil than was required to provide the specified topsoil the top soil shall be retained for the school district. No topsoil shall be hauled off of the site unless directed by the owner.

D. Topsoil should be friable, fertile, dark, loamy soil, free of clay lumps, sub-soil stones, and other extraneous material and reasonable free of weeds and foreign grasses. Topsoil containing dallisgrass, nutgrass or weeds shall be rejected.

E. The soil shall be tested at a lab at contractor’s expense and the results, including suggested soil treatments, sent to the landscape architect. Samples may be requested from both stockpiled soil and imported soil.

F. Physical properties of topsoil should be as follows:
Clay - between 7-27 percent
Silt - between 28-50 percent
Sand - less than 52 percent

G. Landscape contractor shall be responsible for verifying positive flow of water away from building in all areas.

H. General contractor shall be responsible for placing top soil on site within twenty days of the completion of rough grading and utilities.

2.2 GRASS

A. Bermuda Sod: Solid rolled sod, live, rich, dark green in color, free of foreign grasses, weeds, nutgrass, cut with a full ¾" min. layer of soil covering roots. Deliver to site in standard rolls (min. 24" wide). Do not stack for more than 24 hours between time of cutting and time of delivery. Top dress and roll until all joints and undulations have been removed. Tolerances shall be one inch in ten feet of run. Remove sod netting during installation.

B. Bermuda Grass: Extra fancy, hulled and treated, lawn type seed, delivered to site in original, unopened containers meeting requirements of Texas State Seed Law. Minimum purity germination 90 percent.

2.3 FERTILIZER

Fertilizer shall be organic base, uniform in composition, dry and free flowing. Deliver fertilizer to site in original, unopened containers, each bearing manufacturer's guaranteed statement of analysis.

A. First application: 12-12-12 element percentage with minimum 8% sulfur and 4% iron, plus micro-nutrients.

B. Second application: 3:1:2 element ratio. Nitrogen source to be a minimum 50% slow release organic nitrogen (SCU or UF) plus minimum 8% sulfur and 4% iron plus micro-nutrients.

PART 3 - EXECUTION

3.1 PREPARATION

A. Scarify lawn areas where excessive compaction is greater than 85% Standard Proctor to a depth of 4-inches by discing or rototilling. Repeat cultivation as required to thoroughly loosen soil.

B. Leave areas free of weeds and ready for final grading.

C. Provide barricades around scarified areas to prevent compaction by construction vehicles.

3.2 FINAL GRADING

A. Remove from site and legally dispose of stones ¾-inch and larger, clods 1-inch or larger, sticks, and other debris exposed during this operation. (continue to remove stones as they appear until a stand of grass is accepted.)

B. Provide finish grading leaving surface uniform without depressions and undulations. Grade should be approximately 1-inch below paving on low side of concrete and flush on the high side of concrete to facilitate water flowing across walks and drives and to avoid standing water on concrete surfaces.

3.3 HERBICIDE

Apply herbicide to remove any remaining weeds. This work is to be performed by a licensed applicator following the manufacturer's recommendations.

3.4 FERTILIZER

A. Place first application with hydromulch at rate of 12 pounds per 1,000 square feet.

B. Uniformly distribute second application using a rotary type fertilizer spreader 3-4 weeks after first application at 12 pounds per 1,000 square feet.

3.5 SOLID SOD

A. Solid Rolled Sod: Plant grass edge to edge with staggered joints. Topdress with sharp sand raked in carefully to fill joints. Roll to eliminate undulations and provide complete soil contact. Continue topdressing and rolling until all seams and undulations have been eliminated and levels are within tolerances of 1 inch in ten feet of run in general landscape areas. ALL SOD NETTING SHALL BE REMOVED DURING INSTALLATION.

B. All sod areas shall be rolled and top dressed multiple times until all areas are level.

C. Sod shall be top dressed prior to rolling as indicated above. After 2 weeks, landscape contractor shall review all sod areas again and top dress any remaining open or uneven joints. Grass will be required to have a very smooth finish in all surfaces. No grass area with undulations or uneven joints will be accepted until leveled and finished out to the owner's satisfaction.

D. Fertilizing: Fertilize immediately after grass is planted at rate of 4 lbs. Per 1,000 square foot. Repeat fertilizing at the same rate 3-4 weeks later.

3.6 HYDROMULCH/SEEDING

A. At the time of hydromulch/seeding, soil shall be moist but not muddy, and wind velocity shall not exceed ten (10) miles per hour. Add water if required to moisten soil.

B. Hydromulch seed uniformly at the rate of 2 pounds of Bermuda grass seed per 1,000 square feet.

C. Add tackifier to hydromulch mix for slopes 5:1 or greater at the rate of 1 lb. Per bag of mulch. Use a 4' x 8' batter board against bed areas.

3.7 ESTABLISHMENT AND MAINTENANCE OF LAWN AREAS

A. Watering

1. Water lawn areas immediately after grassing operation.

Continue watering as required to keep soil uniformly moist to a minimum depth of 4-inches. Be alert to over-watering newly planted grass, particularly in heavy clay soils.

2. Some areas may require hand watering or temporary irrigation.

B. Replanting/Erosion Control

1. Correct any erosion that may occur during the establishment of grass.

2. Reseed (sod) any areas not showing sufficient growth within 3 weeks after initial grassing. Continue seeding (sodding) until a stand of grass is achieved.

3. A stand of grass will be defined as a uniform cover of activity growing turf.

C. Mowing/Weed Control

1. Mow lawn areas weekly until a stand of grass is achieved. Begin mowing when the lawn reaches a height of 3-inches; set mower to cut at 2-inches. Reduce over 2 cuts to final cut of 1.5-inches.

2. Weed lawn areas until acceptance, removing all foreign vegetation, either by hoeing or pulling. If approved, herbicide spot treatments may be used.

3.8 CLEANUP

During work, keep premises neat and orderly, including organization of storage areas. Remove trash, including debris resulting from removing weeds and rocks from site daily as work progresses. Keep paved areas clean by sweeping or hosing.

END OF SECTION

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SECTION 33 42 16

REINFORCED CONCRETE PIPE CULVERTS

PART 1 - GENERAL

DESCRIPTION

The work as specified in this section includes the furnishing of all pipe, bends, connections, and materials necessary to construct reinforced concrete pipe storm sewers to the lines and grades as shown on the plans and as specified herein.

RELATED WORK DESCRIBED ELSEWHERE

TRENCHING, EMBEDMENT AND BACKFILLING SECTION 31 2333

PART 2 - PRODUCTS

PIPE

Reinforced concrete pipe shall be of either Class III or Class IV as specified in the plans. It shall be tongue and groove and conform to ASTM designation: C-76, and Item 464, "Reinforced Concrete Pipe Culverts," of the 1982 Standard Specifications for Construction of Highways, Streets, and Bridges as adopted by the State Highway Department of Texas on September 1, 1982.

PART 3 - EXECUTION

LAYING PIPE

Unless otherwise authorized by the Engineer, the laying of pipe shall be started at the outlet with the tongue end pointing downstream, and shall proceed toward the inlet with the abutting sections properly matched, true to the established lines and grades.

The ends of the pipe shall be carefully cleaned before the pipe is laid; as each length of pipe is laid, the mouth of the pipe shall be protected to prevent the entrance of earth or bedding material. The pipe shall be fitted and matched so that when laid in the bed it shall form a smooth, uniform conduit.

Proper facilities shall be provided for hoisting and lowering sections of pipe into the trench without disturbing the prepared foundation or the trench walls. For pipe over 42" in diameter a hole not larger than 2 inches in diameter may be drilled in the top of each section of pipe to aid in lifting and placing; the hole shall be neatly drilled, without spalling the concrete or cutting any reinforcement. After the pipe is laid the hole shall be plugged; the plug shall be installed with joint compound to insure a tight seal. Multiple installation of reinforced concrete pipe shall be laid with the centerline of individual barrels parallel. The clear distance between outer surfaces of adjacent pipe shall be as follows:

Diameter	18"	24"	30"	36"	42"
Clear Distance Between Pipes	0'-9"	0'-11"	1'-1"	1'-3"	1'-5"

JOINTING

Both ends of the pipes where they will be in contact with the joint material shall be clean and dry and shall be coated with a suitable primer of the type recommended by the manufacturer. Under no circumstances shall an attempt be made to joint wet pipe. A one-half of an inch thick layer of the compound shall be trowelled or otherwise placed on the groove end of the pipe covering not less than two-thirds of the joint face around the entire circumference. Then, the tongue end of the pipe shall be shoved home with sufficient pressure to make a tight joint. Excess mastic projecting into the pipe shall be removed. Backfill may proceed as soon as the joint has been inspected and approved by the Engineer. Precautions shall be taken in placing and compacting backfill to avoid damage to the joints.

JOINTING DIFFERENT DIAMETER PIPE

When jointing pipes of different diameters, a concrete collar shall be placed around the joint. The concrete collar shall extend a minimum 1 (one) foot either side of the joint and be a minimum 6 (six) inches thick. Forms will not be required unless proper dimensions cannot be otherwise maintained.

END OF SECTION 33 42 16

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SECTION 33 42 17

DRAINAGE STRUCTURES

PART 1 - GENERAL

DESCRIPTION

The work as specified in this section includes all labor, equipment, and materials to install inlets, junction boxes, manholes and headwalls.

RELATED WORK DESCRIBED ELSEWHERE

REINFORCED CONCRETE PIPE CULVERTS SECTION 33 42 16

PART 2 - PRODUCTS

All materials for concrete drainage structures shall conform to the requirements as described in Item 470, "Manholes and Inlets" as adopted by the THD Specifications.

PART 3 - EXECUTION

All structures shall be constructed according to the plan and placed at the locations and elevations shown on the plans or as directed by the Engineer.

END OF SECTION 33 42 17

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Section 33 42 18

Dual Wall Polypropylene (PP) Pipe and Fittings
for Non-Pressure Storm Drainage Applications.

Scope:

This specification describes 12" – 60", ADS *N-12 HP* polypropylene pipe for use in gravity-flow storm drainage applications. (Manufactured by Advanced Drainage Systems, Inc., (ADS). Contact:

Polypropylene (PP) Dual Wall Pipe for use in gravity-flow storm drainage applications shall be in strict accordance with the requirements and test methods of the following ASTM Standard Specifications:

a. ASTM F2736 "Standard Specification for (12 in. to 30 in) Polypropylene (PP) Corrugated Single Wall pipe and Double Wall Pipe".

b. ASTM F2881 "Standard Specification for (36 in. to 60 in.) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications."

Design Requirements:

a. Dual Wall Polypropylene Pipe: Dual wall pipe shall consist of a smooth inner wall and annular exterior corrugations and meet or exceed ASTM F2736, ASTM F2881 and AASHTO MP-21.

b. Manning's "n" value: the "n" value for use in design shall be 0.012.

c. Joints: Pipe shall be joined with a gasketed integral bell & spigot joint meeting the requirements of ASTM F2736 or ASTM F2881, for the respective diameters. 12" – 60" shall be watertight according to the requirements of ASTM D3212. Spigots shall have gaskets meeting the requirements of ASTM F477. Gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during joint assembly. 12" – 60" diameters shall have a reinforced bell with a polymer composite band installed by the manufacturer.

d. Fittings: Fittings shall conform to ASTM F2736, ASTM F2881 and AASHTO MP-21, for the respective diameters. Bell and Spigot connections shall utilize a spun-on, welded or integral bell and a spigot with gaskets meeting ASTM F477. Bell & Spigot fittings joint shall meet the watertight joint performance requirements of ASTM D3212. Corrugated couplings shall be split collar, engaging at least 2 full corrugations.

e. Field Pipe and Joint Performance: To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F2487. Appropriate safety precautions must be used when field testing any pipe material.

f. Material Properties: Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2736, section 4, ASTM F2881, section 5 and AASHTO MP-21, section 6.1, for the respective diameters.

g. Installation: Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in traffic areas for 12 inch through 48 inch diameters shall be one foot, and for 60 inch diameters, the minimum cover shall be two feet in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 95% SPD) material. Maximum fill heights depend on embedment material and compaction level; please refer to ADS Technical Note 2.04 available on the ADS website www.ads-pipe.com or from your local ADS representative.

h. Laying Lengths: 12” – 60” Diameter (PP) laying lengths shall be 20’.

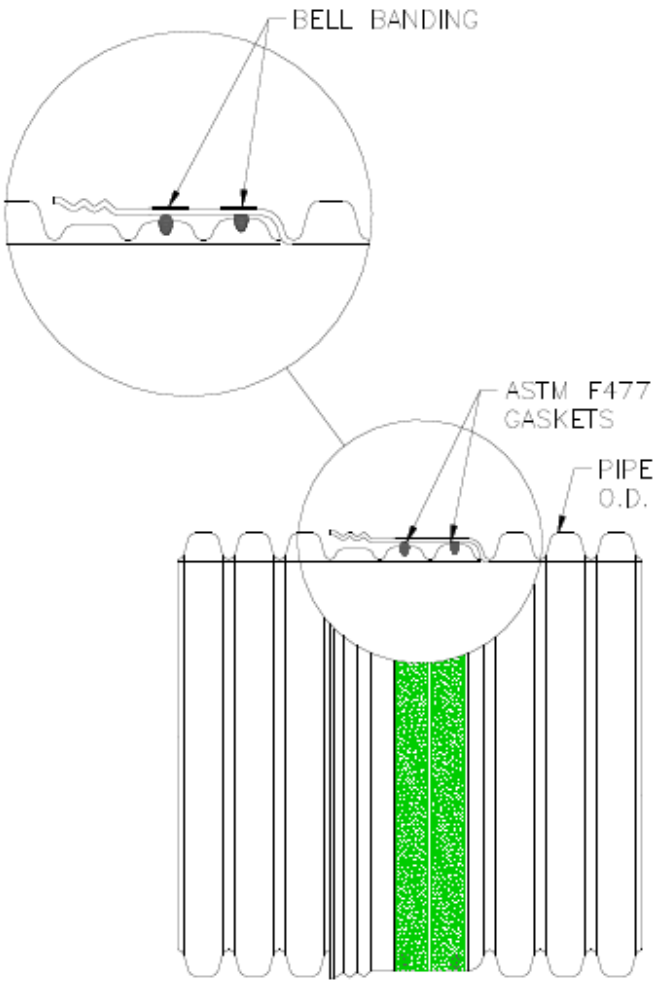
i. Field Repair: Shall be in accordance with the manufacturer’s recommended practices.

Pre-Construction Meeting: The pipe manufacturer shall make available a qualified representative to advise and make recommendations in the installation of the pipe to insure the best possible procedures are followed. The engineer may waive this requirement, if in his opinion the contractor is qualified in the installation of PP plastic pipe. The services of this representative will be furnished at no additional cost.

Pipe Dimensions

Nominal Pipe I.D. in (mm)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	60 (1500)
Average Pipe I.D. In (mm)	12.1 (307)	14.9 (378)	18.0 (457)	24.1 (612)	30.1 (765)	35.7 (907)	41.8 (1062)	47.3 (1201)	59.3 (1506)
Average Pipe O.D. in (mm)	14.5 (368)	17.6 (447)	21.2 (538)	28.0 (711)	35.4 (899)	41.1 (1044)	47.2 (1199)	53.8 (1367)	66.5 (1689)
Minimum Pipe Stiffness * @ 5% Deflection* #/in./in. (kN/m^2)	75 (520)	60 (411)	56 (385)	50 (343)	46 (320)	40 (275)	35 (240)	35 (240)	30 (205)

* Minimum pipe stiffness values listed; contact a representative for maximum values



End of 33 42 18

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SECTION 33 42 19

CORRUGATED POLYETHYLENE PIPE

PART 1 - GENERAL

DESCRIPTION

This item shall govern for the furnishing and installing of all high density corrugated and corrugated smooth lined polyethylene pipe and/or materials for constructing corrugated polyethylene side road pipe culverts or storm drains, stubs and connections, all of which shall conform to ASTM F 667. The pipes shall be of the sizes, types, and dimensions shown on the plans and shall include all connections and joints to new or existing pipes, storm drain manholes inlets, headwalls, and other appurtenances as may be required to complete the work. Corrugated polyethylene pipe shall only be used when specified on the plans, and it will not be considered and alternative material to reinforced concrete pipe unless directed otherwise by the engineer.

PART 2 – PRODUCTS

Pipe Requirements:

Hancor Hi-Q pipe or equal, having a smooth interior and corrugate exterior, and meeting the requirements of AASHTO M294, Type S. Manning's "n" value for use in design shall not be less than 0.010.

Joint Performance:

Pipe shall be joined with coupling bands covering at least two full corrugations on each end of the pipe. Standard (non-gasketed) connections shall beet the soil tightness requirements of the AASHTO Standard Specification for Highway Bridges, Section 26, paragraph 26.4.2.4(e). Silt-tight (gasketed) connections shall incorporate a closed-cell synthetic expanded rubber gasket meeting the requirements of ASTM D1056 Grade 2A2. Gaskets shall be installed by the pipe manufacturer.

Fittings:

Fittings shall conform to AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.

Material Properties:

Pipe and fitting material shall be high density polyethylene meeeting ASTM D3350 minimum cell classification 335420C.

PART 3 – EXECUTION

Installation

Division Six of the N.C.T.C.O.G. Specifications for Public Works Construction, Underground Conduit Construction, still apply except where this document clarifies or changes any specification in which corrugated polyethylene pipe is directly involved.

Trench Width

Trench width shall be the minimum for proper placement and compaction of embedment and backfill. If no special compaction limitations exist, trench width shall be based on the following formula:

1.25D + 1with D being the outside pipe diameter in feet.

The following table shows Trench Width for various Inside Diameters.

Pipe Inside Diameter (In.)	Trench Width (ft)
15	3.0
18	3.2
24	3.9

30	4.8
36	5.4
42	5.8
48	6.5

Embedment

The embedment section is made up of the bedding material, on which the pipe rests, and extends up to the springline of the pipe. Embedment material shall be crushed rock with the following gradation:

0%	retained on the 1 1/4 in. screen
95%-100%	retained on the No.10 screen

Depth of bedding material shall be four inches minimum (611 in rock cuts) for all pipe sizes, unless otherwise directed by the Engineer.

Initial Backfill

Initial backfill begins at the middle of the pipe and provides for a minimal amount of pipe cover. Select material salvaged from trench excavation may be used for initial backfill if accepted by the Engineer. If acceptable material is not available, sand will be required, and shall be compacted using water jetting methods. Should the pipe be for Sanitary Sewer use, sand will be added over the embedment material until it is one foot over the top of pipe and thoroughly jetted. Initial backfill, whether select material from trench excavation or jetted Backfill, shall be compacted to at least 90% Proctor minimum density. Backfill shall be placed and compacted in 6 inch maximum layers. Pipe cover shall be 1/8 of the entire backfill cover above top of pipe not to be less than 6 inches. Minimum cover requirements must be followed at all times in order to protect the pipe, whether it is temporary or permanent cover.

Final Backfill

Select backfill salvaged from trench excavation must be clean and free of large rocks if approved by the Engineer for use as final backfill. The final backfill shall be compacted to at least 95% Proctor minimum density if under the pavement and 90% if it is not.

Joint Connections

Manufacturers recommendations for connection methods and materials necessary to accomplish tight and secure joints shall be strictly followed. This includes polyethylene pipe to polyethylene pipe or polyethylene pipe to reinforced concrete pipe connections. When a polyethylene pipe to reinforced concrete pipe connection does occur, the connection shall be additionally secured by a concrete collar as shown in City Standard drawings.

For further information on the installation of corrugated polyethylene pipe refer to the standard practice of ASTM D2321, Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications. The aggregate envelope around the pipe shall be specified on the plans. Backfilling is a critical phase of construction. It is extremely important that uniformity in backfill material and compacted density throughout the length of the structure is attained in order to create equal pressure surrounding the pipe. The following tables are given to aid in protecting the polyethylene pipe and ensure its proper placement:

HIGH DENSITY CORRUGATED POLYETHYLENE PIPE HEIGHT OF COVER
H-20 AND E-80 LIVE LOADS

Nominal Dia.(In.)	Minimum Cover (In.)		Maximum Cover (Ft.)
	H-20	E-80	
12	12	24	58
15	12	24	59
18	12	24	62
24	12	24	61
30	12	24	61
36	12	24	61
42	12	24	61
48	12	24	61

MULTIPLE INSTALLATION OF POLYETHYLENE PIPES

Diameter of Pipe (In.)	Clear Distances Between Pipes
18	1’ 2”
24	1’ 5”
30	1’ 8”
36	1' 11"
42	2’ 2”
48	2’ 5”

Note: Multiple installation of corrugated polyethylene pipe shall be laid with the centerlines of individual barrels parallel.

Testing

Minimum tube stiffness at five percent deflection shall be 17 psi for storm drains as specified for all sizes when calculated according to ASTM D-2412. All polyethylene tubing shall be tested for elongation, brittleness, joint separation, quality and ring stiffness as specified by ASTM F 667 and other applicable ASTM Designations. The Contractor shall provide certification from the manufacturer that the product was produced and tested in accordance with applicable ASTM Designations before any pipe is placed. The pipe and fittings may be rejected for failure to meet any of the requirements of this specification, and may be retested to establish conformity in accordance with agreement between Owner and Seller. The utility contractor shall video all pipes for compliance and provide the engineer and the owner a copy of the video.

END OF SECTION 33 42 19

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ROCKWALL ISD
CAIN MS ATHLETIC, SITE AND INTERIOR RENO
ISSUE FOR CONSTRUCTION

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CORGAN
www.corgan.com
T: 214.748.2000

SHEET LIST

SHEET INDEX	
SHEET NO.	SHEET NAME
01 - GENERAL	
COVER	COVER SHEET
02 - CIVIL	
C01.00	CIVIL COVER
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C02.01	DEMOLITION PLAN - PARKING LOT
C03.00	OVERALL SITE PLAN
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ET07-01	TECHNOLOGY DETAILS & SYMBOLS
ET07-02	TECHNOLOGY DETAILS & SYMBOLS

CODE INFORMATION

PROJECT DATA AND CODE INFORMATION

PROJECT DATA	
PROJECT NAME:	CAIN MS ATHLETIC, SITE AND INTERIOR RENO
PROJECT ADDRESS:	6620 FM-3097, Rockwall, TX 75032
OWNER:	ROCKWALL ISD
APPLICABLE CODES	
BUILDING CODE:	2018 ICC Building Code
ACCESSIBILITY CODE:	2012 TAS + ADA
ELECTRICAL CODE:	2017 NEC WITH AMENDMENTS
ENERGY CODE:	2018 ICC Energy Conservation Code
FIRE CODE:	2018 ICC Fire Code
MECHANICAL CODE:	2018 ICC Mechanical Code
PLUMBING CODE:	2018 ICC Plumbing Code
REGIONAL OR MUNICIPAL CODE:	CITY OF HEATH, TEXAS
STORM SHELTER CODE:	ICC-500 2020

ALTERNATES

ALTERNATE 01:	TIME CLOCKS AND SCOREBOARD CABINET REPLACEMENT
ALTERNATE 02:	TENNIS COURT LIGHT FIXTURE REPLACEMENT WITH LED
ALTERNATE 03:	KYLE FIELD AND HEATH STADIUM LIGHT FIXTURE REPLACEMENT WITH LED, REFER TO MEP
ALTERNATE 04:	TRIPLE/LONG JUMP RELOCATION

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2		
3		
4		
5		
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9		
10		
△	REVISIONS	

REGISTERED ARCHITECT HANS BERGER 16318 STATE OF TEXAS

Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO
6620 FM-3097, Rockwall, TX 75032

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CONTACT: Mike Ramsey
email: mike.rla@att.net

M E P
ESTES, MCCLURE AND ASSOCIATES, INC.
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email: whill@emaengineer.com

COVER SHEET

JOB 26028
DATE 02/26/2026
SHEET
COVER

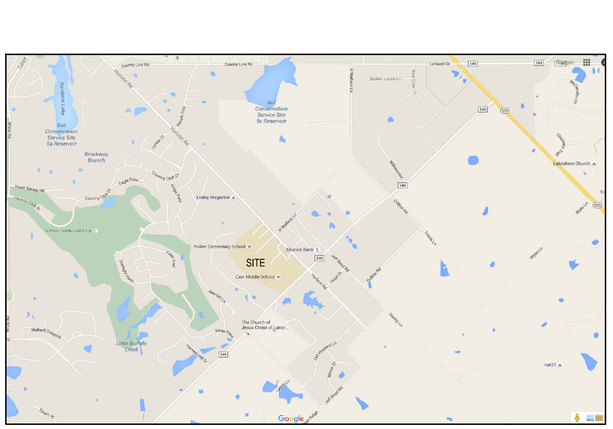
CONSTRUCTION PLANS FOR

CAIN MIDDLE SCHOOL ATHLETIC, SITE & INTERIOR RENO

6620 HORIZON ROAD (FM 3097)
HEATH, ROCKWALL COUNTY, TEXAS 75032

GENERAL NOTE:

CONTRACTOR TO UTILIZE CITY APPROVED CONSTRUCTION PLANS FOR CONSTRUCTION OF ALL CIVIL RELATED FACILITIES. CONTRACTOR TO NOTIFY ARCHITECT/ENGINEER IMMEDIATELY OF ANY COST DISCREPANCIES BETWEEN THE CITY APPROVED SET AND BID SET WITH LATEST ADDENDUMS.



LOCATION MAP
NTS

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C03.00	OVERALL SITE PLAN
C03.01	SITE PLAN - TRACK
C03.02	SITE PLAN - PARKING LOT
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C04.03	EROSION CONTROL DETAILS
C06.50	PAVING DETAILS
C06.51	PAVING DETAILS
C06.52	PAVING DETAILS

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GLENN ENGINEERING
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ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

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STATE OF TEXAS
MIKE GLENN
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LICENSED PROFESSIONAL ENGINEER

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Date of issue:
02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

COVER SHEET

JOB 23162.000
DATE 02/26/2026
SHEET
C01.00

Feb 25, 2026 - 1:55pm User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\92acr2026 TRACK AND PARKING\BIDSET123026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2.DWG

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

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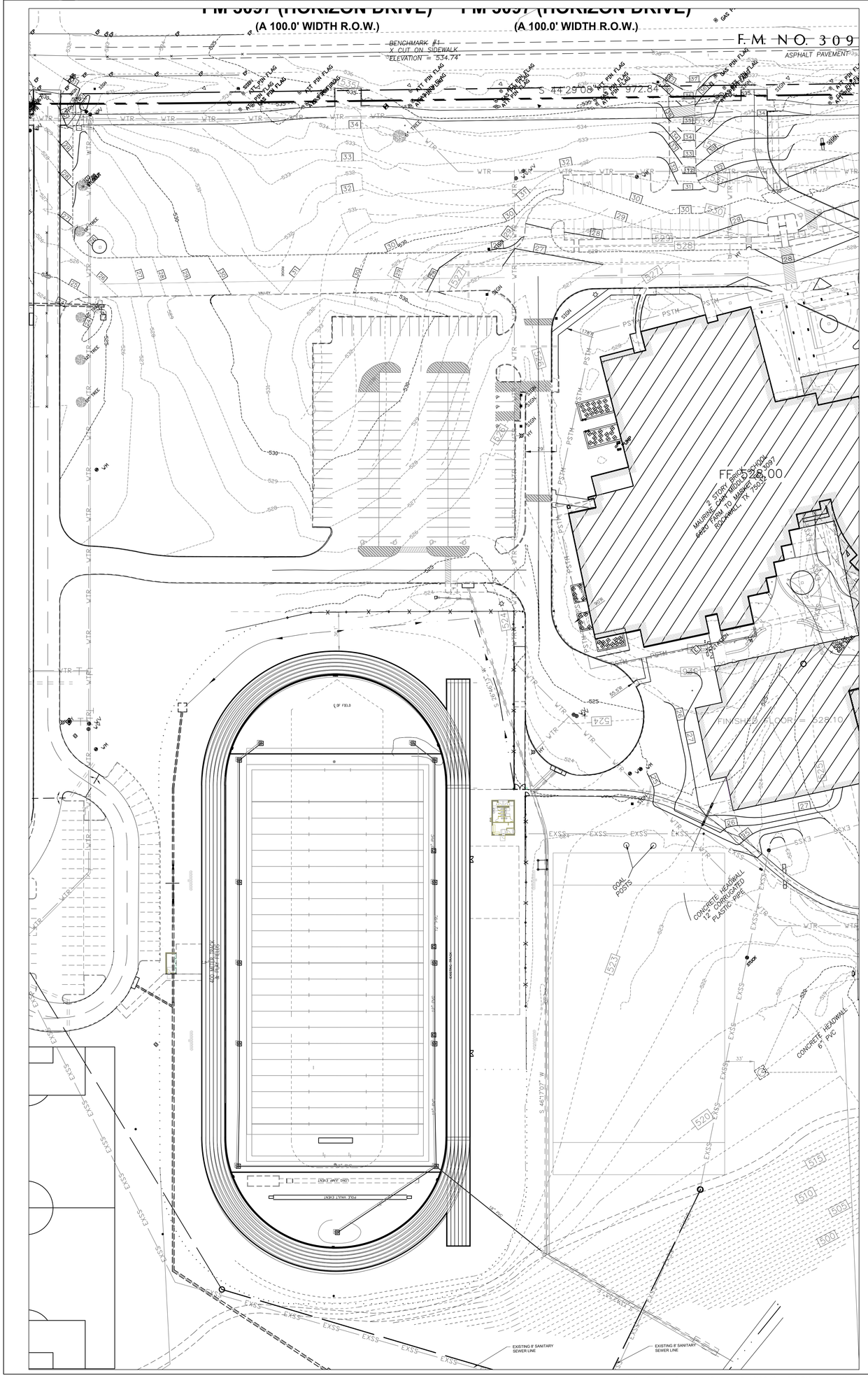
Date of issue:
02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

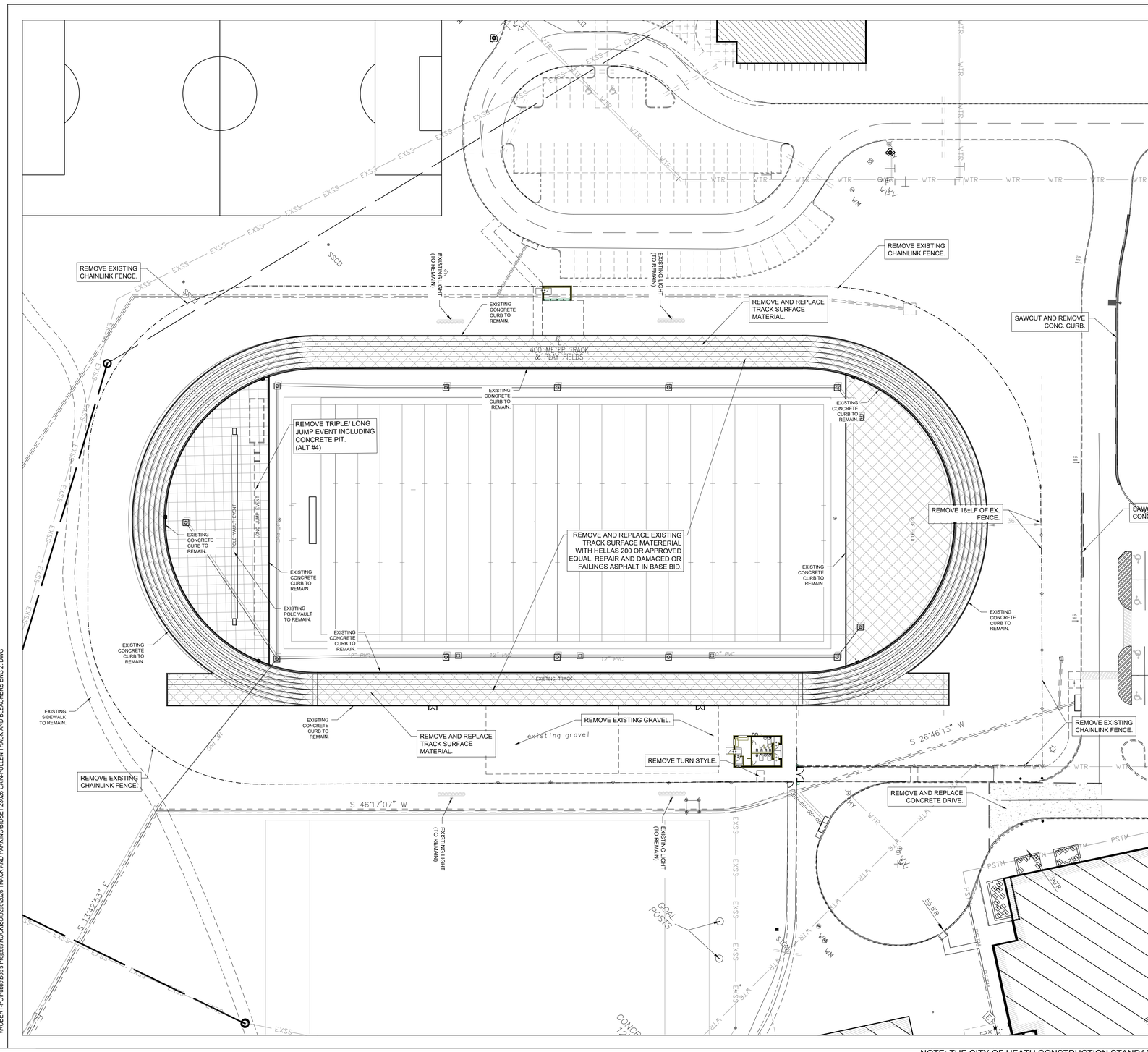
6620 FM-3097, Rockwall, TX 75032

TOPOGRAPHIC SURVEY

JOB 23162.000
DATE 02/26/2026
SHEET C01.01



NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL DEMOLITION NOTES

1. CONTRACTOR SHALL CONSULT ALL UTILITY COMPANIES AND VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DEMOLITION. REMOVAL AND RELOCATION OF ALL UTILITY LINES, METERS, VALVES, ETC. SHALL BE PERFORMED PER REQUIREMENTS OF THE TOWN OF HEATH AND UTILITY COMPANIES. ANY DAMAGE TO PUBLIC UTILITIES SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
2. ALL DEMOLITION AND CONSTRUCTION TO BE KEPT WITHIN THE BOUNDARIES OF THE SITE OR AS DESIGNATED BY CONSTRUCTION ENGINEER. ANY DAMAGE BY CONTRACTOR TO ADJOINING PROPERTIES OR ITEMS NOT IN THE DESIGNATED DEMOLITION AREA SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
3. REMOVE ALL EXISTING UNDERGROUND UTILITIES, CAP AS REQUIRED. BACK FILL AND COMPACT PER TOWN OF HEATH SPECIFICATIONS.
4. REMOVE SURFACE PAVING AS NEEDED TO COMPLETE PAVING PLAN.
5. REMOVE EXISTING SIGNAGE, INCLUDING POSTS AND FOUNDATIONS.
6. REMOVE ANY OTHER ITEMS NOT INDICATED ABOVE BUT WHICH MUST BE DEMOLISHED TO COMPLETE PROJECT AS DESIGNATED BY SITE PLAN.
7. DEMOLITION CONTRACTOR TO CONSULT WITH ARCHITECT OR OWNER ON SALVAGING OR RELOCATING ANY AND ALL PLAYGROUND EQUIPMENT PRIOR TO REMOVING ITEM FROM THE SITE.
8. CONTRACTOR TO USE TREE PROTECTION ON ALL EXISTING TREES THAT ARE TO REMAIN.
9. CONTRACTOR SHALL REMOVE ALL SPRINKLER HEADS AND EQUIPMENT IN THE AREAS OCCUPIED BY THE CONSTRUCTION AND STAGING AREAS. TERMINATE/CAP OFF ALL LINES AS REQUIRED. ALL SPRINKLER HEADS AND EQUIPMENT SHALL BE GIVEN TO THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ALL NECESSARY CHANGES TO THE IRRIGATION SYSTEM THAT ARE REQUIRED TO KEEP THE REMAINING AREAS OUTSIDE THE CONSTRUCTION AREAS IN WORKING ORDER. THIS INCLUDES RELOCATION OF ANY VALVES, PIPING, CONTROLS, ETC., TO OPERATE THE SYSTEM.
10. NO STRUCTURES MAY BE DEMOLISHED WITHOUT A PERMIT FROM THE BUILDING DEPARTMENT. A SEPARATE PERMIT IS REQUIRED FOR EACH STRUCTURE. PAVING, WALLS, FENCES, UTILITIES, AND FLAT WORK CAN BE REMOVED WITHOUT A PERMIT. TREES MAY REQUIRE A PERMIT BASED ON THEIR DESIGNATION PER CITY'S TREE ORDINANCE.
11. ALL PIER TOPS SHOULD BE REMOVED A MINIMUM OF FIVE FEET BELOW PROPOSED FINISHED GRADES.

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02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

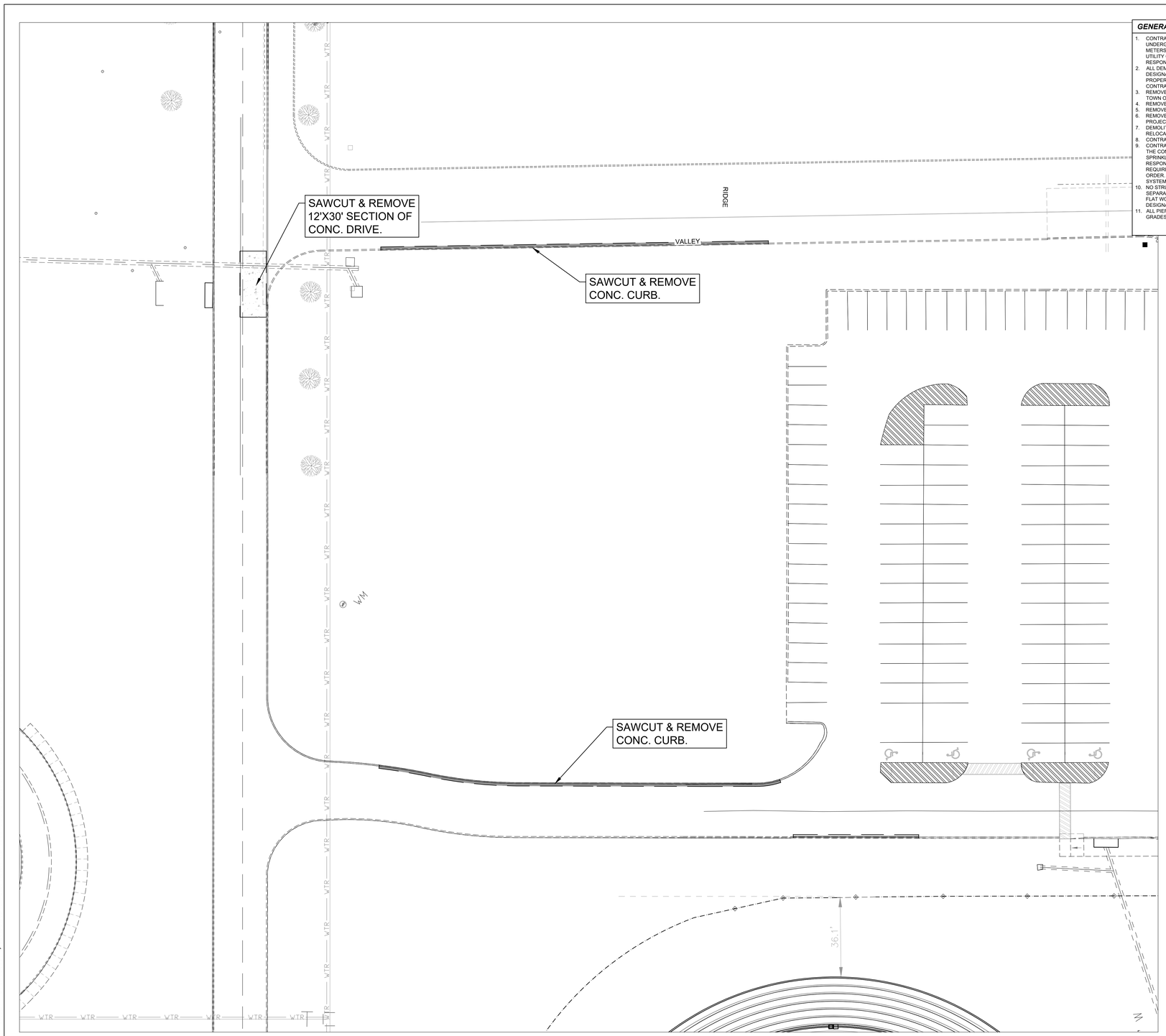
6620 FM-3097, Rockwall, TX 75032

DEMOLITION PLAN - TRACK

JOB 23162.000
DATE 02/26/2026
SHEET C02.00

Feb 25, 2026 - 1:33pm User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\02src\2026 TRACK AND PARKING\BIDSET\2026 CAIN-FULLEN TRACK AND BLEACHERS ENG 2.DWG

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL DEMOLITION NOTES

1. CONTRACTOR SHALL CONSULT ALL UTILITY COMPANIES AND VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DEMOLITION. REMOVAL AND RELOCATION OF ALL UTILITY LINES, METERS, VALVES, ETC. SHALL BE PERFORMED PER REQUIREMENTS OF THE TOWN OF HEATH AND UTILITY COMPANIES. ANY DAMAGE TO PUBLIC UTILITIES SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
2. ALL DEMOLITION AND CONSTRUCTION TO BE KEPT WITHIN THE BOUNDARIES OF THE SITE OR AS DESIGNATED BY CONSTRUCTION ENGINEER. ANY DAMAGE BY CONTRACTOR TO ADJOINING PROPERTIES OR ITEMS NOT IN THE DESIGNATED DEMOLITION AREA SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
3. REMOVE ALL EXISTING UNDERGROUND UTILITIES, CAP AS REQUIRED. BACK FILL AND COMPACT PER TOWN OF HEATH SPECIFICATIONS.
4. REMOVE SURFACE PAVING AS NEEDED TO COMPLETE PAVING PLAN.
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6. REMOVE ANY OTHER ITEMS NOT INDICATED ABOVE BUT WHICH MUST BE DEMOLISHED TO COMPLETE PROJECT AS DESIGNATED BY SITE PLAN.
7. DEMOLITION CONTRACTOR TO CONSULT WITH ARCHITECT OR OWNER ON SALVAGING OR RELOCATING ANY AND ALL PLAYGROUND EQUIPMENT PRIOR TO REMOVING ITEM FROM THE SITE.
8. CONTRACTOR TO USE TREE PROTECTION ON ALL EXISTING TREES THAT ARE TO REMAIN.
9. CONTRACTOR SHALL REMOVE ALL SPRINKLER HEADS AND EQUIPMENT IN THE AREAS OCCUPIED BY THE CONSTRUCTION AND STAGING AREAS. TERMINATE/CAP OFF ALL LINES AS REQUIRED. ALL SPRINKLER HEADS AND EQUIPMENT SHALL BE GIVEN TO THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ALL NECESSARY CHANGES TO THE IRRIGATION SYSTEM THAT ARE REQUIRED TO KEEP THE REMAINING AREAS OUTSIDE THE CONSTRUCTION AREAS IN WORKING ORDER. THIS INCLUDES RELOCATION OF ANY VALVES, PIPING, CONTROLS, ETC., TO OPERATE THE SYSTEM.
10. NO STRUCTURES MAY BE DEMOLISHED WITHOUT A PERMIT FROM THE BUILDING DEPARTMENT. A SEPARATE PERMIT IS REQUIRED FOR EACH STRUCTURE. PAVING, WALLS, FENCES, UTILITIES, AND FLAT WORK CAN BE REMOVED WITHOUT A PERMIT. TREES MAY REQUIRE A PERMIT BASED ON THEIR DESIGNATION PER CITY'S TREE ORDINANCE.
11. ALL PIER TOPS SHOULD BE REMOVED A MINIMUM OF FIVE FEET BELOW PROPOSED FINISHED GRADES.

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Date of issue:
02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

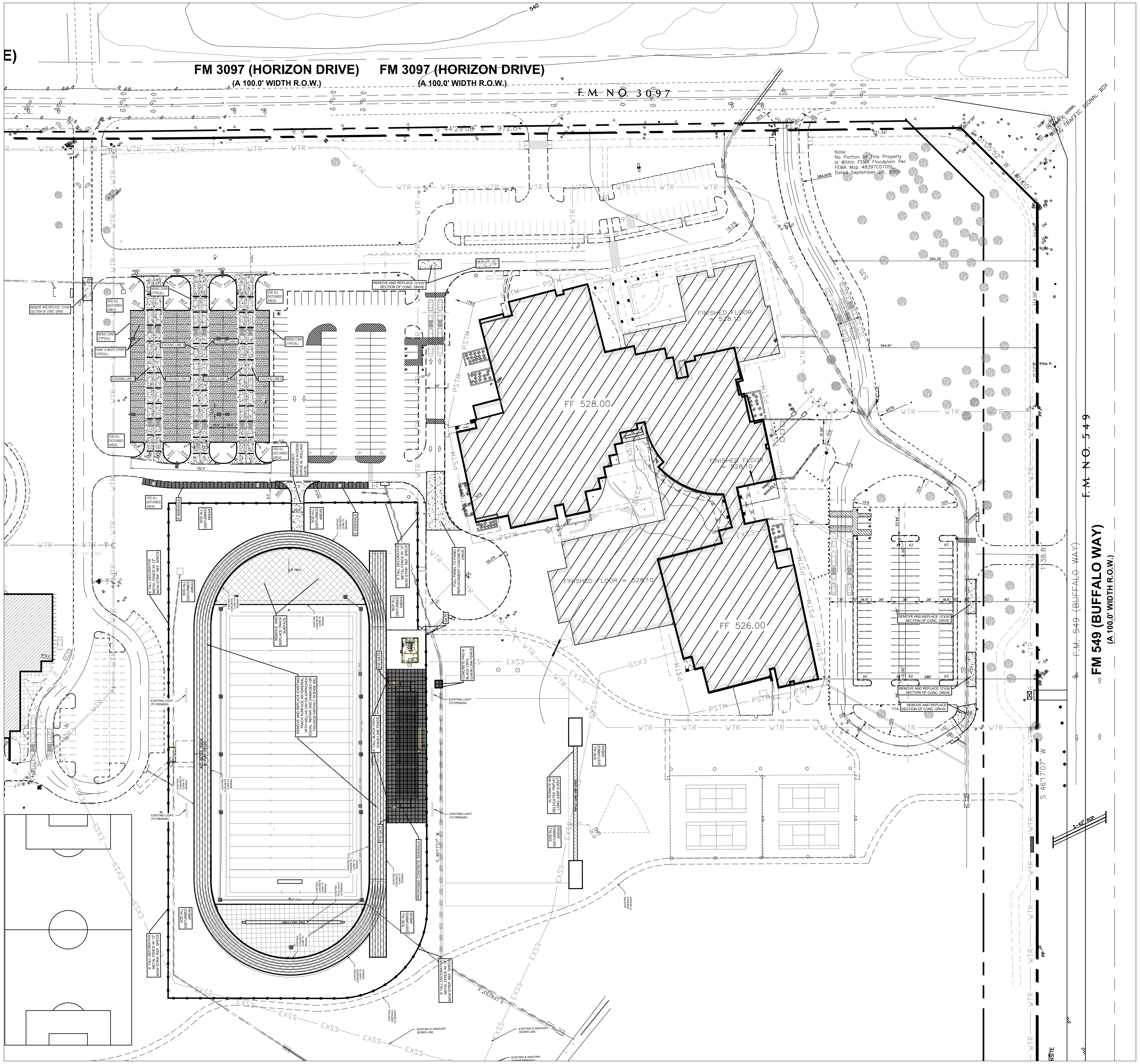
6620 FM-3097, Rockwall, TX 75032

DEMOLITION PLAN - PARKING LOT

JOB 23162.000
DATE 02/26/2026
SHEET C02.01

Feb 26, 2026 - 10:49am User: Robert
\\ROBERT-PC\Public\Bids\s Projects\ROCKISD\92ac\2026 TRACK AND PARKING\BIDSET\23026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2..DWG

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL SITE NOTES

1. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS, THE PLANS INCLUDING ALL NOTES, THE CITY OF ROCKWALL SPECIFICATIONS AND ANY OTHER APPLICABLE STANDARDS OR SPECIFICATIONS RELEVANT TO THE PROPER COMPLETION OF THE WORK SPECIFIED. FAILURE ON THE PART OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL STANDARDS OR SPECIFICATIONS PERTAINING TO THIS WORK SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR PERFORMING THE WORK IN ACCORDANCE WITH ALL SUCH APPLICABLE STANDARDS AND SPECIFICATIONS.
2. CONTRACTOR SHALL HAVE IN HIS POSSESSION, PRIOR TO CONSTRUCTION, ALL NECESSARY PERMITS, LICENSES, ETC. CONTRACTOR SHALL HAVE AT LEAST ONE SET OF APPROVED ENGINEERING PLANS AND SPECIFICATIONS ON-SITE AT ALL TIMES.
3. ALL WORK SHALL CONFORM TO THE CITY OF ROCKWALL SPECIFICATIONS, STANDARDS, AND DETAILS.
4. IF UNFORESEEN PROBLEMS OR CONFLICTS ARE ENCOUNTERED IN THE CONSTRUCTION, FOR WHICH AN IMMEDIATE SOLUTION IS NOT APPARENT, THE ENGINEER, OWNER, AND CITY SHALL BE NOTIFIED IMMEDIATELY.
5. IT WILL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES FOR LINE LOCATIONS, PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL ASSUME FULL LIABILITY TO THOSE COMPANIES FOR ANY DAMAGES CAUSED TO THEIR FACILITIES.
6. CONTRACTORS SHALL BE RESPONSIBLE FOR FIELD LOCATING EXISTING UTILITIES AND IMPROVEMENTS PRIOR TO CONSTRUCTION.
7. TRENCH SAFETY DESIGN WILL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR. CONTRACTOR SHALL SUBMIT DESIGN TO THE CITY OF ROCKWALL ENGINEERING DEPARTMENT FOR REVIEW.
8. ADHERENCE TO ENGINEERING AND FIRE DEPARTMENT STANDARDS SHALL BE REQUIRED.

PAVING LEGEND

▦	PROPOSED 4" REINFORCED CONCRETE SIDEWALK 3,000 PS 5.5 SACK MACHINE FINISH WITH #3 REBARS ON 18" CENTERS EACH WAY.
▨	PROPOSED 6" REINFORCED CONCRETE PAVEMENT 3,600 P.S.I. CONCRETE, 6 1/2 SACK HAND FINISH 6 SACK MACHINE FINISH WITH #4 REBARS ON 18" CENTERS EACH WAY OVER 6 INCHES 6% LIME STABILIZED SUBGRADE PER CITY STANDARDS
▨	PROPOSED 5" REINFORCED CONCRETE PAVEMENT 3,600 P.S.I. CONCRETE, 6 1/2 SACK HAND FINISH 6 SACK MACHINE FINISH WITH #4 REBARS ON 18" CENTERS EACH WAY OVER 6 INCHES 6% LIME STABILIZED SUBGRADE PER CITY STANDARDS

CORGAN

CORGAN
Dallas, TX 75202
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○ ISSUES		
1	02/26/26	ISSUE FOR CONSTRUCTION

△ REVISIONS		
1		

GLENN ENGINEERING

TEXAS REGISTRATION #: F-303
PHONE (972) 717-5151
4500 FULLER DRIVE, SUITE 220
HUB #: 1752575193300
FAX (972) 717-2176
IRVING, TEXAS 75038

MIKE GLENN
35059

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Date of issue:
02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

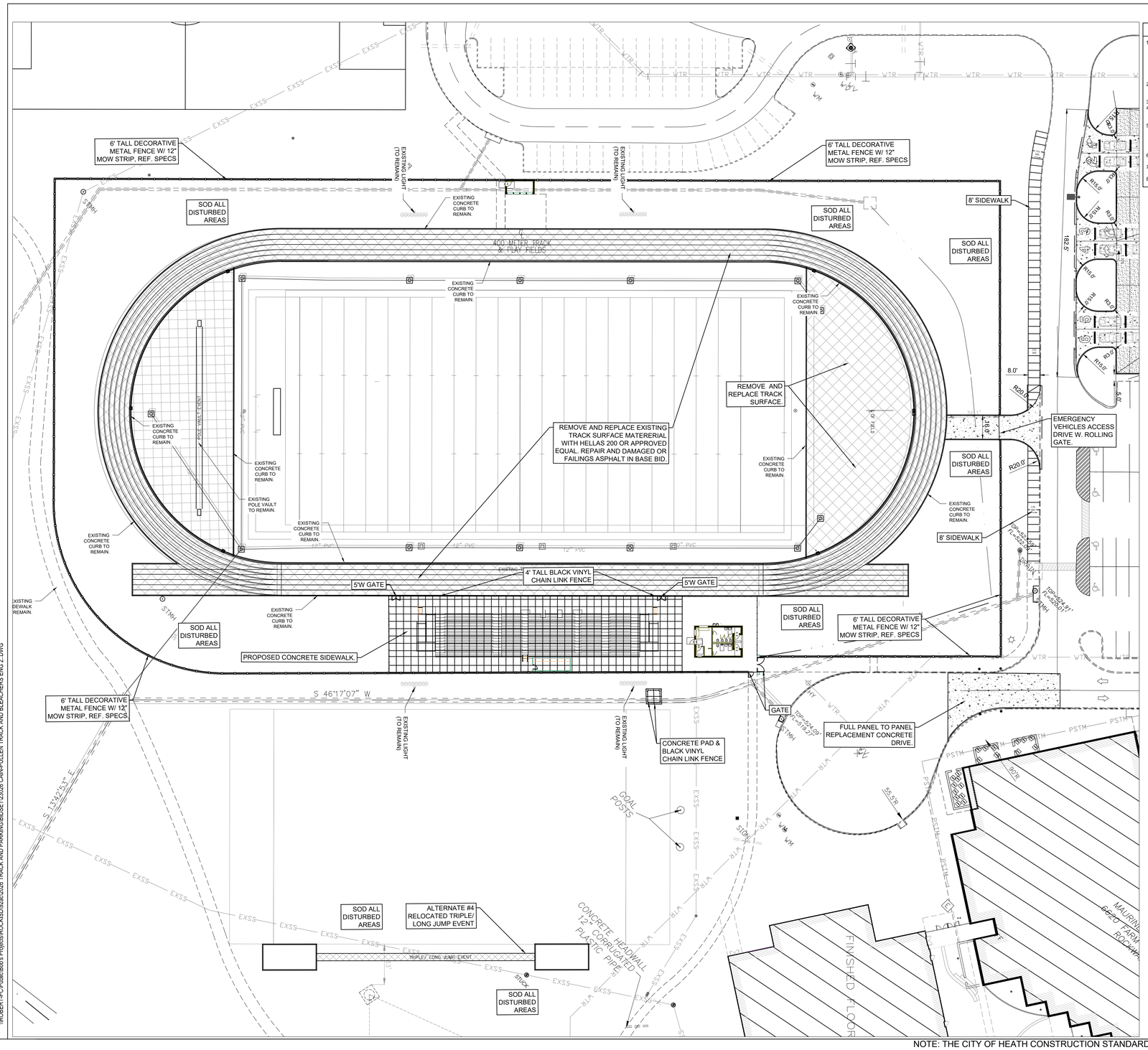
OVERALL SITE PLAN

JOB 23162.000
DATE 02/26/2026
SHEET

C03.00

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

Feb 26, 2026 - 11:01am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\92ac\2026 TRACK AND PARKING\BIDSET\23026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2..DWG



GENERAL SITE NOTES

1. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS. THE PLANS INCLUDING ALL NOTES, THE CITY OF ROCKWALL SPECIFICATIONS AND ANY OTHER APPLICABLE STANDARDS OR SPECIFICATIONS RELEVANT TO THE PROPER COMPLETION OF THE WORK SPECIFIED. FAILURE ON THE PART OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL STANDARDS OR SPECIFICATIONS PERTAINING TO THIS WORK SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR PERFORMING THE WORK IN ACCORDANCE WITH ALL SUCH APPLICABLE STANDARDS AND SPECIFICATIONS.
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3. ALL WORK SHALL CONFORM TO THE CITY OF ROCKWALL SPECIFICATIONS, STANDARDS, AND DETAILS.
4. IF UNFORESEEN PROBLEMS OR CONFLICTS ARE ENCOUNTERED IN THE CONSTRUCTION, FOR WHICH AN IMMEDIATE SOLUTION IS NOT APPARENT, THE ENGINEER, OWNER, AND CITY SHALL BE NOTIFIED IMMEDIATELY.
5. IT WILL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES FOR LINE LOCATIONS, PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL ASSUME FULL LIABILITY TO THOSE COMPANIES FOR ANY DAMAGES CAUSED TO THEIR FACILITIES.
6. CONTRACTORS SHALL BE RESPONSIBLE FOR FIELD LOCATING EXISTING UTILITIES AND IMPROVEMENTS PRIOR TO CONSTRUCTION.
7. TRENCH SAFETY DESIGN WILL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR. CONTRACTOR SHALL SUBMIT DESIGN TO THE CITY OF ROCKWALL ENGINEERING DEPARTMENT FOR REVIEW.
8. ADHERENCE TO ENGINEERING AND FIRE DEPARTMENT STANDARDS SHALL BE REQUIRED.

PAVING LEGEND

PROPOSED 4" REINFORCED CONCRETE SIDEWALK 3,000 PS 5.5 SACK MACHINE FINISH WITH #3 REBARS ON 18" CENTERS EACH WAY.

PROPOSED TRACK SURFACE

0 15 30 60
Scale: 1"=30'

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ISSUES		
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STATE OF TEXAS
MIKE GLENN
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REGISTERED PROFESSIONAL ENGINEER

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Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

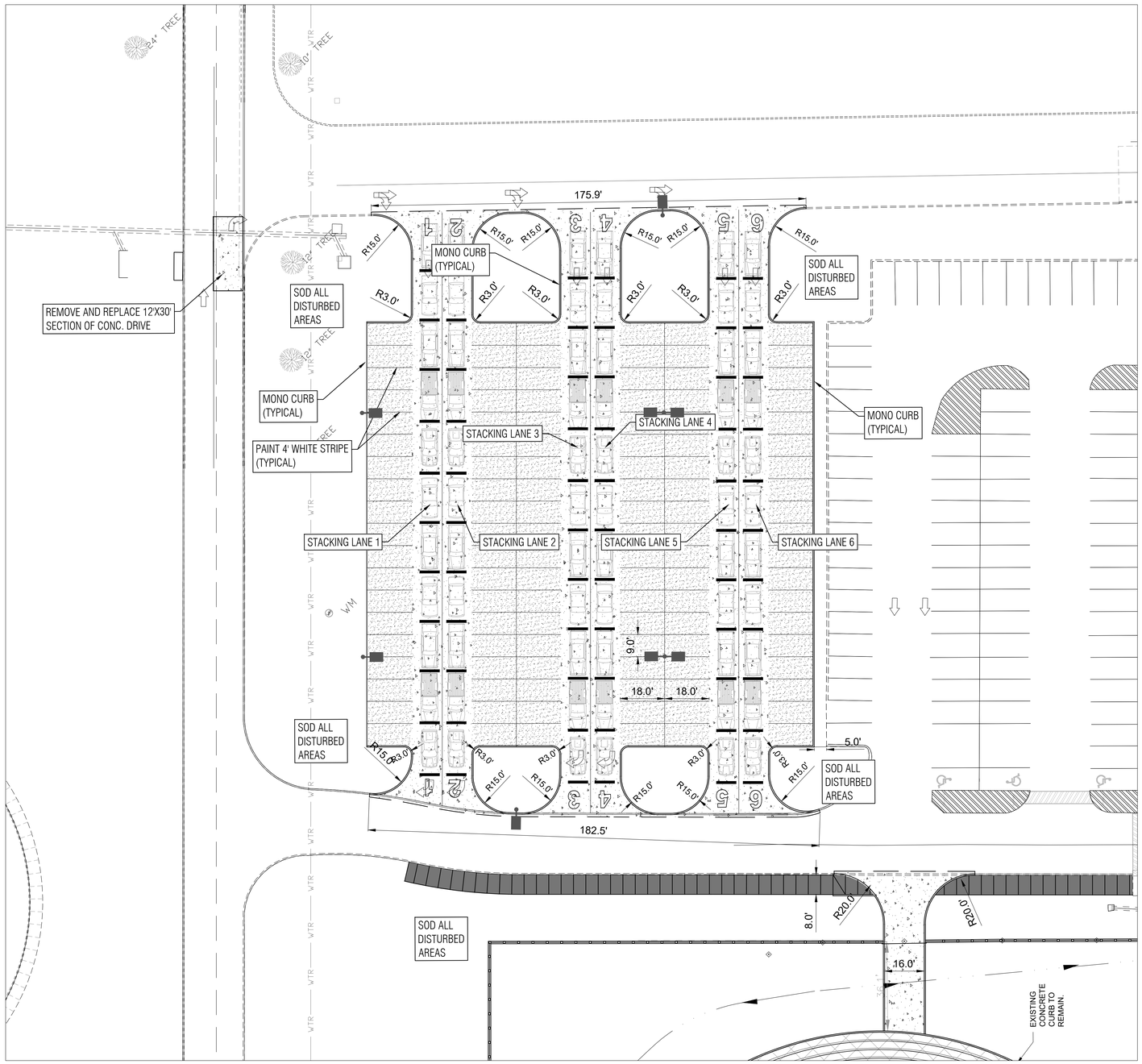
6620 FM-3097, Rockwall, TX 75032

SITE/ PAVING PLAN - TRACK

JOB 23162.000
DATE 02/26/2026
SHEET C03.01

Feb 25, 2026 - 1:35pm User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\92ac\2025 TRACK AND PARKING\BIDSET\23026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2.DWG

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0 10 20 40
Scale: 1"=20'

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STATE OF TEXAS
MIKE GLENN
35059
LICENSED PROFESSIONAL ENGINEER

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Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

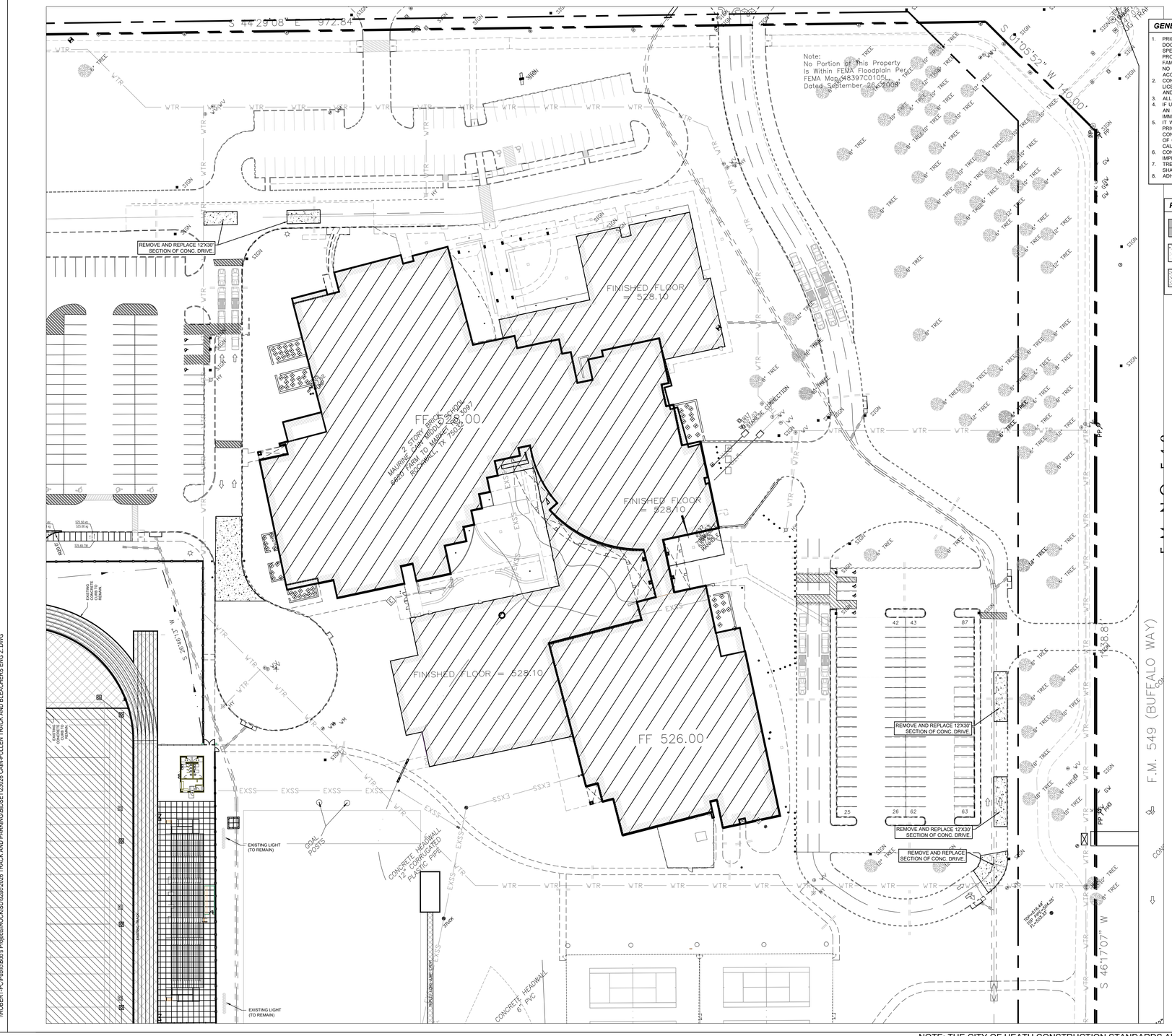
6620 FM-3097, Rockwall, TX 75032

SITE/ PAVING PLAN - PARKING

JOB 23162.000
DATE 02/26/2026
SHEET C03.02

Feb 25, 2026 - 1:36pm User: Robert
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STATE OF TEXAS
MIKE GLENN
35059
LICENSED PROFESSIONAL ENGINEER

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Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

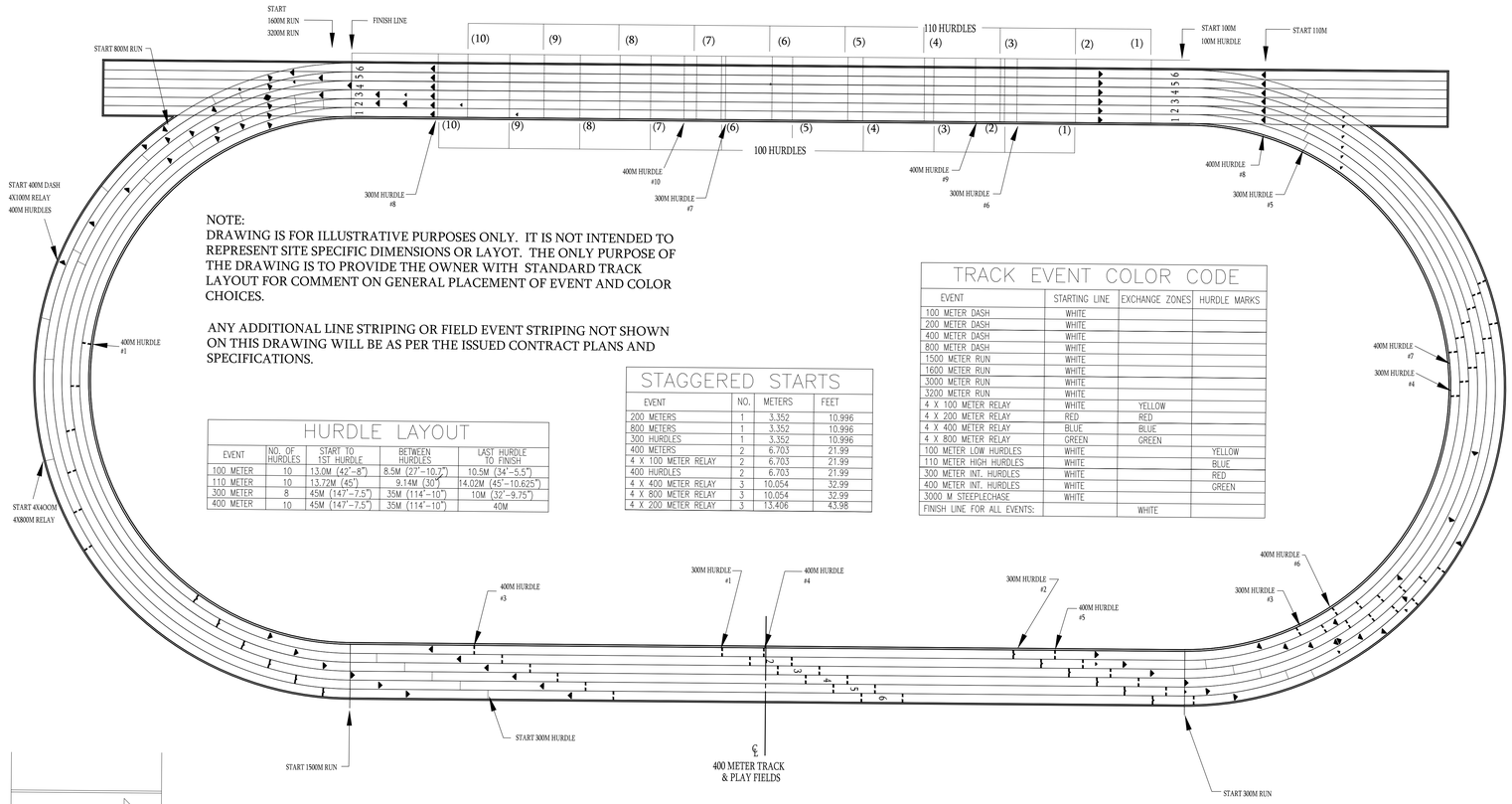
6620 FM-3097, Rockwall, TX 75032

SITE/ PAVING PLAN - CONC. REPLACEMENT

JOB 23162.000
DATE 02/26/2026
SHEET C03.03

Feb 25, 2026 - 11:01am User: Robert
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NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



NOTE:
DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. IT IS NOT INTENDED TO REPRESENT SITE SPECIFIC DIMENSIONS OR LAYOT. THE ONLY PURPOSE OF THE DRAWING IS TO PROVIDE THE OWNER WITH STANDARD TRACK LAYOUT FOR COMMENT ON GENERAL PLACEMENT OF EVENT AND COLOR CHOICES.

ANY ADDITIONAL LINE STRIPING OR FIELD EVENT STRIPING NOT SHOWN ON THIS DRAWING WILL BE AS PER THE ISSUED CONTRACT PLANS AND SPECIFICATIONS.

HURDLE LAYOUT

EVENT	NO. OF HURDLES	START TO 1ST HURDLE	BETWEEN HURDLES	LAST HURDLE TO FINISH
100 METER	10	13.0M (42'-8")	8.5M (27'-10.2")	10.5M (34'-5.5")
110 METER	10	13.72M (45")	9.14M (30")	14.02M (45'-10.625")
300 METER	8	45M (147'-7.5")	35M (114'-10")	10M (32'-9.75")
400 METER	10	45M (147'-7.5")	35M (114'-10")	40M

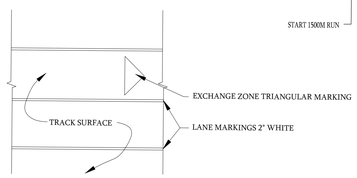
STAGGERED STARTS

EVENT	NO.	METERS	FEET
200 METERS	1	3.352	10.996
800 METERS	1	3.352	10.996
300 HURDLES	1	3.352	10.996
400 METERS	2	6.703	21.99
4 X 100 METER RELAY	2	6.703	21.99
400 HURDLES	2	6.703	21.99
4 X 400 METER RELAY	3	10.054	32.99
4 X 800 METER RELAY	3	10.054	32.99
4 X 200 METER RELAY	3	13.406	43.98

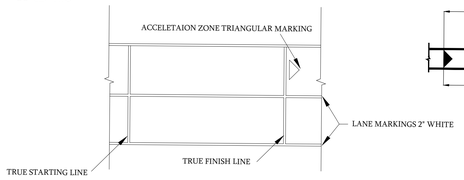
TRACK EVENT COLOR CODE

EVENT	STARTING LINE	EXCHANGE ZONES	HURDLE MARKS
100 METER DASH	WHITE		
200 METER DASH	WHITE		
400 METER DASH	WHITE		
800 METER DASH	WHITE		
1500 METER RUN	WHITE		
1600 METER RUN	WHITE		
3000 METER RUN	WHITE		
3200 METER RUN	WHITE		
4 X 100 METER RELAY	WHITE	YELLOW	
4 X 200 METER RELAY	RED	RED	
4 X 400 METER RELAY	BLUE	BLUE	
4 X 800 METER RELAY	GREEN	GREEN	
100 METER LOW HURDLES	WHITE		YELLOW
110 METER HIGH HURDLES	WHITE		BLUE
300 METER INT. HURDLES	WHITE		RED
400 METER INT. HURDLES	WHITE		GREEN
3000 M STEEPLECHASE	WHITE		
FINISH LINE FOR ALL EVENTS:		WHITE	

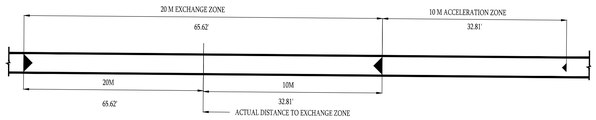
400 METER EVENT MARKING LAYOUT
SCALE: NTS



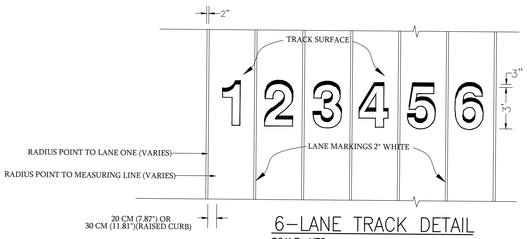
EXCHANGE ZONE MORKING DETAIL
SCALE: NTS



TRACK MARKING DETAIL
SCALE: NTS



TYPICAL RELAY EXCHANGE ZONE
SCALE: NTS



6-LANE TRACK DETAIL
SCALE: NTS

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ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS

1		

GLENN ENGINEERING
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STATE OF TEXAS
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CAIN MS ATHLETIC, SITE AND INTERIOR RENO

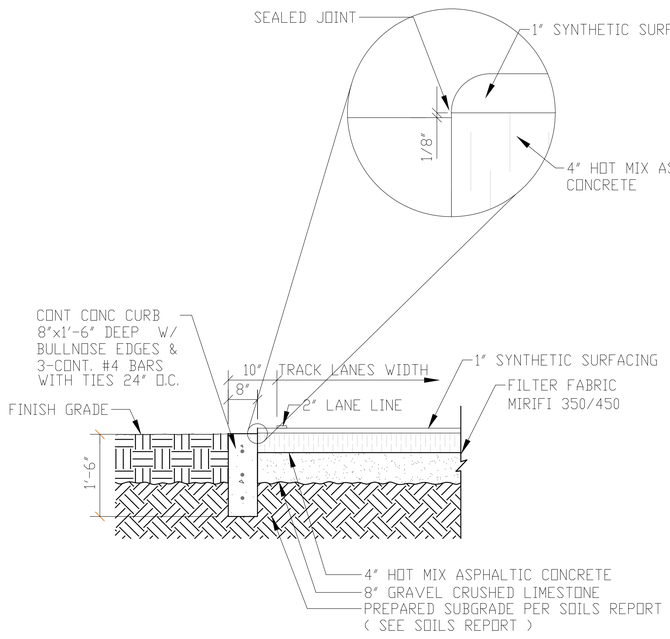
6620 FM-3097, Rockwall, TX 75032

TRACK MARKING DETAIL

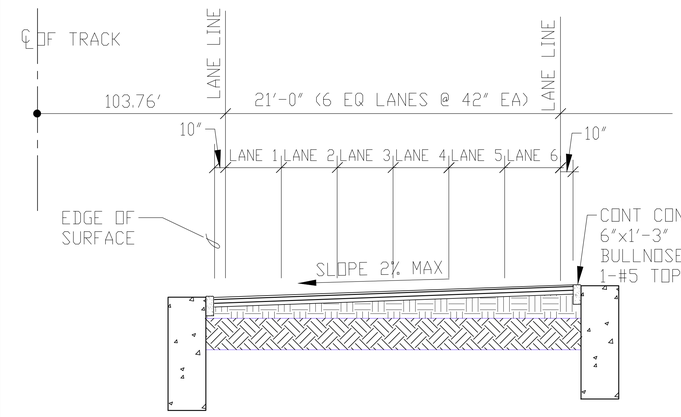
JOB 23162.000
DATE 02/26/2026
SHEET C03.50

Feb 25, 2026 - 1:37pm User: Robert
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NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



A1	TRACK PAVEMENT DETAIL
NTS	



NOTES
1. TRACK LANES SHALL BE 42" WIDE, TYP
2. LANE STRIPING SHALL BE IN ACCORDANCE WITH THE STATE HIGH SCHOOL ASSOCIATION FOR 400 METER TRACKS, TYP
3. REFER TO CIVIL GRADING PLAN FOR STORM DRAIN & FINISHED TRACK ELEVATIONS, TYP

A2	TYPICAL TRACK SECTION
NTS	

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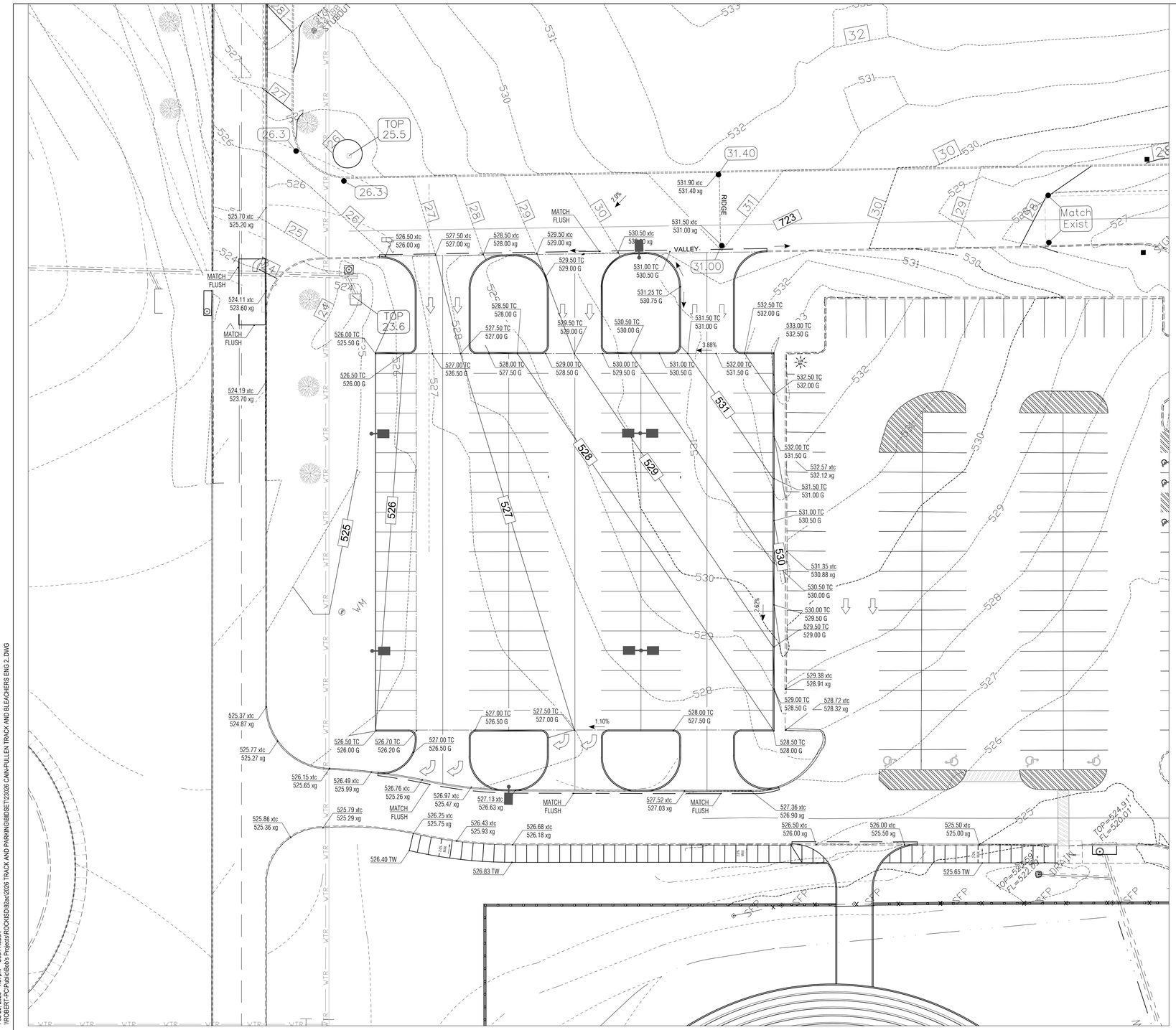
6620 FM-3097, Rockwall, TX 75032

TRACK PAVING DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET C03.51

Feb 25, 2026 - 1:37pm User: Robert
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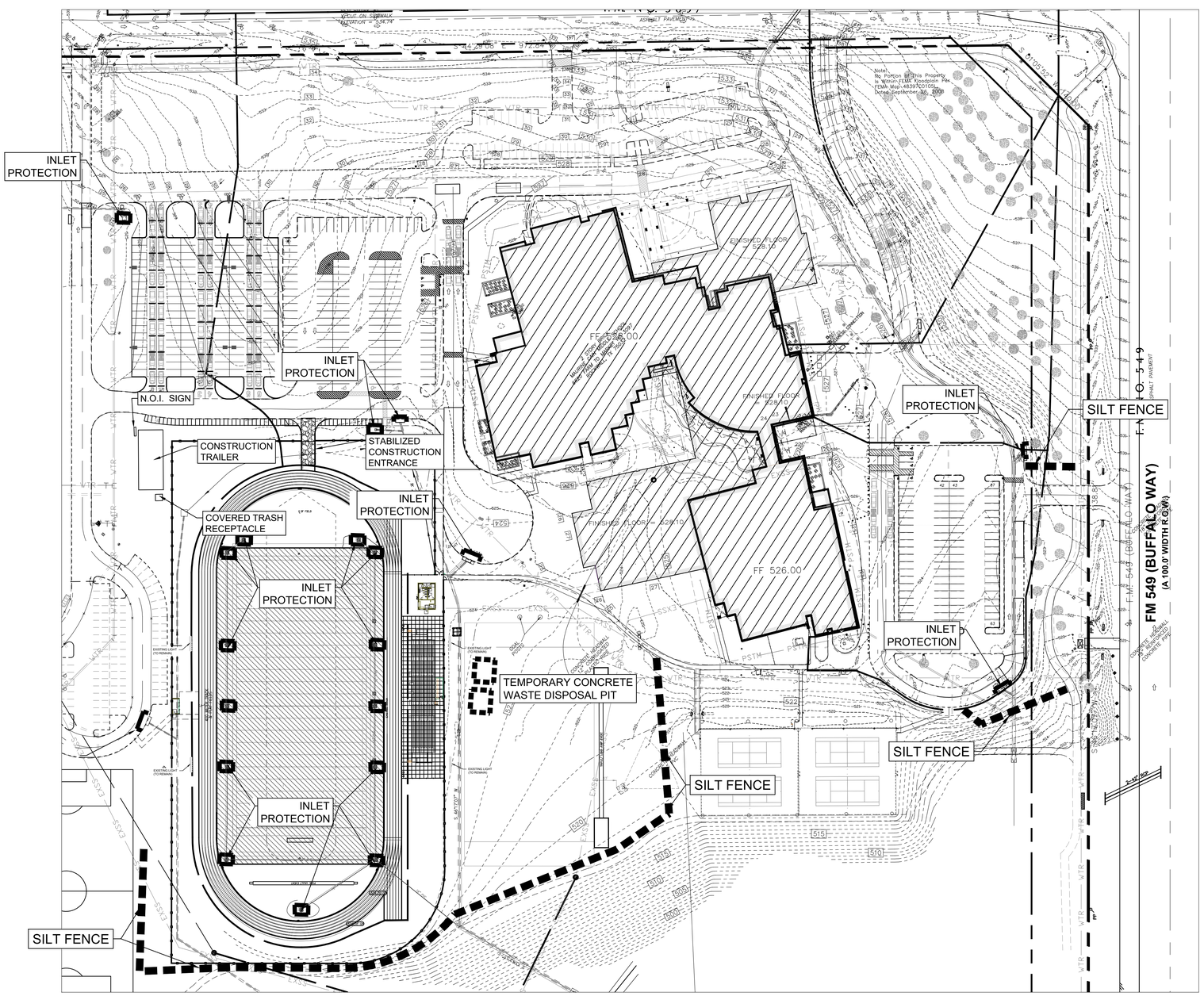
CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

GRADING PLAN

JOB 23162.000
DATE 02/26/2026
SHEET C04.00

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



0 30 60 120
Scale: 1"=60'

SEDIMENT CONTROL NOTES:

1. CONTRACTOR TO CHOOSE LOCATION OF CONSTRUCTION ENTRANCE. THIS ENTRANCE MUST BE USED BY ALL TRAFFIC ENTERING OR EXITING THE SITE. SEE SHEET C04.02 FOR STABILIZED CONSTRUCTION ENTRANCE DETAILS.

2. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.THE STONE FROM ROCK CHECK DAMS SHALL BE USED AS ENERGY DISSIPATERS FOR PROPOSED STORM SEWER AT CONSTRUCTION COMPLETION.

3. CURB INLET PROTECTION SHALL BE INSTALLED AS SOON AS STORM DRAINAGE HAS BEEN CONSTRUCTED.

4. PLYWOOD INLET PROTECTION TO BE PLACED AT UPSTREAM END OF ALL UNFINISHED PIPING AT DAYS END.

5. ALL SEDIMENT CONTROL MEASURES TO REMAIN IN PLACE UNTIL ENTIRE SITE IS STABILIZED.

6. THE EXTENT AND DURATION OF DISTURBANCE TO THE DRAINAGE WAYS SHALL BE MINIMIZED. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE FOLLOWED:
A. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
B. INSTALL SILT FENCE PRIOR TO DISTURBING SOIL. PERIMETER SILT FENCE TO BE INSTALLED OUTSIDE OF ANY POINT TO BE DISTURBED.
C. DURING CONSTRUCTION, INLET PROTECTION SHALL BE INSTALLED AS NEEDED. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED PER CONTRACT REQUIREMENTS. ALL DISTURBED AREAS WHICH ARE INACTIVE FOR LONG PERIODS OF TIME SHALL BE VEGETATED.
D. ONLY WHEN ENTIRE SITE IS STABILIZED AND CONSTRUCTION IS COMPLETE, SHALL SEDIMENT CONTROL MEASURES BE REMOVED.

7. CONTRACTOR SHALL CONTROL MUD ACCUMULATION ON ALL STREETS SURROUNDING THE PROJECT. NO MUD ACCUMULATION WILL BE ALLOWED IN PUBLIC STREETS.

8. MAINTAIN ALL FILTERS DURING CONSTRUCTION TO PREVENT ANY BLOCKAGES FROM ACCUMULATED SEDIMENT. ADDITIONAL HAY BALES MAY BE REQUIRED DURING CONSTRUCTION AS SPECIFIED BY ENGINEER OR CITY INSPECTOR.

9. ALL DISTURBED AREAS SHALL BE SODDED WITH COMMON

10. 75% OF ALL DISTURBED AREA SHALL BE COVERED (1 INCH IN HEIGHT) BY GRASS PRIOR TO CITY ACCEPTANCE.

LEGEND

= INSTALL SILT FENCE

= INSTALL INLET PROTECTION

CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES		
1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS		
1		

GLENN ENGINEERING
TEXAS REGISTRATION # F-303 HUB # 1752575195300
PHONE (972) 717-5151 FAX (972) 717-2176
4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
136059
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Mike Glenn, P.E. 35059, on February 26, 2025

Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

SWPPP PLAN

JOB 23162.000
DATE 02/26/2026
SHEET C04.01

Feb 26, 2026 - 11:00am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\92ac2026 TRACK AND PARKING\BIDSET\23026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2.DWG

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

SITE DESCRIPTION

PROJECT NAME & LOCATION: MAURINE CAIN MIDDLE SCHOOL
6620 FM ROAD 3097
ROCKWALL, TEXAS 75032

OWNER NAME & ADDRESS: ROCKWALL INDEPENDENT SCHOOL DISTRICT
1050 WILLIAMS STREET
ROCKWALL, TEXAS

PROJECT DESCRIPTION: TRACK, PAVING REPLACEMENT

SEQUENCE OF MAJOR ACTIVITIES:
PLACEMENT OF EROSION CONTROL DEVICES
REMOVAL OF TOP LAYER OF TRACK
REMOVAL OF CONCRETE PAVEMENT
REMOVAL OF FENCING
PLACEMENT OF TRACK SURFACING
PLACEMENT OF CONCRETE PAVEMENT
PLACEMENT OF FENCING
PLACEMENT OF LANDSCAPE AND GRASS
REMOVAL OF EROSION CONTROL DEVICES

MAJOR SOIL DISTURBING ACTIVITIES:
DENUDE SITE
PLACEMENT OF CONCRETE
PLACEMENT OF LANDSCAPE AND GRASS

PRE-DEVELOPMENT RUNOFF COEFFICIENT: 0.50

FINAL RUNOFF COEFFICIENT AFTER CONSTRUCTION: 0.70

TOTAL PROJECT AREA: 25.0 +/- ACRES

TOTAL AREA TO BE DISTURBED: 9.0 +/- ACRES

DESCRIPTION OF EXISTING SOIL: CLAY SOILS

DESCRIPTION OF STABILIZATION OF EXISTING DRAINAGE WAYS:
SILT FENCE
INLET PROTECTION
DETENTION BASIN / SEDIMENT BASIN

DESCRIPTION OF EXISTING QUALITY OF STORM WATER DISCHARGE FOR SITE (IF AVAILABLE):
CITY STREETS
EXISTING STREAM

NAME OF RECEIVING WATERS:
CITY CURB AND GUTTER
CURB AND GUTTER ALONG ROADWAYS
ENCLOSED STORM SEWERS
COTTONWOOD CREEK/LAKE RAY HUBBARD

ADDITIONAL COMMENTS:

ESTIMATED PROJECT START DATE: FEBRUARY 2026

ESTIMATED PROJECT END DATE: JANUARY 2027

LATITUDE:

LONGITUDE

NAME OF RECEIVING WATER CREEK TO LAKE RAY HUBBARD

SEQUENCE AND TIMING OF INDICATED EROSION CONTROL PRACTICES AND/OR FEATURES

(INCLUDE TREATMENT OF STOCKPILED DIRT FOR FUTURE USE)

PRIOR TO STARTING CONSTRUCTION:
PLACEMENT OF SILT FENCES
INSTALLATION OF INLET PROTECTION FOR STREET INLETS

DURING CONSTRUCTION:
INSPECTION AND MAINTENANCE OF SILT FENCES
INSTALLATION OF INLET PROTECTION FOR ON-SITE PAVING

COMPLETION OF SITE:
INSTALLATION OF LANDSCAPE AND GRASS
REMOVAL OF EROSION CONTROL DEVICES

SITE RATING FACTOR UTILIZING INDICATED
EROSION CONTROL & MEASURES = 0.70
(MUST BE 0.70 OR LARGER)

EROSION AND SEDIMENT CONTROLS

STABILIZATION PRACTICES

DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 21 DAYS.

TEMPORARY	PERMANENT	
X	X	SEED OR SOD
	X	VEGETATION OTHER THAN SEED OR SOD
X	X	EROSION CONTROL MATS
		PRESERVATION OF NATURAL VEGETATION
		OTHER (DESCRIBE)

ADDITIONAL COMMENTS:

STRUCTURAL PRACTICES

TEMPORARY	PERMANENT	
X		SILT FENCE
		HAY BALES
		ROCK BERMS
		DIVERSION,INTERCEPTOR, OR PERIMETER DIKES
		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
		PIPE SLOPE DRAIN
		TRIANGULAR SEDIMENT FILTER DIKE
X		INLET PROTECTION
		STONE OUTLET SEDIMENT TRAP
		SEDIMENT BASIN (REQUIRED FOR 10 ACRES OR LARGER WHERE ATTAINABLE)
		CHECK DAM
		TEMPORARY SEDIMENT TANK
X		STABILIZED CONSTRUCTION ENTRY
		SANDBAG BERM
		OTHER (DESCRIBE):

ADDITIONAL COMMENTS:

OTHER ADDITIONAL STORM WATER MANAGEMENT FEATURES

PERMANENT	
X	CURB & GUTTER
X	STORM SEWER INLETS
X	STORM SEWER
X	CULVERTS
	STORM WATER DETENTION POND
	VELOCITY DISSIPATION DEVICES
	OTHER (DESCRIBE):

ADDITIONAL COMMENTS:

EROSION AND SEDIMENT CONTROLS

MAINTENANCE/INSPECTION PROCEDURES

1. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A RAIN GAUGE UTILIZING MIN. 0.1 INCH INCREMENTS AT THE PROJECT SITE.
2. CONTROL MEASURES WILL BE INSPECTED AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF ANY STORM EVENT OF 0.5 INCH OR GREATER. IF A REPAIR IS NECESSARY IT WILL BE DONE AT THE EARLIEST PRACTICABLE DATE.
3. INSPECTION WILL BE PERFORMED BY THE OWNERS REPRESENTATIVE AT LEAST ONCE A WEEK AS WELL AS AFTER EVERY 0.5 INCH OF RAIN OR GREATER. AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE FOR EACH INSPECTION AND KEPT AT THE PROJECT SITE. THE INSPECTION SHOULD USE THE OPERATOR INSPECTION FORM IN THE NCTCOG CONSTRUCTION BMP MANUAL OR OTHER FORM APPROVED BY THE CITY.
4. THE CONTRACTOR SHALL KEEP RECORDS OF THE CONSTRUCTION ACTIVITY ON THE SITE.

OTHER (DESCRIBE)

OTHER BEST MANAGEMENT (HOUSEKEEPING) PRACTICES
THE FOLLOWING INDICATED PRACTICES SHALL BE FOLLOWED:

LIME STABILIZATION
X ATTACHED BMP S-11 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

SOLID WASTE MANAGEMENT
X ATTACHED BMP W-2 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

HAZARDOUS WASTE MANAGEMENT
X ATTACHED BMP W-2 FROM NCTCOG CONSTRUCTION BMP MANUAL
— STORAGE AREAS (DESCRIBE):

— OTHER (DESCRIBE):

CONCRETE WASTE MANAGEMENT
X ATTACHED BMP W-3 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

SANDBLASTING WASTE MANAGEMENT
X ATTACHED BMP W-4 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

DUST REDUCTION MEASURES
X DISTURBED AREAS DAMPENED PERIODICALLY FOR DUST CONTROL
— EXCESS DIRT ON ADJACENT ROADS REMOVED DAILY
— OTHER (DESCRIBE):

SIGNATORY REQUIREMENTS

THE CITY HAS ADOPTED THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) CONSTRUCTION BMP MANUAL. THESE OUTLINES WERE DEVELOPED AS AN AID FOR THOSE PREPARING STORM WATER POLLUTION PREVENTION PLANS (SW3P'S) FOR VARIOUS CONSTRUCTION ACTIVITIES IN THE CITY. THEIR USE DOES NOT RELIEVE THE DESIGN ENGINEER OR OPERATOR(S) FROM COMPLYING WITH THE NCTCOG BMP MANUAL OR THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGE FROM CONSTRUCTION SITES.

THE SW3P SHALL BE SEALED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND CERTIFIED BY THE OWNER THAT THE INFORMATION IS TRUE AND THAT THEY ASSUME RESPONSIBILITY FOR THE PLAN. ADDITIONALLY, THEY SHALL CERTIFY THAT THE PLAN MEETS STATE AND LOCAL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL AND STORM WATER QUALITY. IN ALL CASES, A DULY AUTHORIZED REPRESENTATIVE AS INDICATED IN THE GENERAL PERMIT MAY CERTIFY THIS PLAN.

PRIOR TO THE COMMENCEMENT OF WORK, THE OWNER AND GENERAL CONTRACTOR MUST SUBMIT NOTICES OF INTENT (NOI) AS CO-PERMITTEES TO DISCHARGE STORM WATER FROM A CONSTRUCTION SITE UNDER THE NPDES PERMIT. ADDITIONALLY, ALL CONTRACTORS AND SUBCONTRACTORS (INCLUDING FRANCHISE UTILITIES) WHOSE ACTIVITIES IMPACT THE SW3P MUST SIGN AN APPROVED CERTIFICATION THAT THEY UNDERSTAND THEIR RESPONSIBILITIES UNDER THE PLAN. NO WORK WILL BE ALLOWED UNTIL COPIES OF ALL APPROPRIATE NOI'S AND CERTIFICATIONS ARE RECEIVED BY THE CITY.

ALLOWABLE NON-STORM WATER DISCHARGES

- DISCHARGES FROM FIRE FIGHTING ACTIVITIES.
- FIRE HYDRANT FLUSHINGS. *
- WATER USED TO WASH VEHICLES OR CONTROL DUST.
- POTABLE WATER SOURCES (INCLUDING WATERLINE FLUSHINGS CONTAINING LESS THAN 1000 GALLONS). *
- UNCONTAMINATED GROUND WATER (INCLUDING DEWATERING GROUNDWATER INFILTRATION).
- FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS.
- SPRINGS, RIPARIAN HABITATS, WETLANDS AND UNCONTAMINATED GROUNDWATER.
- IRRIGATION WATER.
- EXTERIOR BUILDING WASH DOWN WITHOUT DETERGENTS.
- PAVEMENT WASH WATERS WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED (UNLESS ALL SPILL MATERIAL HAS BEEN REMOVED) AND WHERE DETERGENTS ARE NOT USED.
- AIR CONDITIONING CONDENSATE.

* HEAVILY CHLORINATED WATER (3.5 MG/L OR GREATER FREE CHLORINE) RESULTING FROM WATER LINE STERILIZATION SHALL BE DIRECTED UNDER PERMIT TO THE SANITARY SEWER UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL APPLY TO THE ENGINEERING DEPARTMENT FOR A SANITARY SEWER DISCHARGE PERMIT AFTER THE MANDATORY CHLORINE RETENTION TIME (USUALLY 24 HOURS). THE HEAVILY CHLORINATED WATER MAY BE DISCHARGED TO THE SANITARY SEWER, BEGINNING TWO WORKING DAYS AFTER PERMIT APPLICATION.

NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

CORGAN
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ISSUES

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REVISIONS

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CAIN MS ATHLETIC, SITE AND INTERIOR RENO

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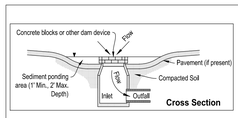
SWPPP DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET C04.02

Feb 25, 2026 - 1:52pm User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\6Dec2026 TRACK AND PARKING\BIDSET\23026 CAIN-PULLEN TRACK AND BLEACHERS ENG 2.DWG

3.4 Inlet Protection

Sediment Control



Cross Section

Description: Inlet protection consists of a variety of methods to intercept sediment at low point inlets through the use of depressed grading, filter stone, filter fabric, inlet inserts, organic filter tubes and other materials. The protection devices are placed around or across the inlet openings to provide localized detention or filtration of sediment and floatable materials in stormwater. Protection devices may be assembled onsite or purchased as manufactured assemblies.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Evaluate drainage patterns to ensure inlet protection will not cause flooding of roadway, property or structures
- Never block entire inlet opening
- Size according to drainage area and flow rates
- Include flow bypass for clogged controls and large storm events

ADVANTAGES / BENEFITS:

- May be the only feasible sediment control when all construction is located within rights-of-way

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness and reliability
- High maintenance requirements
- Has potential to flood roadways or adjacent properties

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and remove blockage of inlet after every storm event
- Remove sediment before it reaches half the design height or volume of the inlet protection, more frequently for curb inlets
- Repair or replace damaged materials
- Clean or replace filter stone and organic filter tubes is when clogged with sediment

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=0.35-0.65
(Depends on soil type)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *Traffic hazards*
- *Passage of larger storm events without causing flooding*
- *Flow diversion to other inlets or drainage points*

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

4.3 Concrete Waste Management

Waste Control

Description: Concrete waste at construction sites comes in two forms: 1) excess fresh concrete mix, including residual mix washed from trucks and equipment, and 2) concrete dust and concrete debris resulting from demolition. Both forms have the potential to impact water quality through stormwater runoff contact with the waste. The objective of concrete waste management is to dispose of these wastes in a manner that protects surface and ground water.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Prohibit the discharge of untreated concrete washout water
- Prohibit dumping waste concrete anywhere except at pre-determined, regulated, recycling or disposal sites
- Provide a washout containment with a minimum of 6 cubic feet of containment volume for every 10 cubic yards of concrete placed
- Minimum 1 foot freeboard on containment
- Minimum 10 mil plastic lining of containment
- Washout water evaporation and concrete recycling are the recommended disposal methods
- Educate drivers and operators on proper disposal and equipment cleaning procedures

LIMITATIONS:

- Does not address concrete sawcutting waste

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and repair any damage to washout containment areas
- Clean up any overflow of washout pits
- Regularly remove and properly dispose of concrete waste

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ● Training
- ○ Suitability for Slopes > 5%

Other Considerations:

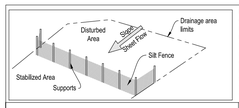
- *None*

TARGETED POLLUTANTS

- ○ Sediment
- ● Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ● Other Construction Wastes

3.10 Silt Fence

Sediment Control



Description: A silt fence consists of geotextile fabric supported by wire mesh netting or other backing stretched between metal posts with the lower edge of the fabric securely embedded six-inches in the soil. The fence is typically located downstream of disturbed areas to intercept runoff in the form of sheet flow. A silt fence provides both filtration and time for sediment settling by reducing the velocity of the runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum drainage area of 0.25 acre per 100 linear feet of silt fence
- Maximum 200 feet distance of flow to silt fence; 50 feet if slope exceeds 10 percent
- Minimum fabric overlap of 3 feet at abutting ends; join fabric to prevent leakage
- Turn end of silt fence line upslope a minimum of 10 feet
- Install stone overflow structure at low points or spaced at approximately 300 feet if no apparent low point

ADVANTAGES / BENEFITS:

- Economical means to treat sheet flow
- Most effective with coarse to silty soil types

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness with clay soils due to clogging
- Localized flooding due to minor ponding at the upslope side of the silt fence
- Not for use as check dams in swales or low areas subject to concentrated flow
- Not for use where soil conditions prevent a minimum toe-in depth of 6 inches or installation of support posts to a depth of 12 inches
- Can fail structurally under heavy storm flows, creating maintenance problems and reducing effectiveness

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair undercutting, sags and other fence failures
- Remove sediment before it reaches half the height of the fence
- Repair or replace damaged or clogged filter fabric

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=0.50-0.75
(Depends on soil type)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Effects of ponding or the redirection of flow onto adjacent areas and property*

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

4.4 Debris and Trash Management

Waste Control

Description: Large volumes of debris and trash are often generated at construction sites, including packaging, pallets, wood waste, personal trash, scrap material, and a variety of other wastes. The objective of debris and trash management is to minimize the potential of stormwater contamination from solid waste through appropriate storage and disposal practices. Recycling of construction debris is encouraged to reduce the volume of material to be disposed of and associated costs of disposal.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Implement a job-site waste handling and disposal education and awareness program
- Provide sufficient and appropriate waste storage containers
- Provide timely removal of stored solid waste materials
- Train workers and monitor compliance

LIMITATIONS:

- Only addresses non-hazardous solid waste
- One part of a comprehensive construction site waste management program

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Empty waste containers regularly
- Clean up loose trash and debris daily
- Verify procedures are being followed
- Train new employees and regularly re-train all employees

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ● Training
- ○ Suitability for Slopes > 5%

Other Considerations:

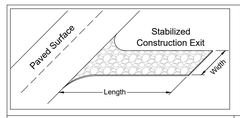
- *None*

TARGETED POLLUTANTS

- ○ Sediment
- ● Nutrients & Toxic Materials
- ○ Oil & Grease
- ● Floatable Materials
- ● Other Construction Wastes

3.11 Stabilized Construction Exit

Sediment Control



Description: A stabilized construction exit is a pad of crushed stone, recycled concrete or other rock material placed on geotextile filter cloth to dislodge soil and other debris from construction equipment and vehicle tires prior to exiting the construction site. The object is to minimize the tracking of soil onto public roadways where it will be suspended by stormwater runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Slope exit away from offsite paved surface
- Minimum width and length dependent on size of disturbed area, which correlates to traffic volume
- 6 inches minimum thickness of stone layer
- Stone of 3 to 5 inches in size
- Add a wheel cleaning system when inspections reveal the stabilized exit does not prevent tracking

ADVANTAGES / BENEFITS:

- Reduces tracking of soil onto public streets
- Directs traffic to a controlled access point
- Protects other sediment controls by limiting the area disturbed

DISADVANTAGES / LIMITATIONS:

- Effectiveness dependent on limiting ingress and egress to the stabilized exit
- A wheel washing system may also be required to remove clay soil from tires, particularly in wet conditions

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Replace rock when sediment in the void area between the rocks is visible on the surface
- Periodically re-grade and top dress with additional stone to maintain efficiency

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization
Waste Management
Housekeeping Practices

Fe=N/A

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

EROSION CONTROL NOTES

THE CITY HAS ADOPTED THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) CONSTRUCTION BMP MANUAL. THESE OUTLINES WERE DEVELOPED AS AN AID FOR THOSE PREPARING STORM WATER POLLUTION PREVENTION PLANS (SW3P'S) FOR VARIOUS CONSTRUCTION ACTIVITIES IN THE CITY. THEIR USE DOES NOT RELIEVE THE DESIGN ENGINEER OR OPERATOR(S) FROM COMPLYING WITH THE NCTCOG BMP MANUAL OR THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGE FROM CONSTRUCTION SITES.

CONTRACTOR SHALL PREPARE A SW3P SEALED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND CERTIFIED BY THE OWNER THAT THE INFORMATION IS TRUE AND THAT THEY ASSUME RESPONSIBILITY FOR THE PLAN. ADDITIONALLY, THEY SHALL CERTIFY THAT THE PLAN MEETS STATE AND LOCAL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL AND STORM WATER QUALITY. IN ALL CASES, A DULY AUTHORIZED REPRESENTATIVE AS INDICATED IN THE GENERAL PERMIT MAY CERTIFY THIS PLAN.

PRIOR TO THE COMMENCEMENT OF WORK, THE OWNER AND GENERAL CONTRACTOR MUST SUBMIT NOTICES OF INTENT (NOI) AS CO-PERMITTEES TO DISCHARGE STORM WATER FROM A CONSTRUCTION SITE UNDER THE NPDES PERMIT. ADDITIONALLY, ALL CONTRACTORS AND SUBCONTRACTORS (INCLUDING FRANCHISE UTILITIES) WHOSE ACTIVITIES IMPACT THE SW3P MUST SIGN AN APPROVED CERTIFICATION THAT THEY UNDERSTAND THEIR RESPONSIBILITIES UNDER THE PLAN. NO WORK WILL BE ALLOWED UNTIL COPIES OF ALL APPROPRIATE NOI'S AND CERTIFICATIONS ARE RECEIVED BY THE CITY.

CONTRACTOR TO CHOOSE LOCATION OF CONSTRUCTION ENTRANCE. THIS ENTRANCE MUST BE USED BY ALL TRAFFIC ENTERING OR EXITING THE SITE.

SEDIMENT CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD. THE STONE FROM ROCK CHECK DAMS SHALL BE USED AS ENERGY DISSIPATERS FOR PROPOSED STORM SEWER AT CONSTRUCTION COMPLETION.

CURB INLET PROTECTION SHALL BE INSTALLED AS SOON AS STORM DRAINAGE HAS BEEN CONSTRUCTED.

PLYWOOD INLET PROTECTION TO BE PLACED AT UPSTREAM END OF ALL UNFINISHED PIPING AT DAYS END.

ALL SEDIMENT CONTROL MEASURES TO REMAIN IN PLACE UNTIL ENTIRE SITE IS STABILIZED.

THE EXTENT AND DURATION OF DISTURBANCE TO THE DRAINAGEWAYS SHALL BE MINIMIZED. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE FOLLOWED:

A. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
B. INSTALL SILT FENCE PRIOR TO DISTURBING SOIL. PERIMETER SILT FENCE TO BE INSTALLED OUTSIDE OF ANY POINT TO BE DISTURBED.
C. DURING CONSTRUCTION, INLET PROTECTION SHALL BE INSTALLED AS NEEDED. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED PER CONTRACT REQUIREMENTS. ALL DISTURBED AREAS WHICH ARE INACTIVE FOR LONG PERIODS OF TIME SHALL BE VEGETATED.
D. ONLY WHEN ENTIRE SITE IS STABILIZED AND CONSTRUCTION IS COMPLETE, SHALL SEDIMENT CONTROL MEASURES BE REMOVED.

CONTRACTOR SHALL CONTROL MUD ACCUMULATION ON ALL STREETS SURROUNDING THE PROJECT. NO MUD ACCUMULATION WILL BE ALLOW IN PUBLIC STREETS.

MAINTAIN ALL FILTERS DURING CONSTRUCTION TO PREVENT ANY BLOCKAGES FROM ACCUMULATED SEDIMENT. ADDITIONAL HAY BALES MAY BE REQUIRED DURING CONSTRUCTION AS SPECIFIED BY ENGINEER OR CITY INSPECTOR.

ALL PROPOSED PARKING AREAS TO BE PAVED AS SOON AS POSSIBLE AFTER SUBGRADE IS PREPARED.

CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROLS ONLY WHEN THERE IS A SUFFICIENT GROWTH OF GROUND COVER TO PREVENT FURTHER EROSION.

CORGAN
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ISSUES		
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CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

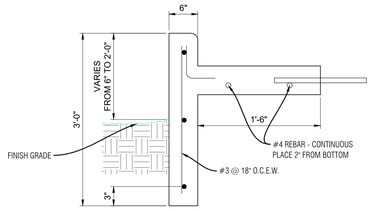
EROSION CONTROL DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET

C04.03

Feb 25, 2026 - 1:53pm User: Robert
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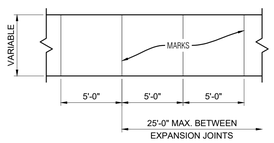
NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



A1 DROP DOWN CURB DETAIL

NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

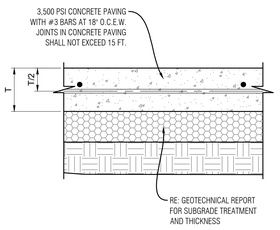
1. AT MARKINGS THE CONCRETE SHALL BE CUT ¼" DEEP, FOLLOWED BY GROOVING TOOL. STRENGTH SHALL BE 3,000 p.s.i. WITH #3 BARS @ 24" O.C.E.W.
2. SIDEWALKS ADJACENT TO BUILDING TO BE PLACED ON 6" SCARIFIED SUBGRADE THE SAME AS PAVING.



B1 SIDEWALK PLAN

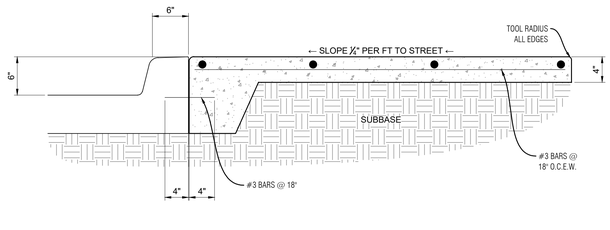
NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

RE: PAVING PLAN FOR PAVEMENT THICKNESS (T)



C1 PAVING SECTION

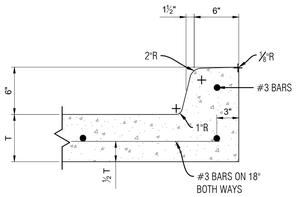
NTS (RE: C050 - PAVING PLAN)



A2 INTERIOR SIDEWALK TYPICAL SECTION

NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

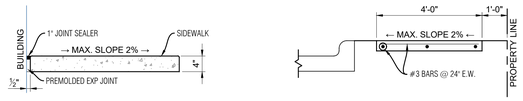
RE: PAVING PLAN FOR PAVEMENT THICKNESS (T)



B2 INTEGRAL CURB & GUTTER

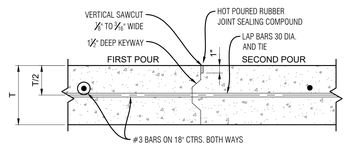
NTS (RE: C050 - PAVING PLAN)

ALL SIDEWALKS AND ACCESSIBLE ROUTES SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%

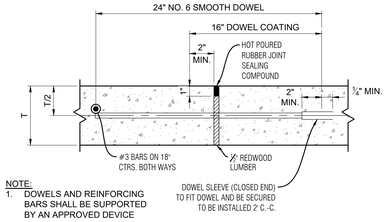


C2 WALK/BUILDING/CURB INTERFACE

NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

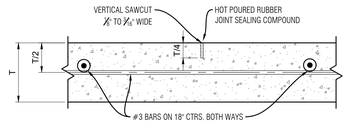


CONSTRUCTION JOINT DETAIL (L)



NOTE:
1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY AN APPROVED DEVICE

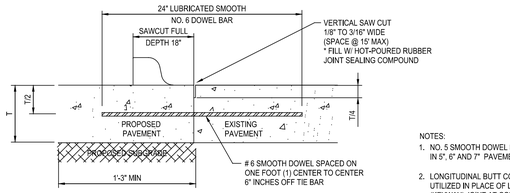
EXPANSION JOINT DETAIL
MAXIMUM SPACING = 60 FEET



SAWED DUMMY JOINT DETAIL (T)
MAXIMUM SPACING = 15 FEET

B3 JOINT DETAILS

NTS (RE: C050 - PAVING PLAN)



* HOT-POURED RUBBER JOINT SEALING COMPOUND PER S.D.H.P.T. ITEM 360, SECTION 360.2 (8)(C), CLASS2 (GREY)

TO BE USED WHERE PROPOSED CONCRETE PAVEMENT MEETS EXISTING CONCRETE PAVEMENT

NOTES:
1. NO. 5 SMOOTH DOWEL BAR MAY BE USED IN 5", 6" AND 7" PAVEMENT THICKNESS.
2. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTOR'S OPTION.
3. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG. DRILLING BY HAND IS NOT APPLICABLE. PUSHING DOWEL BARS INTO GREEN CONCRETE IS NOT ACCEPTABLE.

C3 LONGITUDINAL BUTT JOINT

NTS

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ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

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TEXAS REGISTRATION #: F-303 HUB #: 1752575193300
PHONE (972) 717-5151 FAX (972) 717-2176
4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
35059
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Mike Glenn, P.E. 35059, on February 26, 2025

Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

PRIVATE PAVING DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET C06.50

Feb 25, 2026 - 1:20pm User: Robert
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NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

FIRE LANE STRIPING DETAIL

STRIPING DETAILS AND SPECIFICATIONS

A. PAINT:

1. STRIPE SHALL BE SIX(6) INCHES WIDE PAINTED WITH AN EXTERIOR ACRYLIC LATEX PAINT. COLOR SHALL BE "TRAFFIC RED" GILDDEN NO. 63251 OR EQUAL.
2. LETTERS SHALL BE FOUR(4) INCHES HIGH PAINTED WITH AN EXTERIOR ACRYLIC PAINT. COLOR SHALL BE "TRAFFIC WHITE" GILDDEN NO. 563245 OR EQUAL.

B. APPLICATION:

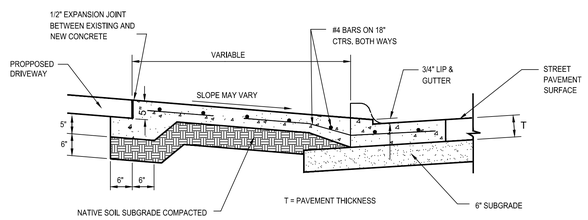
1. STRIPE MAY BE BRUSHED OR SPRAYED, ONE COAT TO FINISH.
2. LETTERS SHALL BE STENCIL FORMED, BRUSH APPLIED AND SPACED AS DETAILED ON THIS SHEET.

A1	FIRE LANE STRIPING DETAIL
NTS	

ALL FLOW ARROWS TO BE SOLID YELLOW REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE.

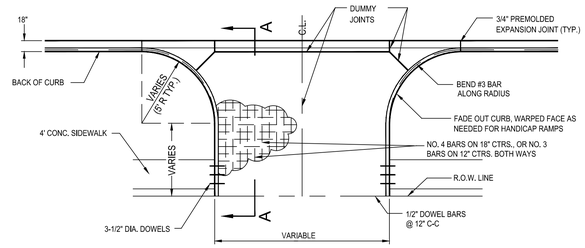
REVERSE ARROWS FOR OPPOSITE DIRECTION OF FLOW.

A2	PAINTED TRAFFIC ARROWS
NTS	



SECTION A-A

B1	TYPICAL DRIVE APPROACH (SECTION A-A)
NTS	



B2	TYPICAL DRIVE APPROACH
NTS	

CORGAN
CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS

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GLENN ENGINEERING
TEXAS REGISTRATION # F-303
PHONE (972) 717-5151
4000 FULLER DRIVE, SUITE 220
HUB # 1752575195300
FAX (972) 717-2176
IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
35039
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Date of issue:
02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

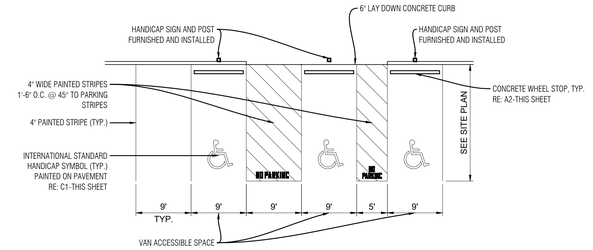
PRIVATE PAVING DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET C06.51

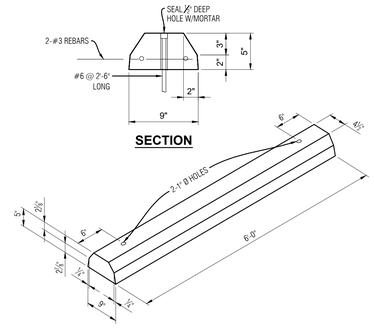
Feb 25, 2026 - 1:21pm User: Robert
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NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

1. PARKING STALL DIMENSIONS TO BE IN ACCORDANCE WITH ADA OR APPROPRIATE GOVERNING AUTHORITY'S STANDARDS, WHICHEVER IS MORE RESTRICTIVE.
2. SEE SITE PLAN FOR ADA PARKING LOCATIONS.

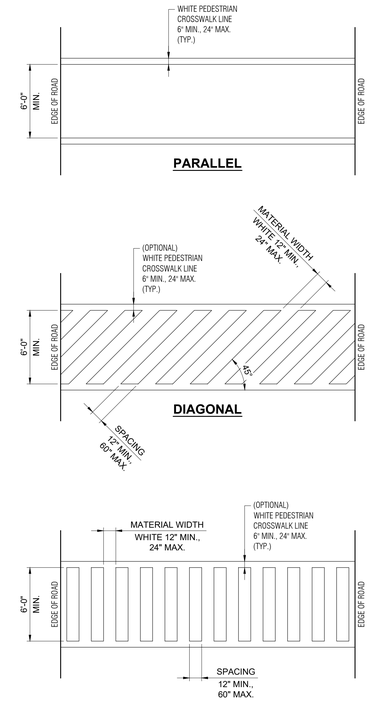


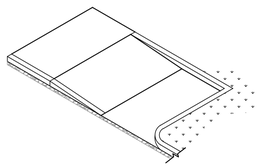
A1	ACCESSIBLE PARKING STALL DETAILS
NTS	



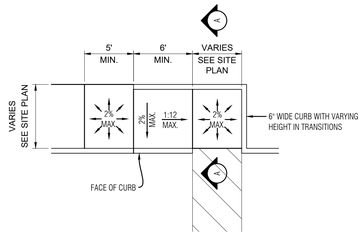
A2	PRECAST CONCRETE WHEEL STOP
NTS	

1. CONTRACTOR SHALL PROPERLY RE-ALIGN STOP BARS AND OTHER PAVEMENT MARKERS AS NECESSARY TO INSTALL CROSSWALK.
2. CROSSWALK STRIPES SHALL BE APPLIED IN ACCORDANCE WITH THE CITY OF WAXAHACHIE STANDARDS.

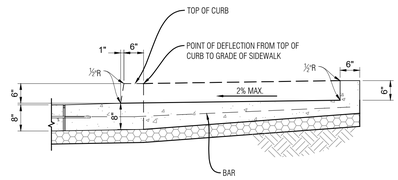




ISOMETRIC



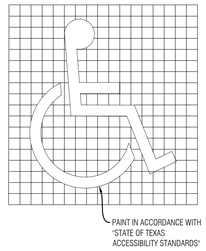
PLAN



SECTION A-A

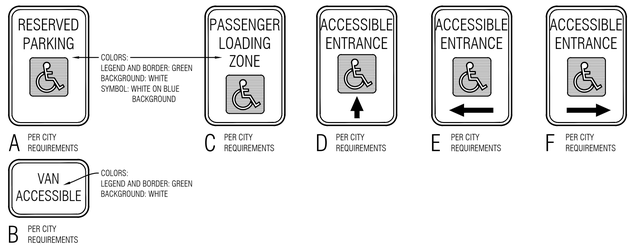
B1	PARALLEL CURB RAMP
NTS	

B3	CROSSWALK STRIPING
NTS	

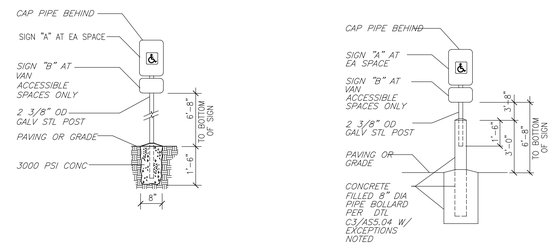


NOTE:
GRID FOR LAYOUT PURPOSES ONLY

C1	ACCESSIBLE SYMBOL DETAIL
NTS	



C2	ACCESSIBLE PARKING SIGN DETAIL
NTS	



C3	SIGN POST DETAILS
NTS	

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Dallas, TX 75202
T: 214.748.2000

ISSUES

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REGISTERED PROFESSIONAL ENGINEER
MIKE GLENN
105559
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Date of issue: 02/26/26

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

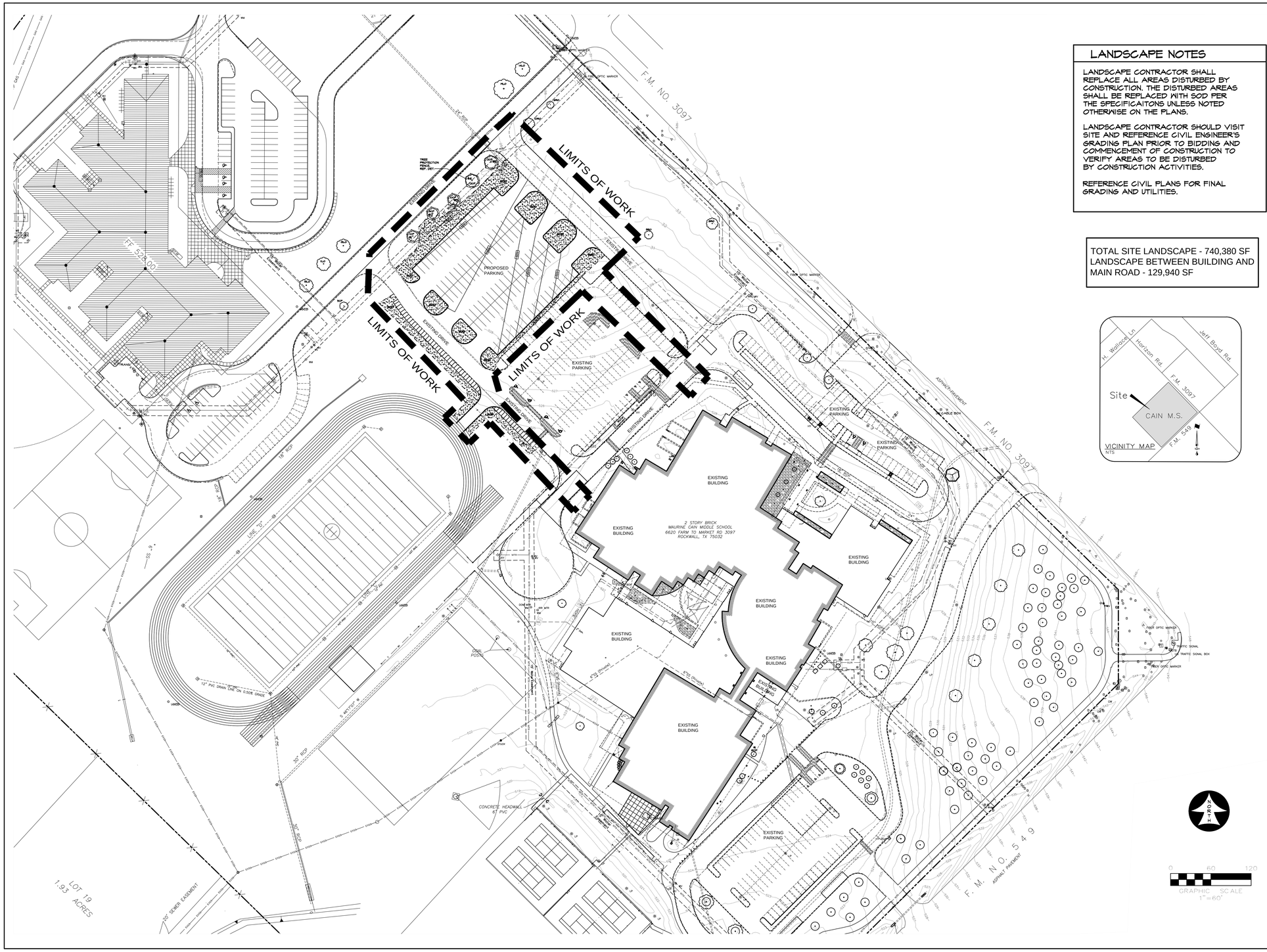
6620 FM-3097, Rockwall, TX 75032

PRIVATE ADA DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET C06.52

Feb 25, 2026 - 1:21pm User: Robert
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NOTE: THE CITY OF HEATH CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



LANDSCAPE NOTES

LANDSCAPE CONTRACTOR SHALL REPLACE ALL AREAS DISTURBED BY CONSTRUCTION. THE DISTURBED AREAS SHALL BE REPLACED WITH SOD PER THE SPECIFICAITONS UNLESS NOTED OTHERWISE ON THE PLANS.

LANDSCAPE CONTRACTOR SHOULD VISIT SITE AND REFERENCE CIVIL ENGINEER'S GRADING PLAN PRIOR TO BIDDING AND COMMENCEMENT OF CONSTRUCTION TO VERIFY AREAS TO BE DISTURBED BY CONSTRUCTION ACTIVITIES.

REFERENCE CIVIL PLANS FOR FINAL GRADING AND UTILITIES.

TOTAL SITE LANDSCAPE - 740,380 SF
LANDSCAPE BETWEEN BUILDING AND MAIN ROAD - 129,940 SF

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T: 913-232-1464

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1	02/26/2026	ISSUE FOR CONSTRUCTION
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	REVISIONS

STATE OF TEXAS
MICHAEL W. RAMSEY
1901
REGISTERED
LANDSCAPE ARCHITECT
2/26/26

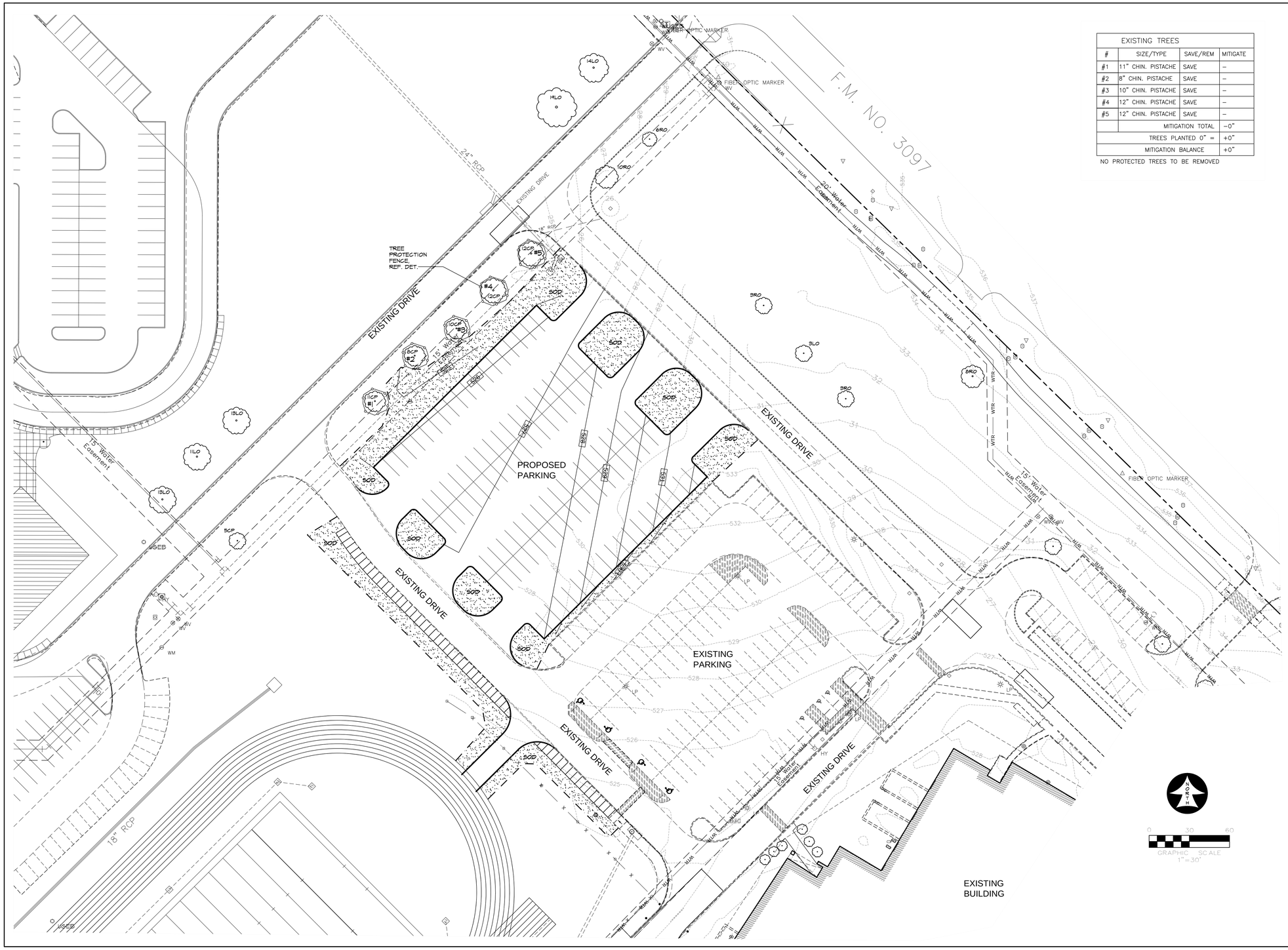
RAMSEY LANDSCAPE ARCHITECTS, LLC
11914 WISHING WELL CT.
FRISCO, TEXAS 75035
PHONE (972) 335-0889
FAX (469) 362-5433
EMAIL: MIKE.RLA@ATT.NET

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

OVERALL LANDSCAPE PLAN

JOB 26028
DATE 02/26/2026
SHEET L 1



EXISTING TREES			
#	SIZE/TYPE	SAVE/REM	MITIGATE
#1	11" CHIN. PISTACHE	SAVE	–
#2	8" CHIN. PISTACHE	SAVE	–
#3	10" CHIN. PISTACHE	SAVE	–
#4	12" CHIN. PISTACHE	SAVE	–
#5	12" CHIN. PISTACHE	SAVE	–
	MITIGATION TOTAL		–0"
	TREES PLANTED 0" =		+0"
	MITIGATION BALANCE		+0"

NO PROTECTED TREES TO BE REMOVED

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STATE OF TEXAS
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1901
REGISTERED
LANDSCAPE ARCHITECT
2/26/26

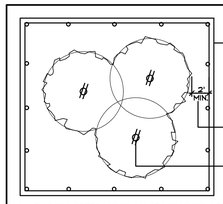
RAMSEY LANDSCAPE ARCHITECTS, LLC
11914 WISHING WELL CT.
FRISCO, TEXAS 75035
PHONE (972) 335-0889
FAX (469) 362-5433
EMAIL: MIKE.RLA@ATT.NET

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

LANDSCAPE PLAN

JOB 26028
DATE 02/26/2026
SHEET L 2



1. EXISTING TREES WITHIN CONTRACT LIMITS ARE SHOWN ON THE DRAWINGS. EXISTING TREES DESIGNATED FOR REMOVAL SHALL BE FLAGGED AT THE PROJECT SITE WITH FLAGGING BY THE CONTRACTOR.
2. PROTECT ALL INDIVIDUAL TREES OR GROUPS OF TREES TO BE PRESERVED BY ERECTING A BARRIER AROUND EACH TREE OR GROUP OF TREES. INSTALL AND MAINTAIN BARRIER AT TREE DRIPLINE. BARRIERS SHALL REMAIN IN PLACE UNTIL REMOVAL IS NECESSARY.
3. IN THE EVENT THAT HEAVY CONSTRUCTION IS SCHEDULED TO OCCUR WITHIN THE DRIPLINE OF AN EXISTING TREE, CONTRACTOR SHALL ERECT A PROTECTION FENCE OUTSIDE THE DRIPLINE UNTIL THIS CONSTRUCTION IS SCHEDULED TO OCCUR. THE PROTECTION FENCE MAY THEN BE ADJUSTED AS REQUIRED TO COMPLETE THE PROPOSED CONSTRUCTION. AFTER CONSTRUCTION IN THIS AREA IS COMPLETED, THE PROTECTION FENCE SHALL BE ADJUSTED TO IT'S ORIGINAL LOCATION.
4. CONTRACTORS SHALL NOT PARK, CLEAN TOOLS AND EQUIPMENT OR STORE MATERIALS WITHIN THE DRIPLINE OF ANY TREE.
5. ALL ROOTS OVER 1" IN DIAMETER SHALL BE CUT CLEAN WITH A HAND SAW.

TREE PROTECTION FENCE AND NOTES

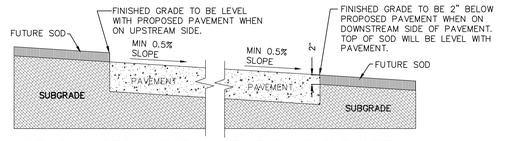
SCALE: N.T.S.

PLANT LEGEND

GROUNDCOVER / VINES

QUANTITY	SYMBOL	CALLOUT	COMMON NAME	SCIENTIFIC NAME	SIZE AND CONDITION
AS SHOWN		SOD	Common Bermuda Grass	Cynodon dactylon	Solid Rolled Sod refer to specifications

LANDSCAPE CONTRACTOR SHALL VERIFY ALL PLANT QUANTITIES



GRADING DETAIL FOR PAVEMENT WITHOUT CURB

SCALE: N.T.S.

LANDSCAPE NOTES

LANDSCAPE CONTRACTOR SHALL REPLACE ALL AREAS DISTURBED BY CONSTRUCTION. THE DISTURBED AREAS SHALL BE REPLACED WITH SOD PER THE SPECIFICAITONS UNLESS NOTED OTHERWISE ON THE PLANS.

LANDSCAPE CONTRACTOR SHOULD VISIT SITE AND REFERENCE CIVIL ENGINEER'S GRADING PLAN PRIOR TO BIDDING AND COMMENCEMENT OF CONSTRUCTION TO VERIFY AREAS TO BE DISTURBED BY CONSTRUCTION ACTIVITIES.

REFERENCE CIVIL PLANS FOR FINAL GRADING AND UTILITIES.

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STATE OF TEXAS
MICHAEL W. RAMSEY
1901
REGISTERED
LANDSCAPE ARCHITECT
2/26/26

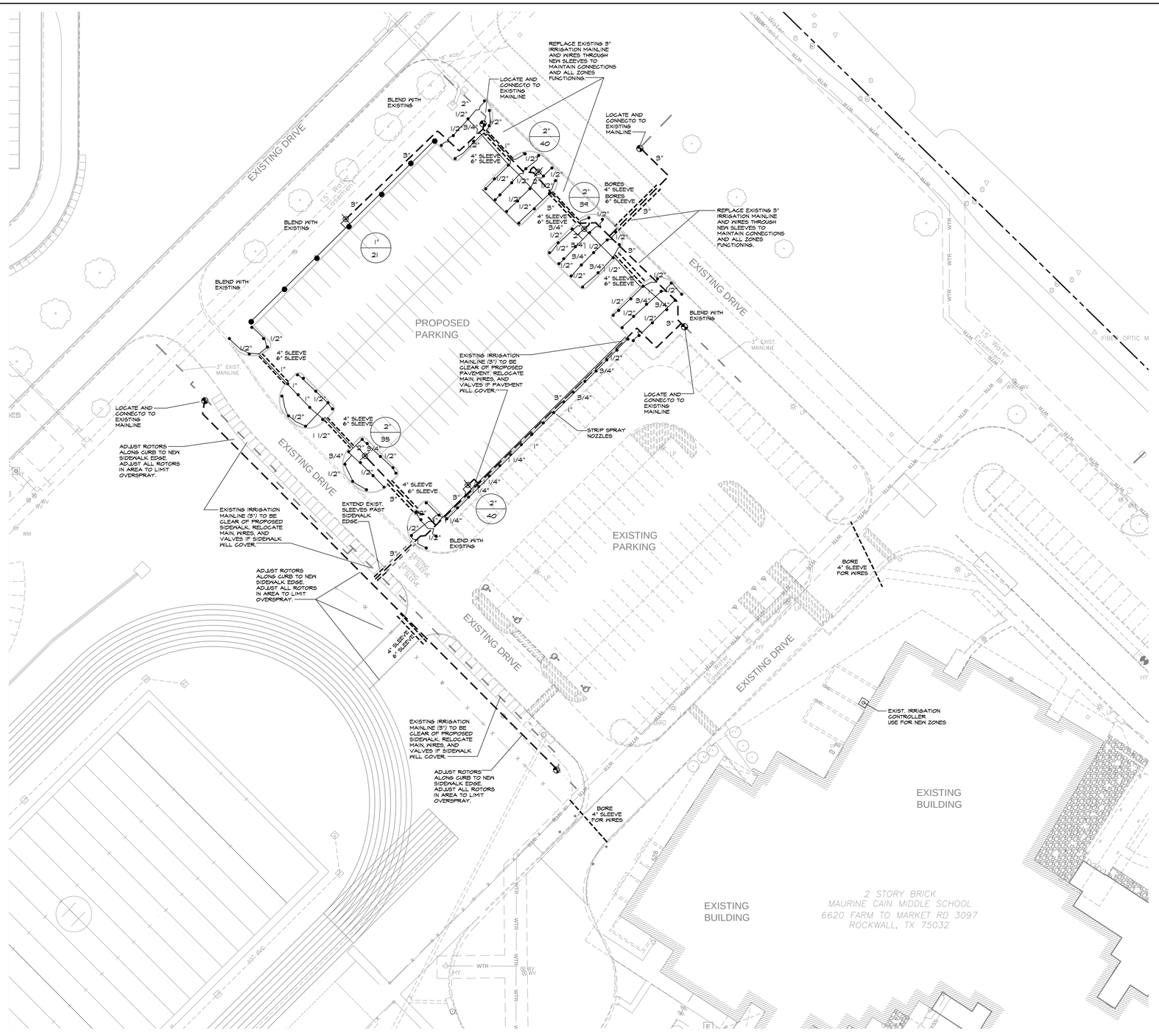
RAMSEY LANDSCAPE ARCHITECTS, LLC
11914 WISHING WELL CT.
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PHONE (972) 335-0889
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CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

LANDSCAPE DETAILS

JOB 26028
DATE 02/26/2026
SHEET L 3



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1	02/26/2026	ISSUE FOR CONSTRUCTION
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STATE OF TEXAS
JOHN JAY WINGFIELD
851
LICENSED IRRIGATOR
02-26-2026

IRRIGATION SPECIALIST
JOHN WINGFIELD – (972) 513-3859

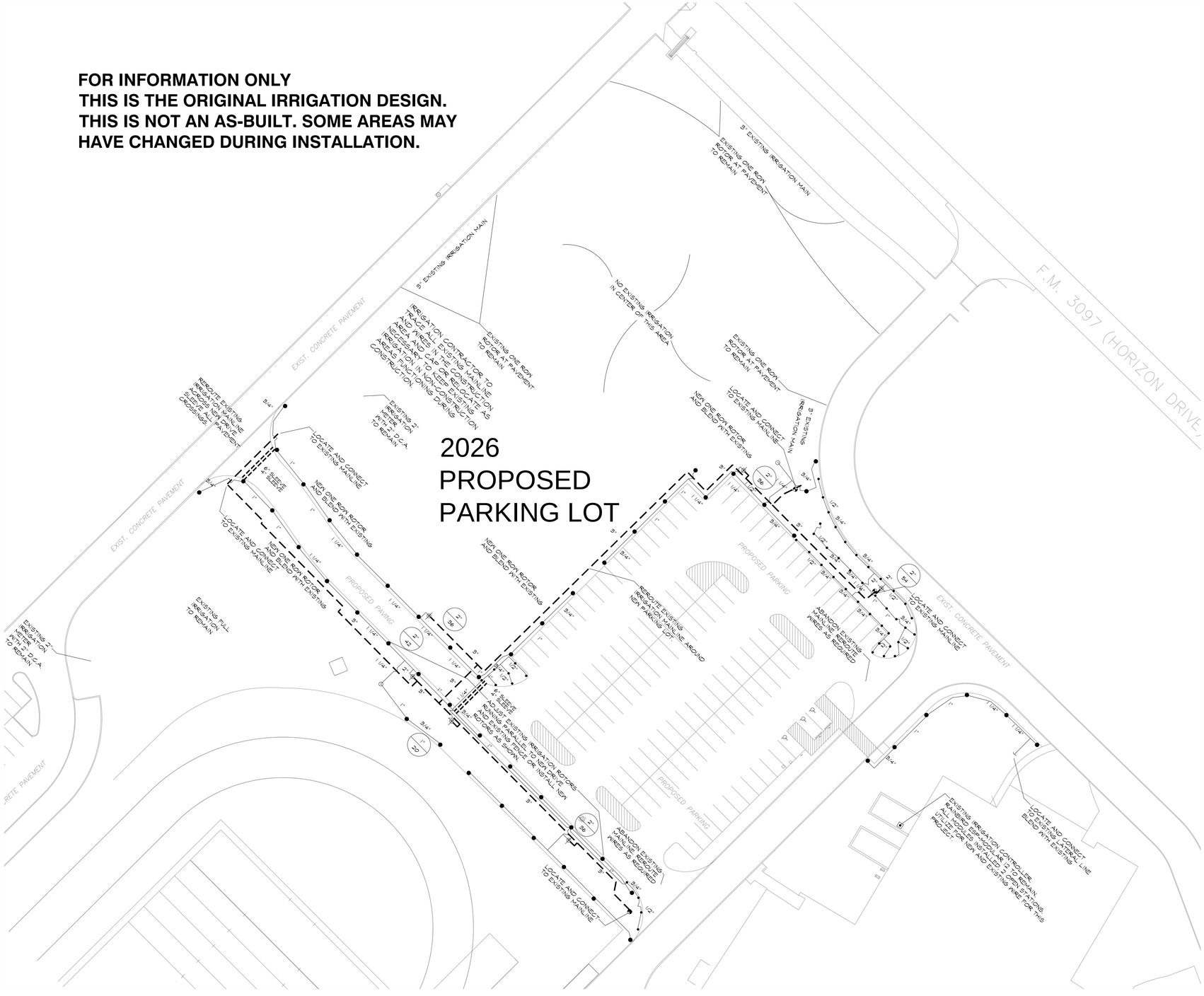
CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

IRRIGATION PLAN

JOB 26028
DATE 02/26/2026
SHEET LI 1

FOR INFORMATION ONLY
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	REVISIONS	

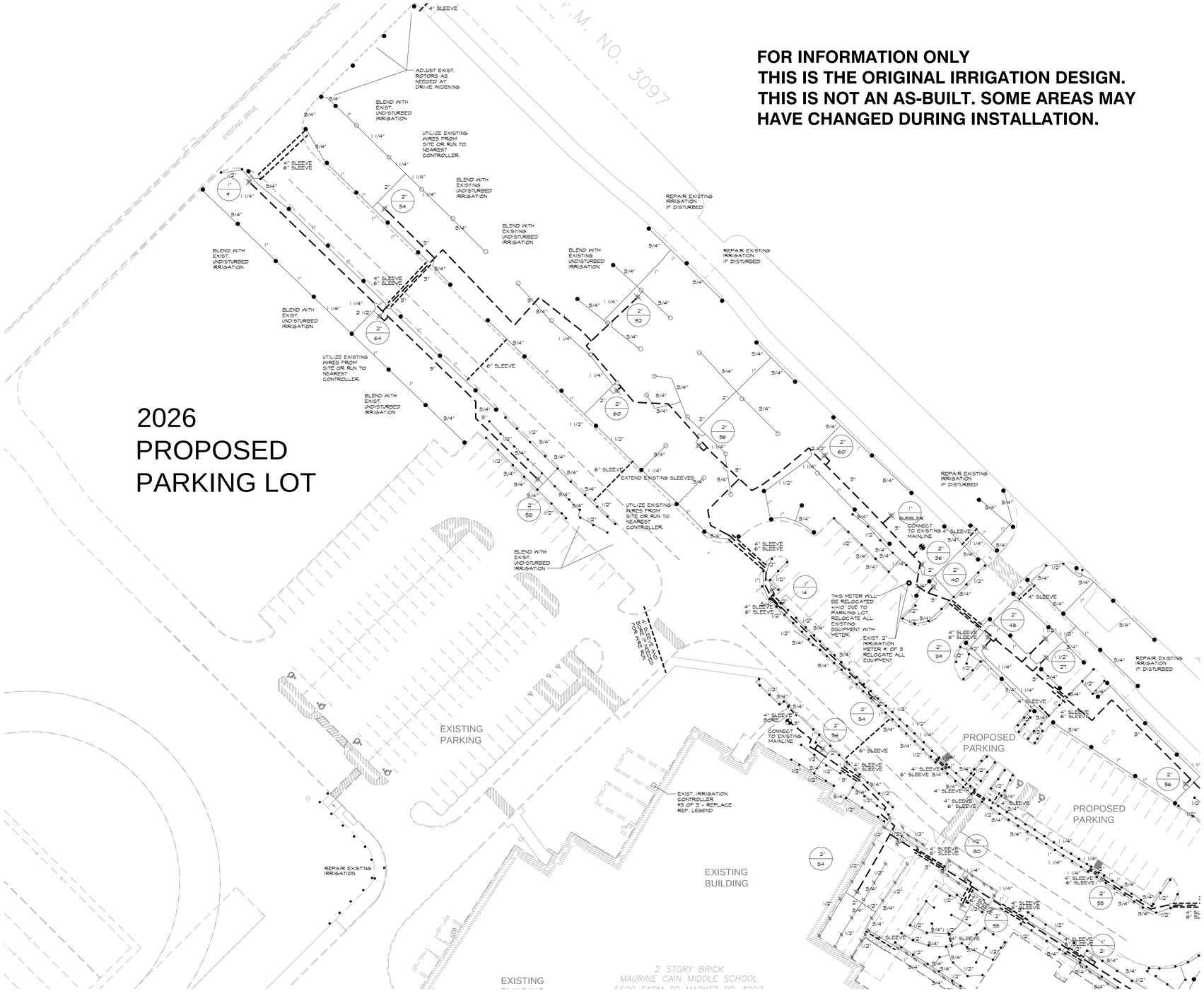
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2017
IRRIGATION DESIGN

JOB 26028
DATE 02/26/2026
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2024
IRRIGATION DESIGN

JOB 26028
DATE 02/26/2026
SHEET LI 3

IRRIGATION NOTES

ALL LOCATIONS OF THE EXISTING IRRIGATION SHOWN ON THESE PLANS WERE DERIVED FROM FIELD INSPECTIONS AND ASSUMPTIONS BASED ON THE INSPECTIONS.
THEY IN NO WAY GUARANTEE THE EXACT LOCATION OF ANY OF THE IRRIGATION EQUIPMENT OR LINES THAT EXIST ON THE SITE. LANDSCAPE CONTRACTOR SHALL TRACE ALL MAINLINE, WIRES, AND VALVE IN CONSTRUCTION AREAS FOR EXACT LOCATIONS.

THE EXISTING IRRIGATION SYSTEM SHALL NOT BE DISABLED FOR MORE THAN 72 HOURS FOR ANY REASON. IF THE EXISTING SYSTEM IS DISABLED FOR 72 HOURS, IT SHALL NOT BE DISABLED AGAIN DURING NORMAL WATERING SCHEDULE UNTIL IT HAS COMPLETED TWO FULL WATERINGS OF THE ENTIRE SITE. IT MAY BE INTERRUPTED FOR A SHORTER AND MORE FREQUENT INTERVAL BUT THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THAT THE NORMAL WATERING SCHEDULE IS COMPLETED.

IRRIGATION CONTRACTOR IS RESPONSIBLE FOR PROPERLY REPAIRED AND FUNCTIONING IRRIGATION SYSTEM IN ALL AREAS IN OR ADJACENT TO CONSTRUCTION.
ALL DISTURBED IRRIGATION AREAS WILL BE REPAIRED OR COMPLETELY REPLACED TO PROVIDE FULL IRRIGATION FOR THE AREAS SHOWN ON THE PLANS.

ALL REPAIRED AND REPLACED IRRIGATION SHALL BE INSTALLED PER THE SPECIFICATIONS.

ANY DEVIATION FROM THE SPECIFICATIONS AND PLANS WILL REQUIRE THE IRRIGATION CONTRACTOR TO OBTAIN APPROVAL FROM THE OWNER.

IF THE IRRIGATION SYSTEM IS DAMAGED DURING THE CONSTRUCTION PROCESS THE GENERAL CONTRACTOR AND IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND RESTORING THE EXISTING SYSTEM TO WORKING STATUS WITHIN 24 HOURS OF WHEN THE DAMAGED OCCURRED.

IRRIGATION CONTRACTOR IS RESPONSIBLE FOR RAISING OR LOWERING HEADS IN AREAS WHERE GRADING IS TAKING PLACE AND THERE IS NO RE-DESIGN OF THE IRRIGATION SYSTEM.

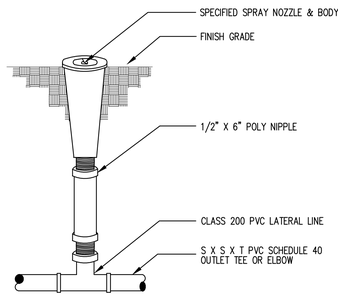
EXISTING IRRIGATION NOTE

PRIOR TO CONSTRUCTION OR DISTURBANCE OF EXISTING IRRIGATION THE IRRIGATION CONTRACTOR, GENERAL CONTRACTOR AND THE OWNER SHALL MEET ON SITE TO REVIEW ALL EXISTING IRRIGATION ON SITE. FIELD NOTES SHALL BE MADE BY THE GENERAL CONTRACTOR AS TO THE LIMITS AND CONDITION OF THE EXISTING SYSTEM. ALL MAINLINE AND WIRES IN THE AREA WHERE CONSTRUCTION WILL DISTURB OR DAMAGE THE EXISTING SYSTEM SHALL BE RELOCATED OR STUBBED OUT PRIOR TO CONSTRUCTION.

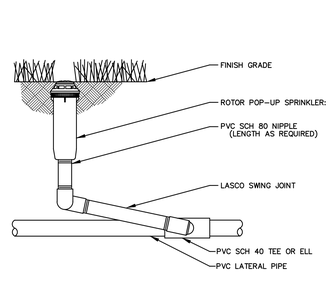
EXISTING IRRIGATION ON THE SITE, EXCEPT FOR THE IMMEDIATE CONSTRUCTION AREA, SHALL BE KEPT IN WORKING CONDITION. ANY TEMPORARY MEASURES TO KEEP THE ENTIRE SITE IRRIGATED SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR.

ALL PLANT MATERIAL ON SITE IS WATERED BY AN EXISTING IRRIGATION SYSTEM. IRRIGATION MAINLINE IS LOOPED AROUND EXISTING BUILDING. LOOP SHALL BE MAINTAINED AS NEEDED TO WATER EXISTING PLANTS TO KEEP THEM HEALTHY. HAND WATERING MAY BE NECESSARY.

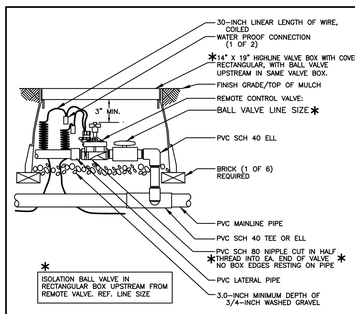
GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING HEALTH OF EXISTING PLANTS DURING CONSTRUCTION. THIS INCLUDES BUT IS NOT LIMITED TO TEMPORARY OR HAND WATERING.



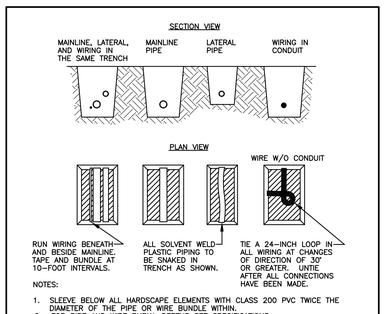
POP-UP SPRAY HEAD



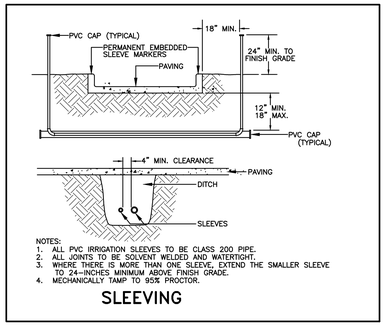
ROTOR POP-UP SPRINKLER



REMOTE CONTROL VALVE



TRENCH DETAIL



SLEEVING

LEGEND

- RAINBIRD 1804 SAM PRS 4" POP-UP SPRAY HEAD ON CUT OFF POLY NIPPLE
- HUNTER I-25 4" POP UP ROTARY HEAD, PART CIRCLE W/ DRAIN CHECK VALVE ON LASCO SWING JOINT
- HUNTER I-25 4" POP UP ROTARY HEAD, FULL CIRCLE W/ DRAIN CHECK VALVE ON LASCO SWING JOINT
- RAINBIRD PEB REMOTE CONTROL VALVE IN 14" X 19" VALVE BOX, WITH BALL VALVE.
- SPEARS PVC BALL VALVE, MAINLINE SIZE, INSTALLED IN VALVE BOX.
- 3 EXISTING 2" WATER METERS. EXISTING TO REMAIN
- IRRIGATION CONTROLLERS (3) EXISTING TO REMAIN NUMBER WIRES PRIOR TO REMOVAL TO MAINTAIN CURRENT ZONE PROGRESSION.
- CLASS 200 PVC MAINLINE PIPE (3" UNLESS NOTED OTHERWISE) SOME 4" FROM METERS TO DISTRIBUTION AREAS.
- CLASS 200 PVC LATERAL PIPE
- CLASS 200 SLEEVE PIPE
- VALVE SIZE / VALVE GPM

INSTALLATION NOTES

1. COORDINATE IRRIGATION INSTALLATION WITH PLANTING PLAN AND SITE CONDITIONS TO PROVIDE COMPLETE COVERAGE WITH MINIMUM OVERSPRAY. THE IRRIGATION CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO ENSURE PROPER COVERAGE AT NO ADDITIONAL COST TO THE OWNER.
2. CONFIRM STATIC WATER PRESSURE OF 65 PSI AT LEAST 7 DAYS BEFORE BEGINNING WORK. IF STATIC WATER PRESSURE IS LESS THAN STATED ABOVE, DO NOT PROCEED UNTIL DIRECTED SO BY THE LANDSCAPE ARCH.
3. THE IRRIGATION CONTRACTOR WILL SECURE ALL REQUIRED PERMITS AND PAY ALL ASSOCIATED FEES UNLESS OTHERWISE NOTED. ALL LOCAL CODES SHALL PREVAIL OVER ANY DISCREPANCIES HEREIN.
4. LATERAL PIPE SHALL BE INSTALLED AT A MINIMUM DEPTH OF 12 INCHES. MAINLINE PIPE AND WIRES SHALL BE INSTALLED AT A MINIMUM DEPTH OF 18 INCHES. USE PURPLE PIPE FOR RECLAIMED WATER.
5. UNSLEEVED PIPES MAY BE SHOWN UNDER PAVEMENT FOR GRAPHIC CLARITY ONLY. INSTALL THESE PIPES IN ADJACENT LANDSCAPED AREAS.
6. ELECTRIC POWER IS EXISTING AT EXISTING CONTROLLER LOCATIONS.
7. 24 VOLT VALVE WIRE SHALL BE A MINIMUM OF #14 GAUGE, U.F. APPROVED FOR DIRECT BURIAL, SINGLE CONDUCTOR "IRRIGATION WIRE". WIRE SPLICES SHALL BE ENCASED IN A WATERPROOF COMPOUND OR GEL. ALL FIELD SPLICES SHALL BE LOCATED IN A ROUND VALVE BOX OF SUFFICIENT SIZE TO ALLOW INSPECTION.
8. VALVE BOXES SHALL BE INSTALLED FLUSH WITH GRADE, SUPPORTED BY BRICKS PER THE DETAIL, WITH 3 INCHES OF CLEAN PEA GRAVEL LOCATED BELOW THE VALVE. USE PURPLE VALVE BOX LIDS FOR RECLAIMED WATER.
9. USE LASCO O-RING SWING JOINT ASSEMBLIES TO CONNECT ALL ROTARY HEADS AND QUICK COUPLERS.
10. CONTRACTOR IS TO CONTACT APPROPRIATE AUTHORITIES AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.

IRRIGATION SLEEVING

GENERAL CONTRACTOR TO COORDINATE SLEEVE INSTALLATION WITH IRRIGATION CONTRACTOR PRIOR TO INSTALLATION OF PAVEMENT.

TEMPORARY IRRIGATION

LANDSCAPE AREAS TO RECEIVE GRASS PER THE PLAN WHERE THERE IS NO PERMANENT IRRIGATION SHOWN OR AREAS DISTURBED BY CONSTRUCTION WITH NO PERMANENT IRRIGATION WILL REQUIRE TEMPORARY IRRIGATION TO ESTABLISH A STAND OF GRASS.

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	REVISIONS

STATE OF TEXAS
JOHN JAY WINGFIELD
851
LICENSED IRRIGATOR
02-26-2026

IRRIGATION SPECIALIST
JOHN WINGFIELD – (972) 513-3859

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

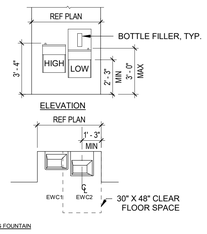
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IRRIGATION DETAILS

JOB 26028
DATE 02/26/2026
SHEET LI 4

STANDARD LAYOUTS

SCALE: 1/4" = 1' - 0"



PLAN DESIGNATION: **EWC1**: SINGLE HIGH
EWC2: SINGLE LOW

SHEET SYMBOLS

- NEW PARTITION
- EXISTING PARTITION
- DEMOLISHED PARTITION
- TEMPORARY PARTITION
- PARTIAL HEIGHT PARTITION
- 001 — DEMOLITION KEYNOTE
- 1t — WINDOW TYPE IDENTIFICATION TAG
- 101 — DOOR IDENTIFICATION TAG
- Room name / 101 — ROOM NAME IDENTIFICATION TAG
- 01 — BATHROOM ACCESSORIES TAG
- Wall - N / Wall - W / Ceiling Finish / Floor Finish / Base Finish / Wall - E / Wall - S — FINISH TYPE IDENTIFICATION TAG
- A3-DA — PARTITION TYPE IDENTIFICATION TAG
- L-1 — LOUVER TAG
- 0 — GRID LINE IDENTIFICATION TAG
- 1 — REVISION CLOUD AND IDENTIFICATION TAG
- LEVEL 100'-0" — ELEVATION IDENTIFICATION TAG
- 1' - 0" — CEILING TAG
- BREAK LINE
- CENTER LINE
- MATCHLINE
- 1/ A101 — EXTERIOR ELEVATION IDENTIFICATION TAG
- 1/ A101 — INTERIOR ELEVATION IDENTIFICATION TAG
- Ref / 01 / A101 — BUILDING SECTION IDENTIFICATION TAG
- Ref / 01 / A101 — WALL SECTION IDENTIFICATION TAG
- 1 / A101 SIM — DETAIL REFERENCE TAG
- FIRE EXTINGUISHER CABINET

STANDARD ABBREVIATIONS

A.D.	AREA DRAIN
A.F.F. OR AFF	ABOVE FINISH FLOOR
A.P.	ACCESS PANEL
A/C.	AIR CONDITIONING
ABV.	ABOVE
ACOUS.	ACOUSTICAL
ACP	ACOUSTICAL CEILING PANEL
ADD'L.	ADDITIONAL
ADJ.	ADJUSTABLE OR ADJACENT
AL.	ALUMINUM
ANCH.	ANCHOR
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
ASSY.	ASSEMBLY
ATC	ACOUSTICAL CEILING TILE
AUTO.	AUTOMATIC
AWC	ACOUSTICAL WALL PANELS
B.L.	BUILDING LINE
B.O.	BOTTOM OF
BD.	BOARD
BLDG.	BUILDING
BLK.	BLOCK
BM.	BEAM
BOT.	BOTTOM
BRK.	BREAK
BRKT.	BRACKET
BSMT.	BASEMENT
BTWN.	BETWEEN
C.B.	CATCH BASIN
C.G.	CORNER GUARD
C.I.	CAST IRON
C.I.P	CAST IN PLACE
C.J.	CONTROL JOINT
C.O.	CLEAR OPENING
C.T.	CERAMIC TILE
CAB.	CABINET
CAT.	CATEGORY
CER.	CERAMIC
CFMF	COLD FORMED METAL FRAMING
CLG.	CEILING
CLO.	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
CORR.	CORRIDOR
CPT	CARPET
CPTT	CARPET TILE
CTR.	CENTER
CTRL.	CONTROL
D.F.	DRINKING FOUNTAIN
D.O.	DOOR OPENING
D.P.	DAMP PROOFING
D.S.	DOWNSPOUT
DBL.	DOUBLE
DEMO.	DEMOLITION
DEPT.	DEPARTMENT
DET. OR DTL.	DETAIL
DIA. OR DIAM.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DN.	DOWN
DR	DOOR
DRN	DRAIN
DWG.	DRAWING
DWGS.	DRAWINGS

DWR.	DRAWER
E.	EAST
E.J.	EXPANSION JOINT
E.S.	EXPOSED STRUCTURE
E.W.	EACH WAY
E.W.C.	ELECTRIC WATER COOLER
EA.	EACH
EL. OR ELEV.	ELEVATION
ELEC. OR ELECT.	ELECTRICAL
EMERG. OR EMER.	EMERGENCY
ENCL	ENCLOSURE
EQ	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EXP. OR EXPAN.	EXPANSION
EXT.	EXTERIOR
F.A.	FIRE ALARM
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
F.H.C.	FIRE HOSE CABINET
F.H.R.	FIRE HOSE REEL
F.HT.	FULL HEIGHT
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.S.	FACE OF STUD
F.S.	FULL SIZE
F.V.C.	FIRE VALVE CABINET
FDN.	FOUNDATION
FIN.	FINISH
FL. OR FLR.	FLOOR
FLASH	FLASHING
FLUOR.	FLUORESCENT
FPRF.	FIREPROOF(ING)
FR.	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FSTNR.	FASTENER
FT.	FOOT OR FEET
FTG.	FOOTING
FURR.	FURRING
FUT.	FUTURE
G.B.	GRAB BAR
G.C.	GENERAL CONTRACTOR
GA.	GAUGE
GALV.	GALVANIZED
GFRG	GLASS FIBER REINFORCED GYPSUM
GL.	GLASS
GND.	GROUND
GR.	GRADE
GRN	GRANITE
GSW	GYPSUM SHAFT WALL
GYP. BD.	GYPSUM BOARD
H.B	HOSE BIB
H.C.	HOLLOW CORE
H.K.	HOUSEKEEPING
H.M.	HOLLOW METAL
HCP.	HANDICAPPED
HD.	HAND
HDW. OR HDWR.	HARDWARE
HDWD.	HARDWOOD
HNDRL.	HANDRAIL
HORZ.	HORIZONTAL
HR.	HOUR
HT.	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
I.D.	INSIDE DIAMETER/DIMENSION
IN.	INCH
INCL.	INCLUDE(D)(ING)

INFO.	INFORMATION
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
JAN CLO.	JANITOR CLOSET
JAN.	JANITOR
JST.	JOIST
JT.	JOINT
L	LEG
LAB.	LABORATORY
LAM.	LAMINATE
LAV.	LAVATORY
LKR.	LOCKER
LT.	LIGHT
M.	METER
M.H.	MANHOLE
M.O.	MASONRY OPENING
MAS.	MASONRY
MATL.	MATERIAL
MAX	MAXIMUM
MBL	MARBLE
MECH.	MECHANICAL
MEMB.	MEMBRANE
MEP.	MECHANICAL, ELECTRICAL, PLUMBING
MFG.	MANUFACTURER
MIN.	MINIMUM
MIR.	MIRROR
MISC.	MISCELLANEOUS
MTD.	MOUNTED
MTL.	METAL
MUL.	MULLION
N	NORTH
N.I.C.	NOT IN CONTRACT
N.T.S.	NO TO SCALE
NO.	NUMBER
NOM.	NOMINAL
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER/DIMENSION
OFF.	OFFICE
OPNG.	OPENING
OPP.	OPPOSITE
OPP.HD.	OPPOSITE HAND
OVHD.	OVERHEAD
OZ.	OUNCE
P.C.	PRECAST CONCRETE
P.LAM.	PLASTIC LAMINATE
PAV.	PAVING
PC.	PIECE
PL.	PLATE
PLAS.	PLASTIC
PLBG.	PLUMBING
PLYWD.	PLYWOOD
PMMP	PREMANUFACTURED METAL PANEL
PNT.	PAINT
POL.	POLISHED
PR.	PAIR
PRCST.	PRECAST
PREMANUF.	PREMANUFACTURED
PT.	POINT
PTD.	PAINTED
PTN.	PARTITION
R.	RADIUS
R.D.	ROOF DRAIN
R.O.	ROUGH OPENING
RCP	REFLECTED CEILING PLAN
REBAR	REINFORCING BAR

REF.	REFERENCE
REFG.	REFRIGERATOR
REINF.	REINFORCED
REQD.	REQUIRED
RESIL.	RESILIENT
REV.	REVISION
RFL.	REFLECTED
RM.	ROOM
S.	SOUTH
S.C.	SOLID CORE
S.H.	SPRINKLER HEAD
S.S.	STAINLESS STEEL
SAN.	SANITARY
SCHED. OR SCHD.	SCHEDULE
SEC.	SECURITY
SECT.	SECTION
SEW.	SEWER
SGL.	SINGLE
SHT.	SHEET
SHWR.	SHOWER
SIM.	SIMILAR
SPEC. OR SPECS.	SPECIFICATION(S)
SPKR.	SPEAKER
SQ.	SQUARE
SQ. FT. OR S.F.	SQUARE FOOT (FEET)
SQ. YD. OR S.Y.	SQUARE YARD(S)
STA.	STATION
STD.	STANDARD
STL.	STEEL
STOR.	STORAGE
STRUCT.	STRUCTURE OR STRUCTURAL
SUSP.	SUSPENDED
SYM.	SYMMETRICAL
T&G	TONGUE & GROOVE
T.	TREAD
T. OR TEMP.	TEMPERED
T.O.C.	TOP OF CONCRETE
T.O.CMU	TOP OF CMU
T.O.D.	TOP OF DECK
T.O.O.	TOP OF
T.O.P.	TOP OF PARAPET
T.O.S.	TOP OF STEEL
T.O.S.S.	TOP OF STRUCTURAL SLAB
T.V.	TELEVISION
TEL.	TELEPHONE
THK.	THICK
TLT.	TOILET
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
UNF.	UNFINISHED
UR.	URINAL
V.I.F.	VERIFY IN FIELD
VB.	VAPOR BARRIER
VERT.	VERTICAL
VEST.	VESTIBULE
W.	WEST OR WIDTH
W.B.	WEATHER BARRIER
W.C.	WATER CLOSET
W.P.	WATERPROOF
W/	WITH
W/O	WITHOUT
WD.	WOOD
WDW.	WINDOW
WR/GB	WATER RESISTANT GYP. BOARD
WSCT.	WAINSCOT
WT.	WEIGHT

ACCESSIBILITY NOTES

01 EXTERIOR ROUTE CONSTRUCTION

1. AN ACCESSIBLE ROUTE, IN THE DIRECTION OF TRAVEL, SHALL NOT HAVE A SLOPE EXCEEDING 1:20 (5/8" PER FOOT) EXCEPT AT A RAMP.
2. AN ACCESSIBLE ROUTE CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).
3. ALL NEW PAVING AND WALKS FOR AN ACCESSIBLE ROUTE, SHALL NOT HAVE AN ABRUPT CHANGE IN SURFACE LEVEL (VERTICALLY) GREATER THAN 1/4" WHEN ABUTTING EITHER EXISTING OR OTHER NEW SURFACES DESIGNATED FOR AN ACCESSIBLE ROUTE.
4. AN ACCESSIBLE ROUTE CROSSING OR PARALLELING A HAZARDOUS AREA, SHALL BE CLEARLY MARKED IN A CONTRASTING COLOR, WITH THE ROUTE LOCATION, MARKING MATERIALS AND COLOR SHOWN ON THE DRAWING.
5. ANY OPENINGS THAT ARE CONSTRUCTED IN THE SURFACE OF AN ACCESSIBLE ROUTE SHALL HAVE THE OPENINGS RUNNING PERPENDICULAR TO THE DIRECTION OF TRAVEL WITH THE OPENINGS DIMENSION NOT TO EXCEED 1/2" IN THE DIRECTION OF TRAVEL.

02 CURB RAMPS

1. THE TOP AND BOTTOM OF THE RAMP, AT THE TRANSITION TO EITHER EXISTING OR NEW SURFACES, SHALL BE FLUSH AND FREE OF ANY ABRUPT VERTICAL CHANGES.
2. THE SURFACE FINISH OF THE RAMP, EITHER RAISED OR RECESSED AS PERMITTED BY ACCESSIBILITY CODES AND GUIDELINES, SHALL BE INSTALLED TO PERMIT WATER DRAINAGE.
3. THE RAMP CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).

03 INTERIOR ROUTE CONSTRUCTION

1. AN ACCESSIBLE ROUTE, IN THE DIRECTION OF TRAVEL, SHALL NOT HAVE A SLOPE EXCEEDING 1:20 (5/8" PER FOOT), EXCEPT AT A RAMP.
2. AN ACCESSIBLE ROUTE CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).
3. ALL NEW FLOOR CONSTRUCTION AND FLOORING MATERIALS SHALL NOT HAVE AN ABRUPT VERTICAL CHANGE IN FINISH SURFACE LEVEL GREATER THAN 1/4" WHEN ABUTTING EITHER EXISTING OR NEW SURFACES DESIGNATED FOR AN ACCESSIBLE ROUTE.

04 DOORS

1. ANY THRESHOLD SHALL NOT EXCEED 1/2" IN HEIGHT, NOR 1:2 SLOPE.
2. ALL ACCESSIBLE HARDWARE OPERABLE BY THE DISABLED, SHALL NOT EXCEED A HEIGHT OF 4'-0" AFF AND SHALL BE EASILY OPERATED WITH ONE HAND WITHOUT GRASPING, PINCHING OR TWISTING OF THE WRIST.
3. ALL ACCESSIBLE DOORS WITH CLOSERS SHALL HAVE THE CLOSER ADJUSTED SO THAT THE CLOSING TIME, FROM A 70 DEGREE OPEN ANGLE TO WITHIN 3" OF THE JAMB, IS NOT LESS THAN 3 SECONDS.
4. THE OPENING FORCE OF THE ALL ACCESSIBLE DOORS, EXCEPT FIRE EXIT DOORS, SHALL NOT EXCEED 5 POUNDS IN THE DIRECTION OF TRAVEL FOR EXITING.
5. THE OPERABLE HARDWARE ON A DOOR LEADING TO HAZARDOUS AREAS (E.G. BOILER ROOMS, MECHANICAL AND ELECTRICAL ROOMS, OTHER EQUIPMENT ROOMS, AND LOADING DOCK), SHALL HAVE A TEXTURED SURFACE ON THE TOUCHABLE AREA.

05 TOILET ROOMS

1. THE FLUSH CONTROL FOR ALL ACCESSIBLE TOILET/URINALS SHALL NOT EXCEED 3'-8" AFF, AND SHALL BE ON THE WIDE (APPROACH) SIDE OF THE TOILET.
2. ACCESSIBLE LAVATORIES SHALL HAVE ALL EXPOSED HOT WATER PIPING AND DRAIN PIPES EITHER INSULATED OR CONFIGURED TO PROTECT AGAINST SKIN CONTACT. THE UNDERSIDE OF THE LAVATORY SHALL NOT HAVE ANY SHARP OR ABRASIVE SURFACES.
3. ANY GRAB BAR INSTALLATION SHALL BE ABLE TO SUPPORT 250 POUNDS APPLIED IN ANY DIRECTION.

06 SIGNAGE

1. ALL ACCESSIBLE PERMANENT ROOMS AND SPACES, EXIT WAYS AND EXIT STAIRWAYS, SHALL HAVE SIGNAGE THAT MEETS ACCESSIBLE SIGNAGE REQUIREMENTS FOR LETTER SIZE, LETTER AND NUMBER TYPESTYLE, RAISED LETTERS, GRADE 2 BRAILLE, COLOR/CONTRAST, AND LOCATION.
2. ALL ACCESSIBLE TOILET ROOMS SHALL BE DESIGNATED WITH THE INTERNATIONAL SYMBOL OF ACCESSIBILITY AND ACCESSIBLE TEXT SIGNAGE FOR A PERMANENT ROOM, PLACED DIRECTLY BELOW THE PICTOGRAM SYMBOL. THE SIGNAGE SHALL MEET THE ACCESSIBLE SIGNAGE REQUIREMENTS FOR LETTER SIZE, LETTER AND NUMBER TYPESTYLE, RAISED LETTERS, GRADE 2 BRAILLE, COLOR/CONTRAST, AND LOCATION.
3. ALL ACCESSIBLE PARKING SPACES AND PUBLIC ENTRANCES SHALL BE DESIGNATED WITH THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGNAGE IN ADDITION TO ANY OTHER SIGNAGE REQUIRED FOR ACCESSIBILITY. THIS SIGNAGE SHALL MEET ACCESSIBILITY REQUIREMENTS FOR COLOR/CONTRAST AND LOCATION.

ACCESSIBLE MOUNTING HEIGHTS

	ADULT			SECTION
WATER CLOSET				
TOP OF SEAT	17"-19"			604.4
FLUSH CONTROLS	15" MIN-48" MAX			604.6/309.3/308
URINAL				
RIM OF BASIN	17" MAX.			605.2
FLUSH CONTROLS	15" MIN-48" MAX			604.6/309.3/308
LAVATORY/SINKS				
RIM OR COUNTER SURFACE	34" MAX.			606.3
APRON CLEARANCE	27" MIN.			306
KNEE CLEARANCE	27" MIN.			306.3
TOE CLEARANCE	9" MIN.			306.2
DRINKING FOUNTAIN				
SPOUT HEIGHT	36" MAX.			602.4
KNEE CLEARANCE	27" MIN.			306.3
TOE CLEARANCE	9" MIN			306.2
DRINKING FOUNTAIN (BENDING DISABLED)				
SPOUT HEIGHT	38"-43"			602.7
GRAB BARS				
TOP OF BAR	33" MIN-36" MAX			609.4
MIRROR				
BOTTOM OF REFLECTIVE SURFACE (above counters & lavs.)	40" MAX.			603.3
TOP OF REFLECTIVE SURFACE	74" MIN.			603.3
SHOWER STALL				
TOP OF SEAT	17" MIN-19" MAX			610.2
SHOWER SPRAY UNIT HEIGHT (FIXED)	48" MAX			608.6
SHOWER SPRAY UNIT HEIGHT (HAND HELD)	48" MAX			608.6
CONTROLS AND OPERATING MECHANISMS				
TOWEL DISPENSER	48" MAX.			308
SOAP DISPENSER	48" MAX.			308
HAND DRYER	48" MAX.			308
TOILET TISSUE DISPENSER	15"-48" MAX.			604.7
SANITARY NAPKIN DISPENSER/RECEPTACLE	48" MAX.			308
TOILET SEAT COVER DISPENSER	48" MAX.			308
ELECTRICAL DEVICES				
ELECTRICAL, PHONE AND DATA OUTLETS (TO CENTER)	17" MIN-46" MAX			308.2.1
ABOVE COUNTER OUTLETS (TO CENTER)	44" MAX.			308.2.2
LIGHT SWITCHES (HIGHEST OPERABLE PART)	48" MAX.			308
FIRE ALARM PULL (HIGHEST OPERABLE PART)	48" MAX.			308
THERMOSTATS (HIGHEST OPERABLE PART)	48" MAX.			308
FIRE EXTINGUISHER CAB. (T.O.HANDLE/OPER. DEVICE)	48" MAX.			308.3.1
PUBLIC TELEPHONE (TO HIGHEST OPERABLE PART)	48" MAX.			308
RAMPS AND STAIRS				
TOP OF HANDRAILS	34"-38"			505.4
ELEVATORS				
HALL CALL BUTTON	48" MAX			407.2.1.1/308
HALL LANTERNS	72" MIN			407.2.2.2
DRESSING AND FITTING ROOMS				
TOP OF BENCH	17" MIN-19" MAX			903.5
FOOD SERVICE LINES				
TOP OF TRAY SLIDE	28" MIN-34" MAX			904.5.2

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	REVISIONS

REGISTERED ARCHITECT · HANSBERGER · ROBERT SMITH · 16318 · STATE OF TEXAS

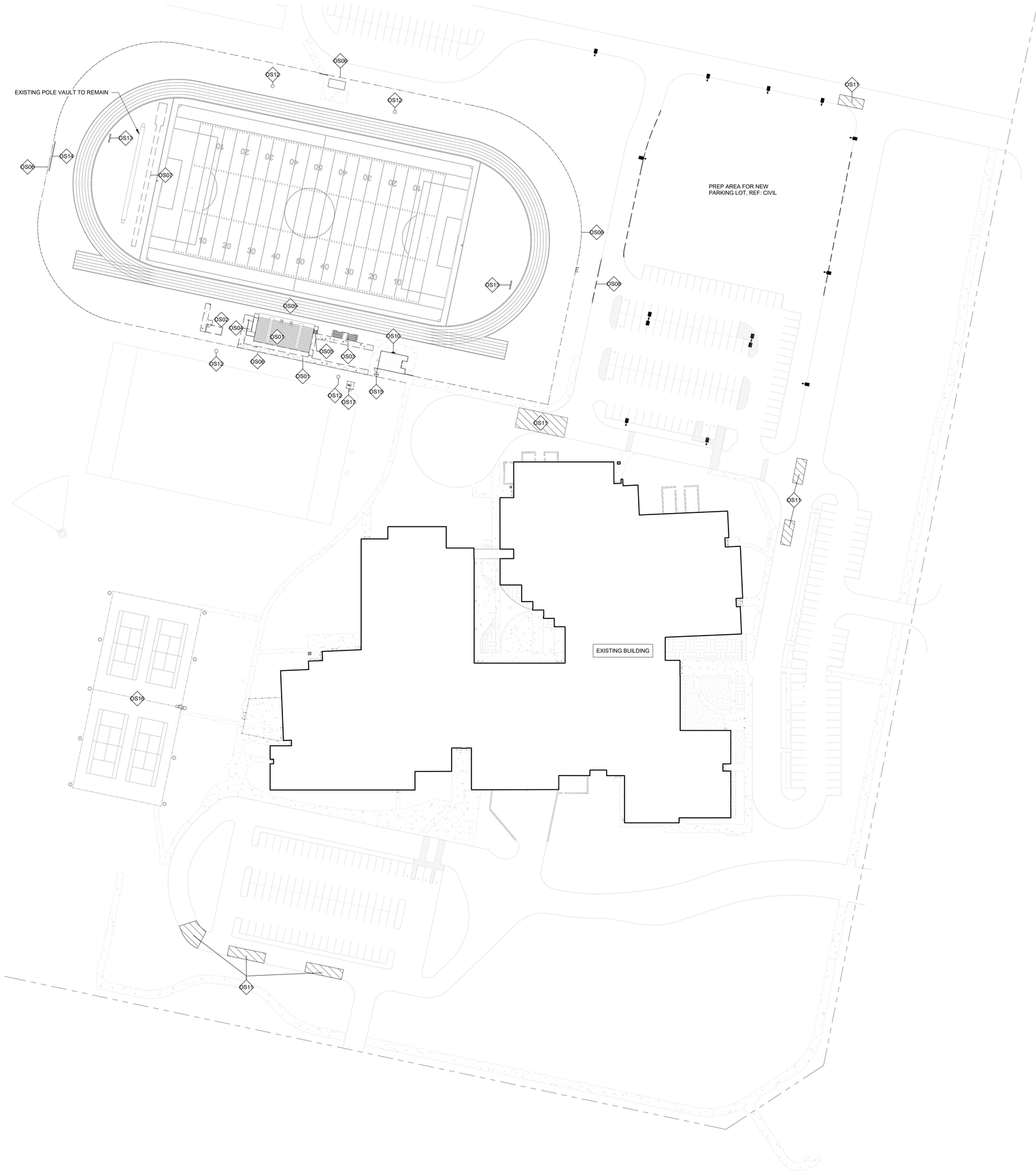
Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

STANDARDS AND SYMBOLS

JOB 26028
DATE 02/26/2026
SHEET A0G-01



01 DEMO SITE PLAN
1" = 50'-0"

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
3. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL ITEMS TO REMAIN THROUGH THE ENTIRE COURSE OF DEMOLITION AND CONSTRUCTION (INCLUDING, BUT NOT LIMITED TO PARTITIONS, FINISHED, DOORS, FRAMES AND HARDWARE).
4. CONTRACTOR TO COORDINATE ALL PHASES OF DEMOLITION FOR PROJECT AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR CONFLICTING CONDITIONS, WHICH WOULD INTERFERE WITH THE SATISFACTORY COMPLETION OF THE WORK, PRIOR TO THE START OF DEMOLITION.
5. DO NOT REMOVE ANY FIRE PROTECTION SIGNALS OR EQUIPMENT. U.N.O PROTECT REQUIRED FOR THE DURATION OF THE JOB.
6. CONTRACTOR TO REMOVE BUILT-IN FURNITURE/ MILLWORK WHERE INDICATED (SHOWN DASHED). REFER TO NEW PLANS FOR RELOCATION ITEMS.
7. AT ALL LOCATIONS AT DEMOLITION AT EXTERIOR WALLS, INFILL TO MATCH EXISTING WALL CONSTRUCTION AND FINISH U.N.O.
8. REMOVE AND SALVAGE FIRE ALARM DEVICES, SPEAKERS AND SECURITY CAMERAS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
9. REMOVE AND SALVAGE EXIT SIGNS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
10. STIP EXISTING PAINT AND PREP FOR NEW ON ALL EXISTING HANDRAILS TO REMAIN.

KEYNOTE LEGEND

DS01	REMOVE EXISTING PAVING / SIDEWALK. REF CIVIL.
DS02	REMOVE EXISTING STORAGE SHED.
DS03	REMOVE AND SALVAGE EXISTING BLEACHERS, RETURN TO DISTRICT.
DS04	REMOVE EXISTING BLEACHER RAMP.
DS05	REMOVE EXISTING BLEACHER STAIR.
DS06	REMOVE EXISTING CHAIN LINK FENCE.
DS07	ALT 04: REMOVE AND INFILL EXISTING TRIPLE/LONG JUMP.
DS08	REMOVE EXISTING CURB, REF. CIVIL.
DS09	REMOVE EXISTING TRACK SURFACE AND STRIPING, PREP FOR RESURFACING. REF: CIVIL.
DS10	REMOVE EXISTING DRINKING FOUNTAINS, PREP FOR NEW.
DS11	REMOVE EXISTING DAMAGED PAVING, PREP FOR NEW, REF. CIVIL.
DS12	REMOVE EXISTING LIGHT FIXTURES, PREP FOR NEW. EXISTING POLES TO REMAIN, REF. MEPT.
DS13	ALT 01: REMOVE EXISTING TIME CLOCK, PREP FOR NEW.
DS14	ALT 01: REMOVE EXISTING SCOREBOARD CABINET, PREP FOR NEW.
DS15	REMOVE EXISTING TURNSTILE.
DS16	ALT 02: REMOVE EXISTING LIGHT FIXTURES, PREP FOR NEW. EXISTING POLES TO REMAIN, REF. MEPT.
DS17	REMOVE EXISTING FENCING, REMOVE OVERGROWN EXISTING LANDSCAPING TO PREP FOR NEW CONCRETE PAD AND DECORATIVE METAL FENCE.

Deadline: March 31, 2026 - 2PM

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REGISTERED ARCHITECT
HANSBERGER
JAMES R. 16318
STATE OF TEXAS

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CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

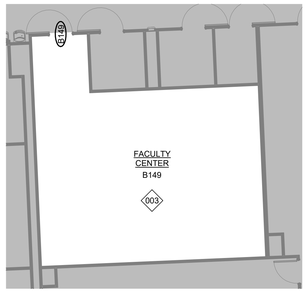
DEMO SITE PLAN

JOB 26028
DATE 02/26/2026
SHEET

A00-00



03 ENLARGED DEMO PLAN - DYSLEXIA - C121
1/8" = 1'-0"



02 ENLARGED DEMO PLAN - FACULTY CENTER - B149
1/8" = 1'-0"



01 DEMO FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
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9. REMOVE AND SALVAGE EXIT SIGNS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
10. STIP EXISTING PAINT AND PREP FOR NEW ON ALL EXISTING HANDRAILS TO REMAIN.

KEYNOTE LEGEND

003	REMOVE EXISTING FLOORING AND BASE, PREP FOR NEW.

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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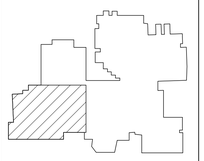
REGISTERED ARCHITECT
BRIAN HANSBERGER
16318
STATE OF TEXAS

Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

KEYPLAN



DEMO FLOOR PLAN - LEVEL ONE - OVERALL

JOB 26028
DATE 02/26/2026
SHEET

A00-01



01 DEMO FLOOR PLAN - LEVEL ONE - SEGMENT E
1/8" = 1'-0"

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
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KEYNOTE LEGEND

001	REMOVE EXISTING DOOR & HARDWARE, EXISTING FRAME TO REMAIN. PREP FOR NEW DOOR AND HARDWARE. PREP FRAME FOR NEW PAINT.
003	REMOVE EXISTING FLOORING AND BASE, PREP FOR NEW.
004	SALVAGE EXISTING MIRRORS, PREP FOR RE-INSTALL.
006	PREP AND PRIME EXISTING EXPOSED CEILING STRUCTURE AND DUCTS FOR NEW PAINT.

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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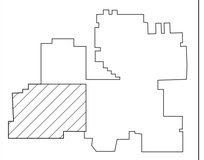
REGISTERED ARCHITECT
HANSBERGER
JB 16318 HUTH
STATE OF TEXAS

Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

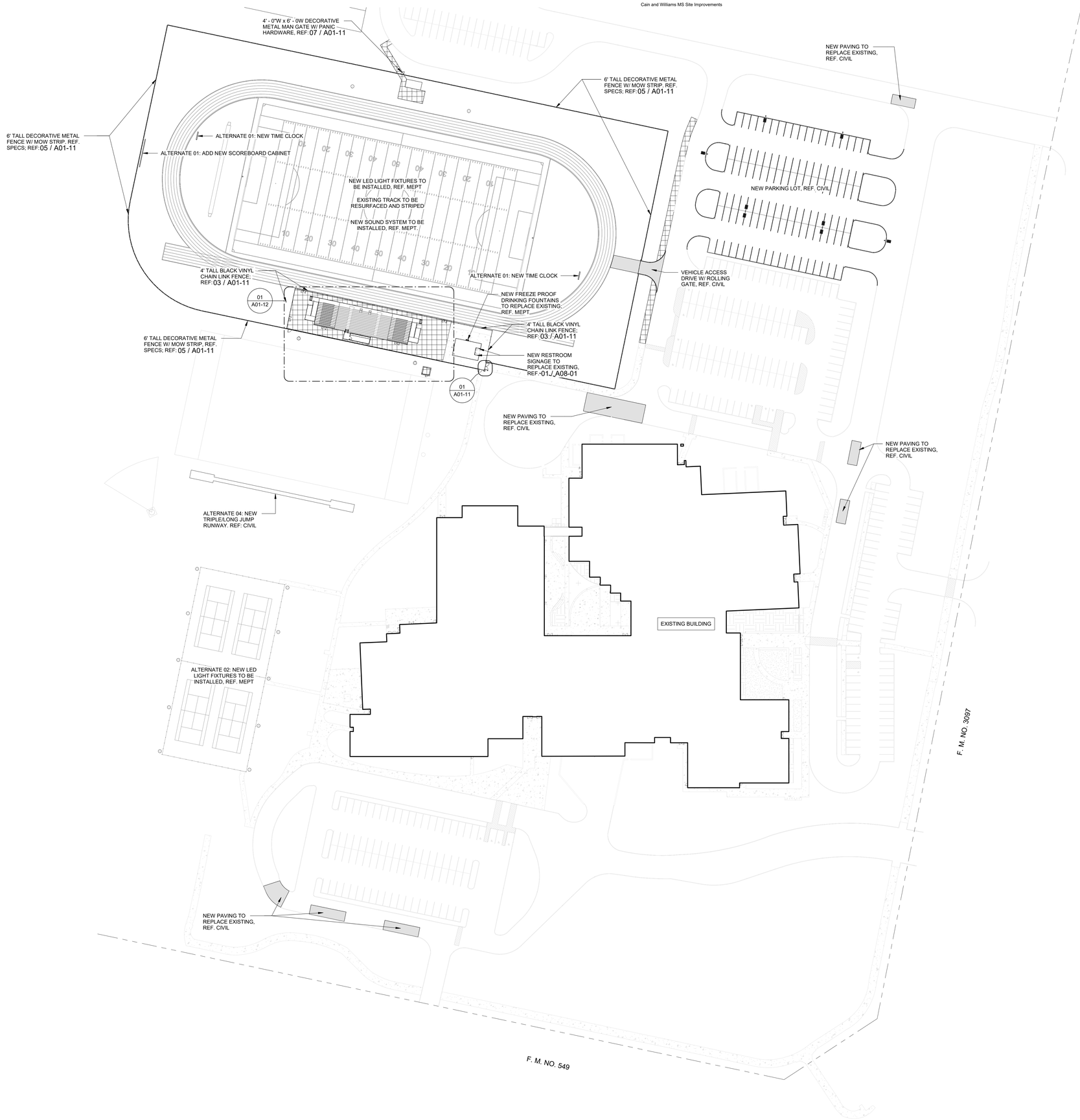
KEYPLAN



DEMO FLOOR PLAN - LEVEL ONE

JOB 26028
DATE 02/26/2026
SHEET

A00-02



01 SITE PLAN
1" = 50'-0"

PLAN N

GENERAL SITE NOTES

1. FIELD VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE BEGINNING WORK.
2. OBTAIN AVAILABLE PLANS DEPICTING EXISTING & PROPOSED UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO SAID UTILITIES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. REFER TO CIVIL AND MEP DOCUMENTS FOR ADDITIONAL HARDSCAPE, SAW CUTTING, EARTH REMOVAL, TRENCHING, AND RELOCATION AND/OR DEMOLITION OF EXISTING UTILITIES UNDER AND ABOVE GROUND, TYP.
4. U.N.O. FURNISH & INSTALL 12"W x 4"D CONC. MOW STRIP BELOW ALL CHAIN LINK FENCING. COORDINATE TOP OF MOW STRIP HEIGHT W/ CIVIL GRADING PLANS & VERIFY W/ ARCHITECT.
5. REFER TO CIVIL DRAWINGS FOR COORDINATION WITH EXISTING ROADS AND ACCESSES.
6. REFER TO IRRIGATION DRAWINGS FOR SLEEVE LOCATIONS.
7. REFER TO CIVIL FOR PARKING DIMENSIONS & DETECTABLE WARNINGS. PROVIDE DETECTABLE WARNINGS AT CURB RAMP & OTHER LOCATIONS WHERE WALKING SURFACES CROSS OR ADJOIN A VEHICULAR WAY AS PER TAS REQUIREMENTS.
8. SUBMIT SIGNAGE LOCATIONS, MESSAGES, GRAPHICS, AND FACE DIRECTIONS TO ARCHITECT PRIOR TO FABRICATION, TYP.
9. ALL DRIVE STRIPING AND DIRECTIONAL ARROWS TO BE REVIEWED IN SUBMITTAL PRIOR TO INSTALL FOR COLORS & DIRECTION.
10. ALL SIDEWALKS & BUILDING ENTRY FLATWORK TO HAVE A MEDIUM BROOM FINISH, U.N.O.

PARKING COUNT

TYPE	COUNT	Phase Created
9' x 18' - 90 deg	309	Existing
9' x 18' - 90 deg	114	Phase 2
Grand total: 423		

SITE MATERIALS LEGEND

- 6'-0" DECORATIVE METAL FENCING W/ MOWSTRIP; REF. SPECS
- 4'-0" BLACK VINL CHAIN LINK FENCING; REF. SPECS
- EXISTING DRIVE
- NEW DRIVE; REF. CIVIL
- EXISTING SIDEWALK
- NEW PAVING; REF. CIVIL

Deadline: March 31, 2026 - 2PM

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REGISTERED ARCHITECT
BRIAN HANSBERGER SMITH
TX 16318
STATE OF TEXAS

Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

SITE PLAN

JOB 26028
DATE 02/26/2026
SHEET
A01-01

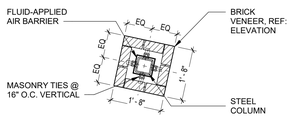
2/26/2026 12:16:37 PM A01-01 SITE PLAN

GENERAL SITE NOTES

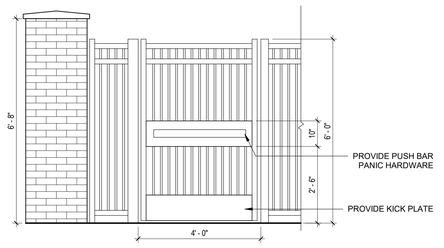
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10. ALL SIDEWALKS & BUILDING ENTRY FLATWORK TO HAVE A MEDIUM BROOM FINISH, U.N.O.

FINISH KEY - EXTERIOR

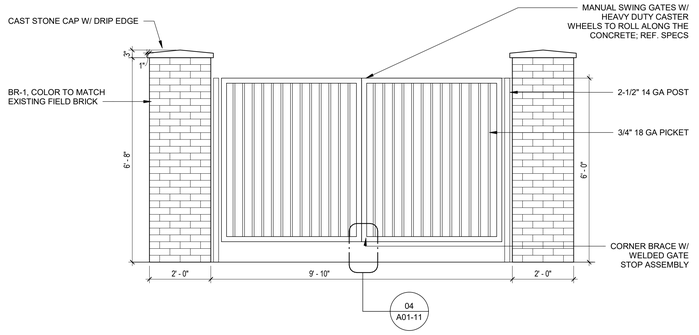
CODE	DESCRIPTION	MANUFACTURER	COLOR / FINISH	COMMENTS
BR-1	OPTION 01: FIELD BRICK	ENDICOTT CLAY	ROSE BLEND	RUNNING BOND, U.N.O.
BR-1	OPTION 02: FIELD BRICK	ACME	ROYAL ORCHID	RUNNING BOND, U.N.O.



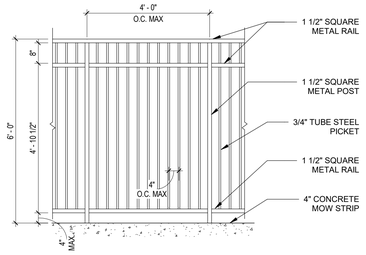
08 PLAN DETAIL - BRICK PILASTER
1/2" = 1'-0"



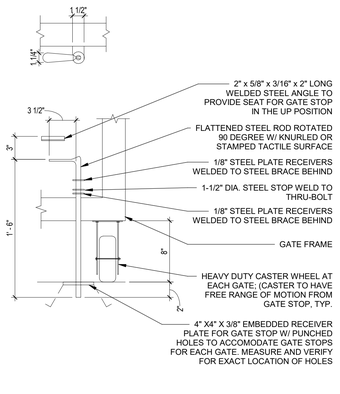
07 DECORATIVE METAL - MAN GATE
1/2" = 1'-0"



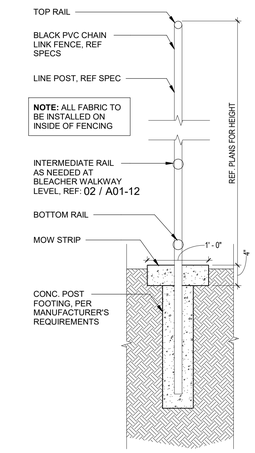
06 ELEVATION - ENTRY GATE
1/2" = 1'-0"



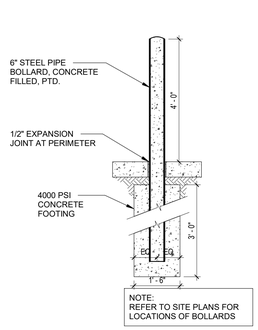
05 DECORATIVE METAL FENCE - ELEVATION
1/2" = 1'-0"



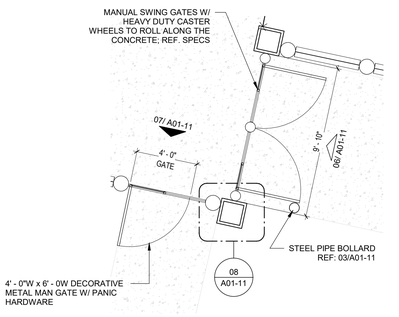
04 GATE STOP
1 1/2" = 1'-0"



03 BLACK VINYL CHAIN LINK FENCE - SECTION
1" = 1'-0"



02 BOLLARD SECTION
1/2" = 1'-0"



01 ENLARGED PLAN - EXTERIOR FENCE
1/4" = 1'-0"

EXT. MATERIALS LEGEND

BR-1

SITE MATERIALS LEGEND

- 6'-0" DECORATIVE METAL FENCING W/ MOWSTRIP; REF. SPECS
- BLACK VINYL CHAIN LINK FENCING, REF. PLANS FOR HEIGHT; REF. SPECS
- EXISTING DRIVE
- NEW DRIVE; REF. CIVIL
- EXISTING SIDEWALK
- NEW PAVING; REF. CIVIL

Deadline: March 31, 2026 - 2PM

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STATE OF TEXAS

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02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

ENLARGED SITE PLANS AND DETAILS

JOB 26028
DATE 02/26/2026
SHEET A01-11

GENERAL GRANDSTAND NOTES

1. THE DESIGN, FABRICATION, & CONSTRUCTION DEPICTED IN THESE DRAWINGS AND SPECIFICATIONS IS BASED UPON GRANDSTANDS AS MANUFACTURED BY STURDISTEEL, WACO, TEXAS.

2. THE GRANDSTANDS TO BE PROVIDED AND INSTALLED ARE:
A. CONTINUOUS ANGLE FRAME GRANDSTANDS: THOSE BEARING UPON A LEVEL SLAB (PROVIDED BY OTHERS) AND CONSTRUCTED OF A STEEL ANGLE SUBSTRUCTURE AND ALUMINUM DECKING AND SEATING CONFIGURATIONS AS INDICATED ON THE PLANS AND SECTIONS.

3. (4) TYPES OF GRANDSTANDS ARE TO BE PROVIDED AS THE FOLLOWING INDICATES:
A. TRACK GRANDSTANDS (PERMANENT)
1. PROVIDE HANDICAP SEATING SPACES AS REQUIRED ON THE PLAN. DOUBLE HANDICAP SPACE, MIN. 66"x48" (SINGLE HANDICAP SPACE, MIN. 33"x48") FOR FRONT ACCESS, PROVIDE RAILS AT BACK OF SPACE, TYP.
2. PROVIDE CENTER AISLE HANDRAILS WHERE INDICATED ON PLAN. PROVIDE BREAKS IN CENTER AISLE HANDRAILS.
3. PROVIDE 4'-0" (MIN) WIDE AISLES WHERE THERE ARE ROWS ON ONLY ONE SIDE OF AN AISLE AT TRACK GRANDSTAND. PROVIDE HANDRAILS AT GRANDSTAND END WALLS.

4. PROVIDE VERTICAL AND HORIZONTAL MEMBERS AND 9 GA. GALV. CHAIN LINK FENCING FOR GUARDRAILS AT ENDS AND BACKS OF GRANDSTANDS AS INDICATED ON THE DRAWINGS.

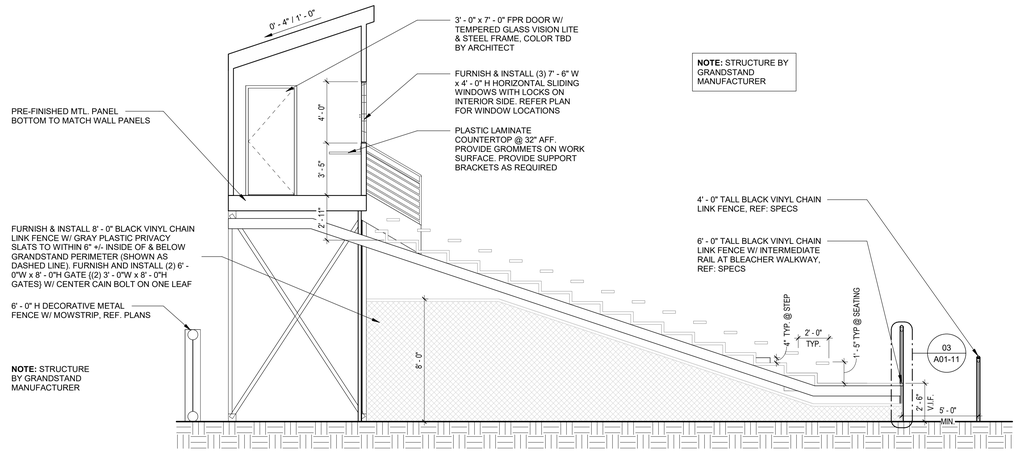
5. PROVIDE RAMPS FOR HANDICAP ACCESS/EGRESS AS INDICATED ON THE PLANS.

6. BENCH SEATING, 18" WIDE PER PERSON.

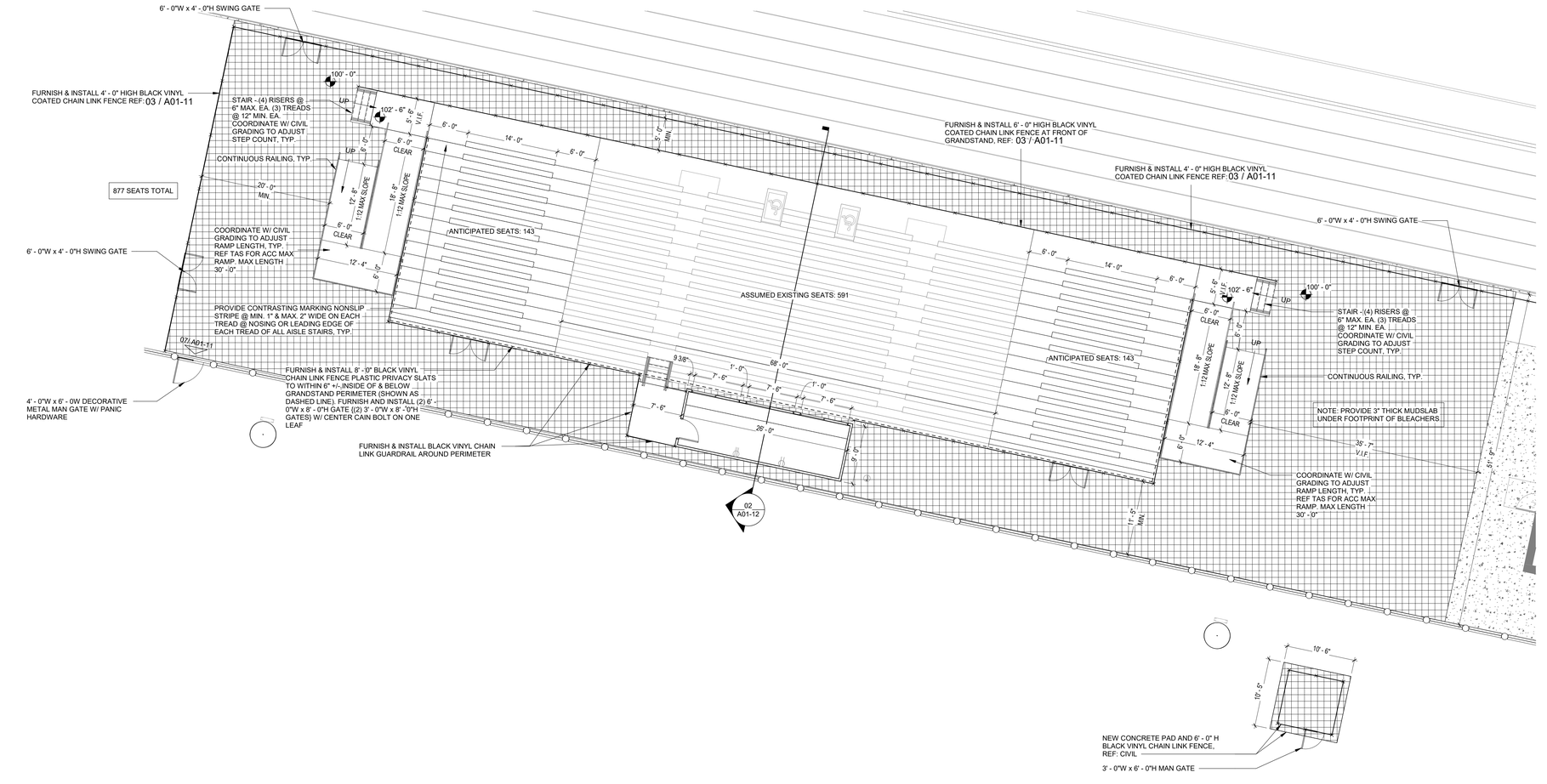
7. FURNISH AND INSTALL PRESSBOXES AS INDICATED WITH MANUFACTURER'S STANDARD PIECES, FINISHES, AND TRIM.

8. FURNISH AND INSTALL ALL STEPS, RAMPS, HANDRAILS, AND PERIMETER GUARDRAILS, AS REQUIRED BY CODES AND PROJECT CONDITIONS.

9. THE GRANDSTAND CONTRACTOR SHALL PROVIDE AL LSTEEL AND ALUMINUM COMPONENTS AND CONCRETE PIERS REQUIRED TO PROVIDE A TURN-KEY, READY FOR USE GRANDSTAND SYSTEM. THESE COMPONENTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: FOUNDATIONS FOR STEEL COMPONENTS, STEEL SUB-FRAME, ALUMINUM SEATS, ALUMINUM FLOOR DECK AND RISER CLOSURES, ALUMINUM STEPS, ALL HANDRAILS AND GUARDRAILS ATTACHED TO THE GRANDSTANDS, AND ALUMINUM PANEL SIDING PANELS AT TRACK/FIELD SIDE.



02 SECTION - PRESS BOX
1/4" = 1'-0"



01 ENLARGED SITE PLAN - TRACK GRANDSTAND
1/8" = 1'-0"

GENERAL SITE NOTES

1. FIELD VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE BEGINNING WORK.
2. OBTAIN AVAILABLE PLANS DEPICTING EXISTING & PROPOSED UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO SAID UTILITIES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. REFER TO CIVIL AND MEP DOCUMENTS FOR ADDITIONAL HARDSCAPE, SAW CUTTING, EARTH REMOVAL, TRENCHING, AND RELOCATION AND/OR DEMOLITION OF EXISTING UTILITIES UNDER AND ABOVE GROUND, TYP.
4. U.N.O. FURNISH & INSTALL 12"W x 4"D CONC. MOW STRIP BELOW ALL CHAIN LINK FENCING. COORDINATE TOP OF MOW STRIP HEIGHT W/ CIVIL GRADING PLANS & VERIFY W/ ARCHITECT.
5. REFER TO CIVIL DRAWINGS FOR COORDINATION WITH EXISTING ROADS AND ACCESSES.
6. REFER TO IRRIGATION DRAWINGS FOR SLEEVE LOCATIONS.
7. REFER TO CIVIL FOR PARKING DIMENSIONS & DETECTABLE WARNINGS. PROVIDE DETECTABLE WARNINGS AT CURB RAMP & OTHER LOCATIONS WHERE WALKING SURFACES CROSS OR ADJOIN A VEHICULAR WAY AS PER TAS REQUIREMENTS.
8. SUBMIT SIGNAGE LOCATIONS, MESSAGES, GRAPHICS, AND FACE DIRECTIONS TO ARCHITECT PRIOR TO FABRICATION, TYP.
9. ALL DRIVE STRIPING AND DIRECTIONAL ARROWS TO BE REVIEWED IN SUBMITTAL PRIOR TO INSTALL FOR COLORS & DIRECTION.
10. ALL SIDEWALKS & BUILDING ENTRY FLATWORK TO HAVE A MEDIUM BROOM FINISH, U.N.O.

SITE MATERIALS LEGEND

- 6'-0" DECORATIVE METAL FENCING W/ MOWSTRIP; REF. SPECS
- BLACK VINYL CHAIN LINK FENCING, REF. PLANS FOR HEIGHT; REF. SPECS
- EXISTING DRIVE
- NEW DRIVE; REF. CIVIL
- EXISTING SIDEWALK
- NEW PAVING; REF. CIVIL

Deadline: March 31, 2026 - 2PM

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REGISTERED ARCHITECT
HANSBERGER
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16318
STATE OF TEXAS

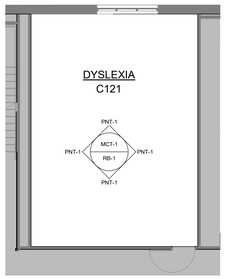
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02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

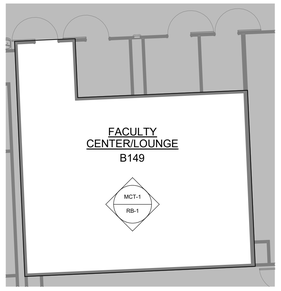
6620 FM-3097, Rockwall, TX 75032

ENLARGED SITE PLANS AND DETAILS

JOB 26028
DATE 02/26/2026
SHEET
A01-12



03 ENLARGED FINISH FLOOR PLAN - DYSLEXIA - C121
1/8" = 1'-0"



02 ENLARGED FINISH FLOOR PLAN - FACULTY CENTER - B149
1/8" = 1'-0"

FINISH KEY - BASE						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR / FINISH	SIZE	COMMENTS
RB-1	RUBBER BASE	TARKETT	STANDARD COVE BASE	BLACK	4" H	COILS

FINISH KEY - FLOORS						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR/FINISH	SIZE	COMMENTS
MCT-1	MARMOLEUM COMPOSITION TILE	FORBO	MCT TILE	EIGER (MCT 629)	13" x 13"	QUARTER-TURN INSTALLATOIN

FINISH KEY - WALLS						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR / FINISH	SIZE	COMMENTS
PNT-1	PAINT	SHERWIN WILLIAMS	REF SPECS	RESERVED WHITE (SW 7056) (258-C2)	--	FIELD PAINT
PNT-3	PAINT	SHERWIN WILLIAMS	REF SPECS	IMPULSIVE PURPLE (SW6832) (182-C7)	--	ACCENT PAINT
PNT-5	PAINT	SHERWIN WILLIAMS	REF SPECS	GAUNTLET GREY (SW 7019) (244-C6)	--	HM DOORS & FRAME
PNT-6	PAINT	SHERWIN WILLIAMS	REF SPECS	DORIAN GREY (SW 7017) (244-C3)		ACCENT PAINT
PNT-8	PAINT	SHERWIN WILLIAMS	REF SPECS	TRICORN BLACK (SW 6258) (521-C1)	--	EXPOSED STRUCTURE



01 FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

PLAN N

GENERAL PLAN NOTES

1. ALL WALLS ARE TYPE A3-DA UNLESS NOTED OTHERWISE.
2. ALL INTERIOR FLOOR LEVELS ARE AT EL. 100'-0" UNLESS NOTED OTHERWISE.
3. PROVIDE CONTROL JOINTS IN GYMPSUM BOARD WALLS ABOVE THE CORNER OF ALL INTERIOR DOOR AND WINDOW FRAMES IN THE CENTER OF STRAIGHT WALLS 30'-0" IN LENGTH OR GREATER OR AS INDICATED ON INTERIOR ELEVATIONS. PROVIDE HORIZONTAL CONTROL JOINTS AT 10'-0" A.F.F. THROUGHOUT BUILDING, TYP.
4. REFER TO A00-00 FOR STANDARD PLUMBING FIXTURE LAYOUTS (I.E. "S1", "S4", "U2", "L1, "EWC1").
5. ALL WALL-MOUNTED FIRE EXTINGUISHERS TO BE MOUNTED AT 48" MAX. TO EXTINGUISHER HANDLE/OPERATING MECHANISM, U.N.O.
6. PROVIDE BLOCKING WITHIN PARTITION FOR ALL WALL MOUNTED ITEMS.
7. PROVIDE HORIZONTAL CFMF TO CONTAIN BATT INSULATION ON ALL E3-DA.

GENERAL FINISH NOTES

1. ANY SURFACE MOUNTED PLUG MOLD AND CONDUIT TO BE PAINTED TO MATCH ADJACENT WALL.
2. ALL GENERAL WALL PAINT TO BE "PNT-1" AND BASE "RB-1" UNLESS OTHERWISE NOTED. ONE PRIME COAT AND TWO FINISH COATS.
3. CONTRACTOR SHALL INSPECT ALL SURFACES TO RECEIVE PAINTING AND CORRECT ALL DEFECTS BEFORE START OF WORK.
4. ALL CARPET INSTALLATIONS TO BE APPROVED BY THE ARCHITECT. ANY DOMING, CUPPING OR EXAGGERATED SEAMS ARE UNACCEPTABLE. GC TO SUBMIT SEAMING PLAN TO ARCHITECT FOR APPROVAL.
5. CONTRACTOR SHALL REMOVE ALL SPOTS AND ADHESIVE SMEARS FROM SURFACE WITH MANUFACTURER'S APPROVED CLEANING AGENT.
6. CONTRACTOR TO PROVIDE AND INSTALL VINYL OR METAL REDUCING STRIPS AS NOTED IN THE TRANSITION SCHEDULE SO THAT FLOORING IS ADA COMPLIANT. ARCHITECT TO APPROVE PRODUCT & COLOR.
7. ALL FLOORING MATERIAL TRANSITIONS OCCURING AT DOORS SHALL BE CENTERED UNDER THE DOOR IN A CLOSED POSITION.
8. UNDERSIDE OF CONCRETE SLAB, EXPOSED BEAMS AND COLUMNS EQUIPMENT, ELECTRIC CONDUIT AND ANY MISCELLANEOUS ITEMS ARE TO BE PROPERLY PREPARED AND PRIMED TO RECEIVE A PAINT FINISH.
9. THERE SHALL NOT BE PAINT CONDITIONS THAT OCCUR CAUSING FINISH OR COLOR TO TERMINATE ON AN OUTSIDE CORNER. ANY SUCH CONDITIONS TO BE BROUGHT TO ARCHITECT'S ATTENTION.
10. PROVIDE FULL-HEIGHT HIGH CORNER GUARDS AT ALL EXPOSED GYP BOARD CORNERS MOUNTED ABOVE BASE, U.N.O. REFERENCE FINISH PLANS FOR SPECIFIC LOCATIONS AND TYPES.
11. CONTINUE WT-3 WAINSCOT ONTO WALLS THAT TURN BACK, U.N.O.
12. PAINT ALL EXISTING DOORS/WINDOW FRAMES, PNT-5

KEYNOTE LEGEND

F01	REMOVE EXISTING FACE PLATES FROM PURPLE TILE WALL, REPLACE TILE AS NEEDED.

FINISH FLOOR LEGEND

REF FINISH TAG — MCT-1

FINISH TYPE IDENTIFICATION TAG: Wall - N; Wall - W; Floor Finish; Base Finish; Wall - E; Wall - S

FLOOR TRANSITION SYMBOL — A

REF. TRANSITION SCHEDULE ON A09-00

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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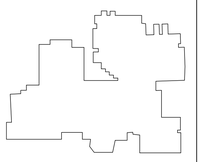
REGISTERED ARCHITECT
HANSBERGER
JOSEPH
16318
STATE OF TEXAS

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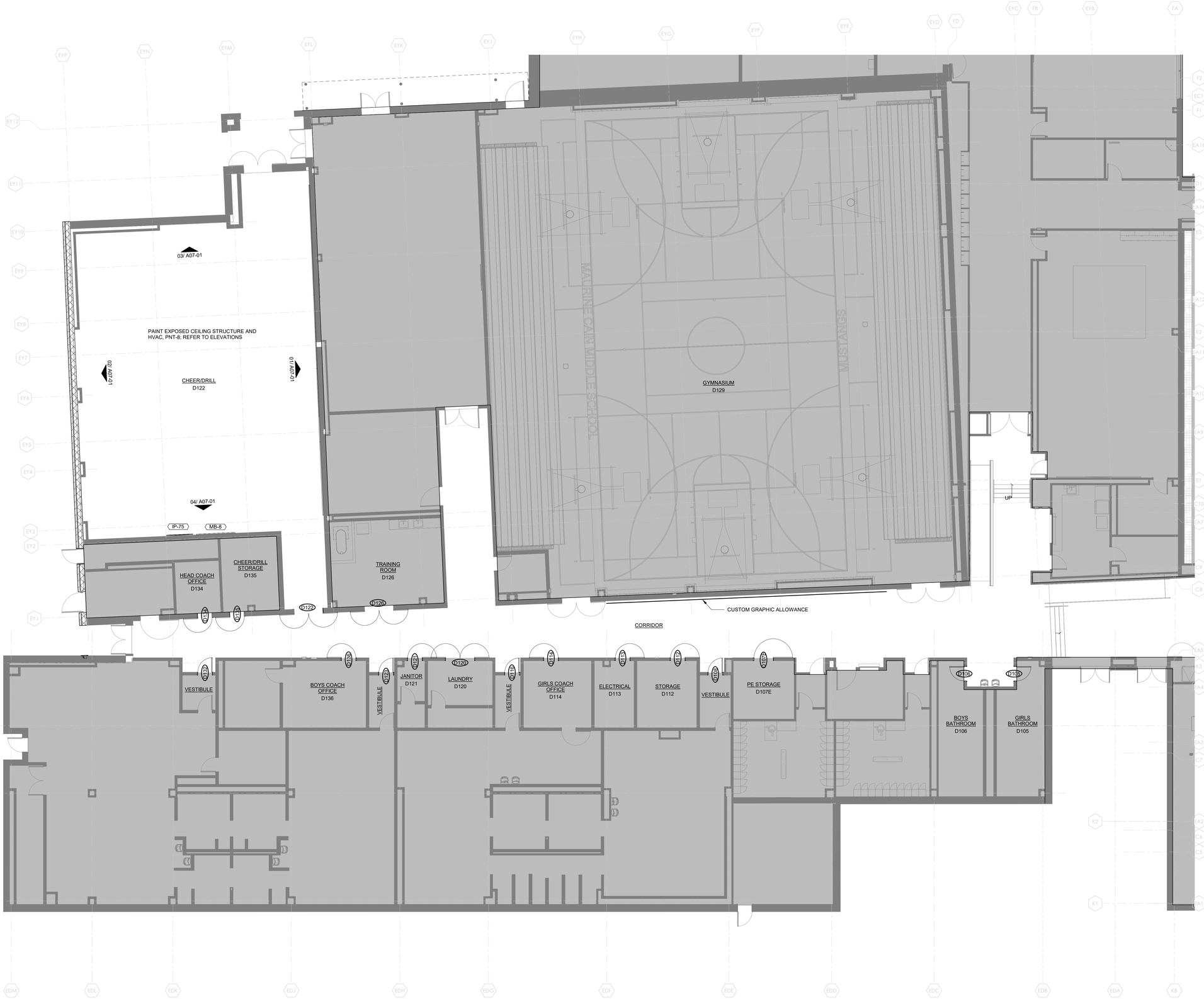
6620 FM-3097, Rockwall, TX 75032

KEYPLAN



FLOOR PLAN - LEVEL ONE - OVERALL

JOB 26028
DATE 02/26/2026
SHEET A02-01



01 FLOOR PLAN - LEVEL ONE - SEGMENT E
1/8" = 1'-0"

GENERAL PLAN NOTES

1. ALL WALLS ARE TYPE A3-DA UNLESS NOTED OTHERWISE.
2. ALL INTERIOR FLOOR LEVELS ARE AT EL. 100'-0" UNLESS NOTED OTHERWISE.
3. PROVIDE CONTROL JOINTS IN GYMPSUM BOARD WALLS ABOVE THE CORNER OF ALL INTERIOR DOOR AND WINDOW FRAMES IN THE CENTER OF STRAIGHT WALLS 30'-0" IN LENGTH OR GREATER OR AS INDICATED ON INTERIOR ELEVATIONS. PROVIDE HORIZONTAL CONTROL JOINTS AT 10'-0" A.F.F. THROUGHOUT BUILDING, TYP.
4. REFER TO A00-00 FOR STANDARD PLUMBING FIXTURE LAYOUTS (I.E. "S1", "S4", "U2", "L1, "EWC1").
5. ALL WALL-MOUNTED FIRE EXTINGUISHERS TO BE MOUNTED AT 48" MAX. TO EXTINGUISHER HANDLE/OPERATING MECHANISM, U.N.O.
6. PROVIDE BLOCKING WITHIN PARTITION FOR ALL WALL MOUNTED ITEMS.
7. PROVIDE HIZONTAL CFMF TO CONTAIN BATT INSULATION ON ALL E3-DA.

GENERAL RCP NOTES

1. CEILING HEIGHTS ARE 9'-0" A.F.F. UNLESS NOTED OTHERWISE.
2. THE CEILING FINISH SCHEDULE INDICATES CEILING MATERIALS AND FINISHES. MATERIALS OR FINISHES THAT VARY WITHIN A ROOM WILL BE INDICATED ON THE R.C.P.
3. RCP'S WILL TYPICALLY INDICATE:
   A. LOCATIONS, DIMENSIONS AND HEIGHTS A.F.F. OF FURRDOWNS.
   B. VARYING CEILING MATERIALS AND THEIR LOCATIONS.
   C. HEIGHTS OF WALLS A.F.F. (FULL EHIGHT AND PARTIAL HEIGHT).
   D. REQUIRED FIRE-RATINGS OF WALLS.
   E. FINAL LOCATIONS OF CEILING MOUNTED FIXTURES/ DEVICES.
4. CONTRACTOR COORDINATE MEP/ ETC. DRAWINGS FOR ALL FIXTURES / DEVICES MOUNTED IN, ABOVE, OR HUNG FROM THE CEILING. FINAL FIXTURE / DEVICE LOCATIONS ARE DETERMINED BY THE ARCHITECTURAL R.C.P. WHERE CONDITIONS DIFFER SIGNIFICANTLY BETWEEN THE PLANS, REQUEST CLARIFICATION FROM THE ARCHITECT BEFORE PROCEEDING. WHERE FIXTURES / DEVICES SHOWN OR SPECIFIED ON DRAWINGS OTHER THAN THE ARCHITECTURAL R.C.P.'S ARE VISIBLE AT THE CEILING PLANE, COORDINATE LOCATIONS WITH THE ARCHITECT.
5. LOCATE CEILING MOUNTED FIXTURES / DEVICES IN THE CENTERS OF FULL CEILING PLANELS / TILES U.N.O.
6. GYP. CEILINGS AND ALL SIDES OF GYP. BULKHEADS TO BE PNT-1, U.N.O. ON THE RCP'S.
7. ACCENT PAINT ON GYP. BOARD BULKHEADS TO BE PAINTED ON BOTTOM AND SIDES OF BULKHEAD.
8. ALL INTERIOR PARTITIONS ARE TO BE TO DECK, U.N.O.

SPECIALTY EQUIPMENT SCHEDULE

CODE	DESCRIPTION
IP-75	INTERACTIVE 75" PANEL, REF. MEP
MB-8	MARKERBOARD 4'X8'

SCOPE LEGEND

NOT IN SCOPE

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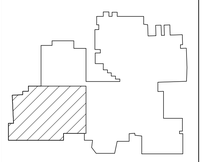
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RB 16318
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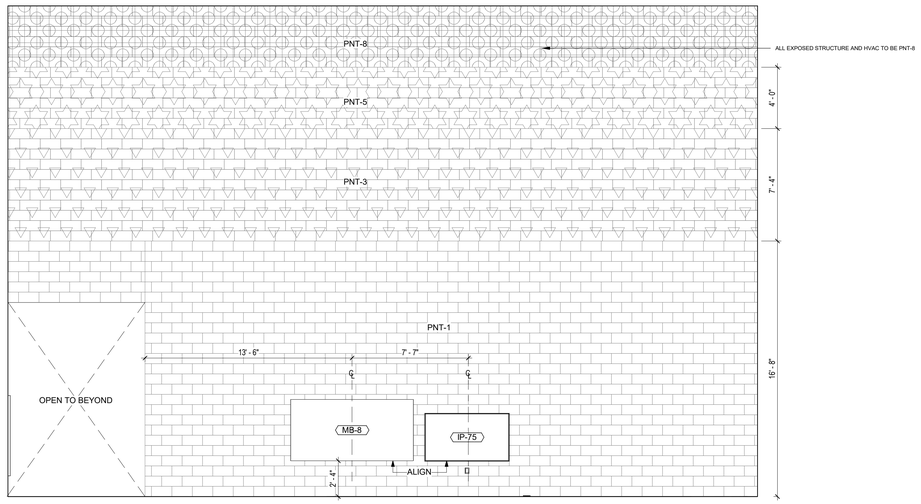
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KEYPLAN

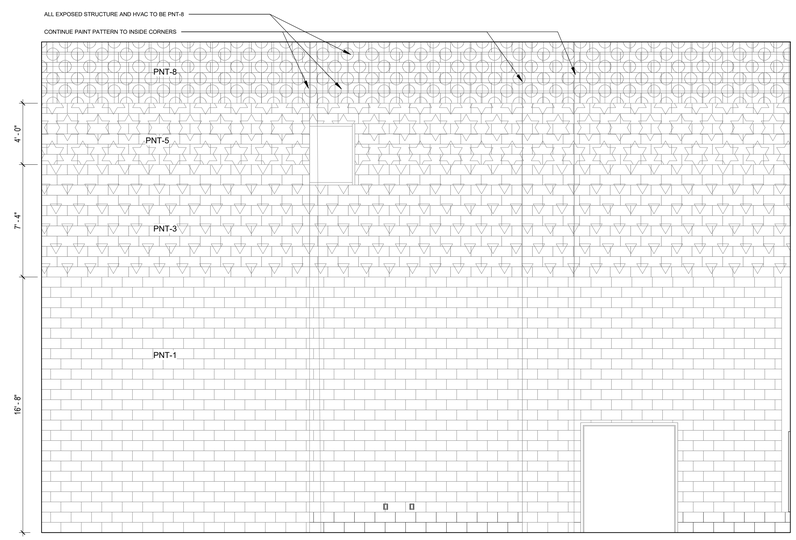


FLOOR PLAN - LEVEL ONE

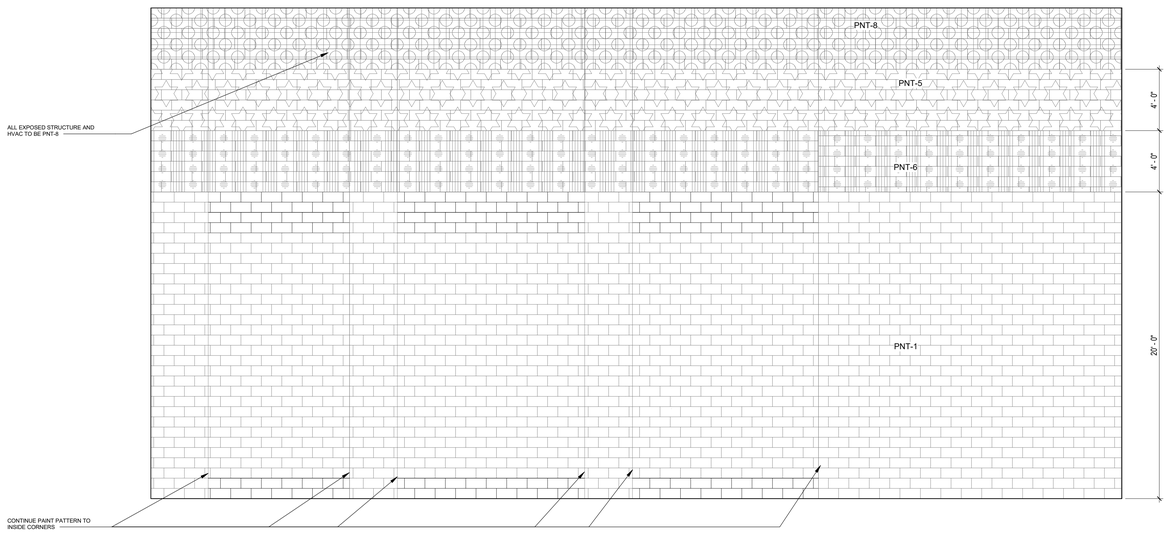
JOB 26028
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SHEET A02-02



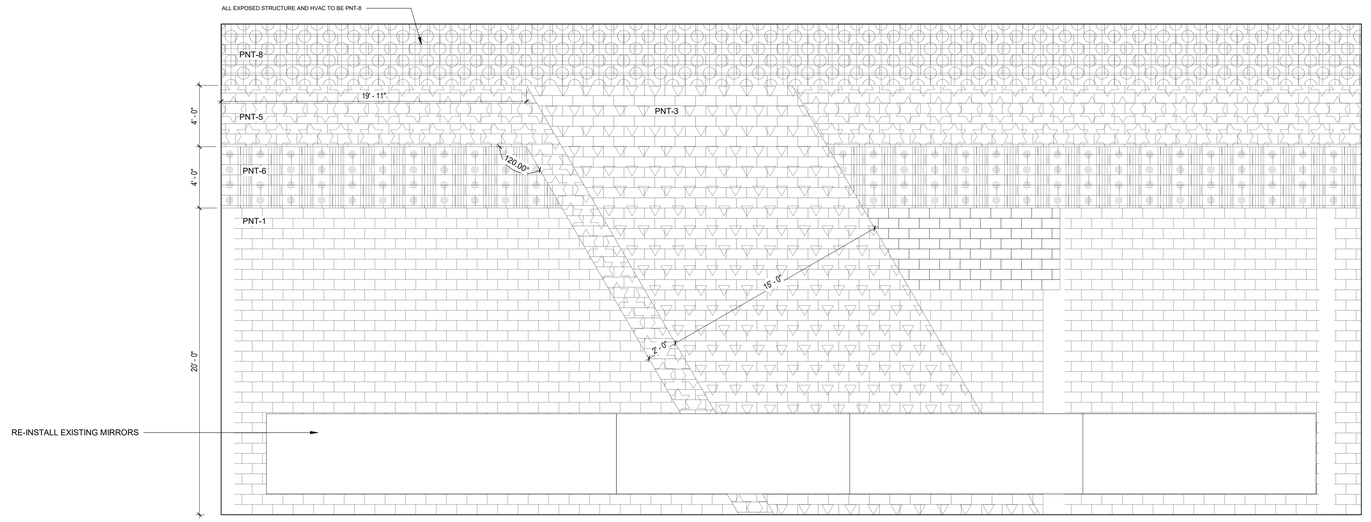
04 D122 - S GYMNASTICS
1/4" = 1'-0"



03 D122 - N GYMNASTICS
1/4" = 1'-0"



02 D122 - W GYNMASTICS
1/4" = 1'-0"



01 D122 - E GYNMASTICS
1/4" = 1'-0"

SPECIALTY EQUIPMENT SCHEDULE

CODE	DESCRIPTION
IP-75	INTERACTIVE 75" PANEL. REF. MEP
MB-8	MARKERBOARD 4'X8"

INT. MATERIALS LEGEND

PNT-8 PNT-5 PNT-3

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REGISTERED ARCHITECT
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STATE OF TEXAS

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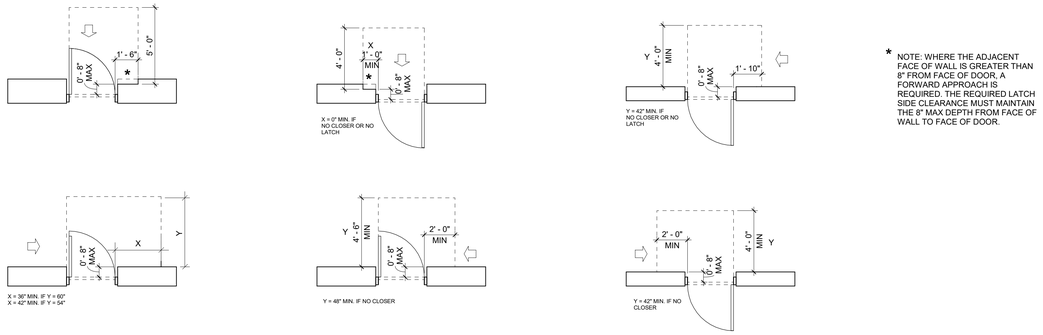
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INTERIOR ELEVATIONS

JOB 26028
DATE 02/26/2026
SHEET A07-01

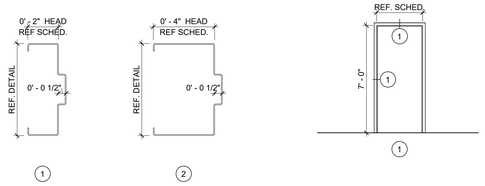
NEW DOOR SCHEDULE

DOOR NUMBER	ROOM		DOOR						FRAME			FRAME	HARDWARE SET	FIRE RATING	STC RATING	COMMENTS
	FROM ROOM	TO ROOM	WIDTH	HEIGHT	PANEL TYPE	MATERIAL	FINISH	THICKNESS	FRAME TYPE	MATERIAL	FINISH	4" HEAD				
LEVEL 1																
D105	CORRIDOR	GIRLS BATHROOM	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D106	CORRIDOR	BOYS BATHROOM	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D107E	CORRIDOR	PE STORAGE	4' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	8.0			1, 3
D108	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D112	STORAGE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	7.0			1, 3
D113	ELECTRICAL	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	2.0			1, 3
D114	GIRLS COACH OFFICE	CORRIDOR	3' - 0"	7' - 0"	B	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	5.0			1, 3
D116	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D120	CORRIDOR	LAUNDRY	6' - 0"	7' - 0"	AA	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	6.0			1, 2, 3
D121	JANITOR	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	7.0			1, 3
D122	CHEER/DRILL	CORRIDOR	6' - 0"	7' - 0"	BB	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	1.0			1, 2, 3
D123	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D126	TRAINING ROOM	CORRIDOR	6' - 0"	7' - 0"	BB	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	4.0			1, 2, 3
D132	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	3.0			3
D134	HEAD COACH OFFICE	CORRIDOR	3' - 0"	7' - 0"	B	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	5.0			1, 3
D135	CHEER/DRILL STORAGE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	7.0			1, 3
D136	BOYS COACH OFFICE	CORRIDOR	3' - 0"	7' - 0"	B	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-5	No	5.0			1, 3



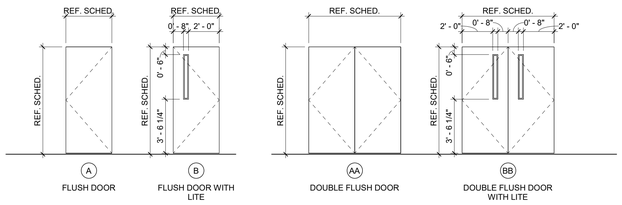
* NOTE: WHERE THE ADJACENT FACE OF WALL IS GREATER THAN 8" FROM FACE OF DOOR, A FORWARD APPROACH IS REQUIRED. THE REQUIRED LATCH SIDE CLEARANCE MUST MAINTAIN THE 8" MAX DEPTH FROM FACE OF WALL TO FACE OF DOOR.

05 REQUIRED DOOR CLEARANCES FOR WALLS GREATER THAN 8" THICK
1/4" = 1'-0"



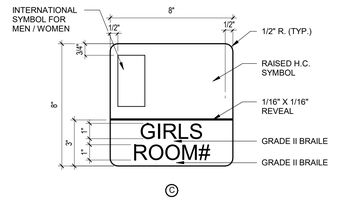
04 H. M. FRAME PROFILES
3" = 1'-0"

FRAME TYPES
1/4" = 1'-0"



STANDARD PANEL TYPES
1/4" = 1'-0"

NOTES:
1. ALL COPY TO BE HELVETICA REGULAR
2. ALL COPY TO BE RAISED 1/32" MIN.
3. COPY STROKE WIDTH TO BE 1/4" WIDE MIN.



01 SIGNAGE - TYPE C
3" = 1'-0"

DOOR COMMENTS

SPECIFIC DOOR COMMENTS
1. DOOR SWING IS 180º.
2. DOOR TO RECEIVE KEYED REMOVABLE MULLION.
3. EXISTING DOOR FRAME TO REMAIN AND BE RE-PAINTED PNT-5.

GENERAL DOOR COMMENTS
4. ALL DOOR RIM EXIT DEVICE HARDWARE TO BE MOUNTED AT 39" A.F.F.
5. ALL HARDWARE TO BE DULL CHROME FINISH.
6. ALL DOOR EXIT DEVICES TO RECEIVE FLUSH END CAPS.
7. PROVIDE 3/4" UNDERCUT AT INTERIOR DOORS TO ALLOW FOR AIR FLOW. DOOR LOUVERS OR SIDE WALL TRANSFER GRILLES WILL NOT BE ACCEPTABLE.
8. PER AHJ REQUIREMENTS, ROOMS CONTAINING AIR-CONDITIONING SYSTEMS, ELECTRICAL EQUIPMENT OR FIRE PROTECTION SYSTEMS SHALL HAVE AHJ APPROVED SIGNAGE APPROVED BY THE FIRE CODE OFFICAL.

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	REVISIONS	

REGISTERED ARCHITECT
HANSBERGER
JOSEPH R. 16318
STATE OF TEXAS

Date of issue:
02/26/2026

CAIN MS ATHLETIC, SITE AND INTERIOR RENO

6620 FM-3097, Rockwall, TX 75032

DOOR SCHEDULE

JOB 26028
DATE 02/26/2026
SHEET A08-01

MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.



2 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

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	REVISIONS	

JAVIER GARCIA
118760
LICENSED
PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET MP02-01

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Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
DESIGN SOLVE ENHANCE www.EMAengineer.com

SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.



1 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - OVERALL
1" = 20'-0"

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02-26-2026

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MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET MP02-02

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MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

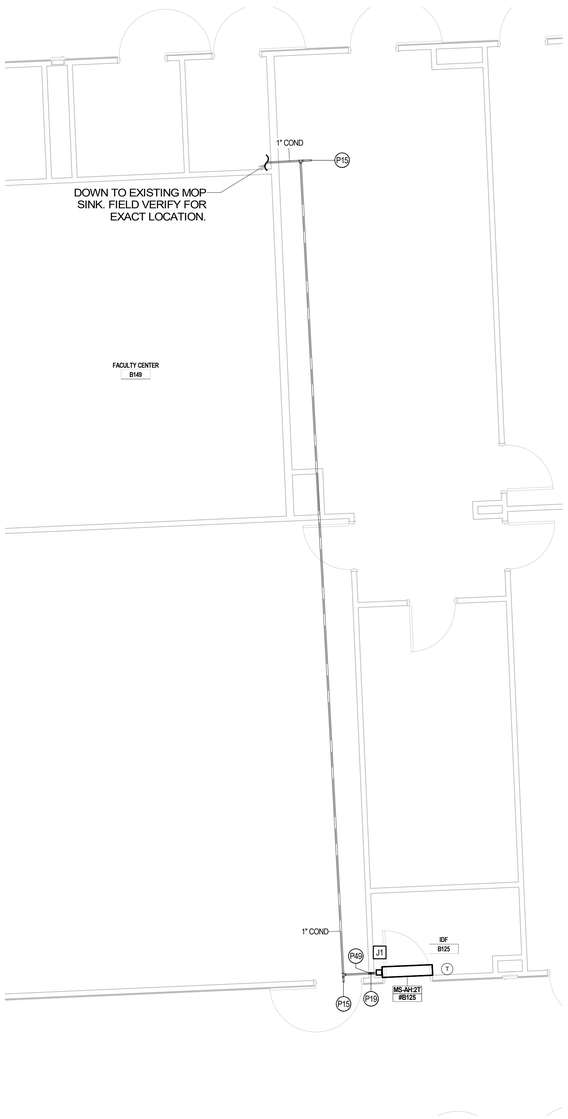
1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

MECHANICAL PLAN NOTES

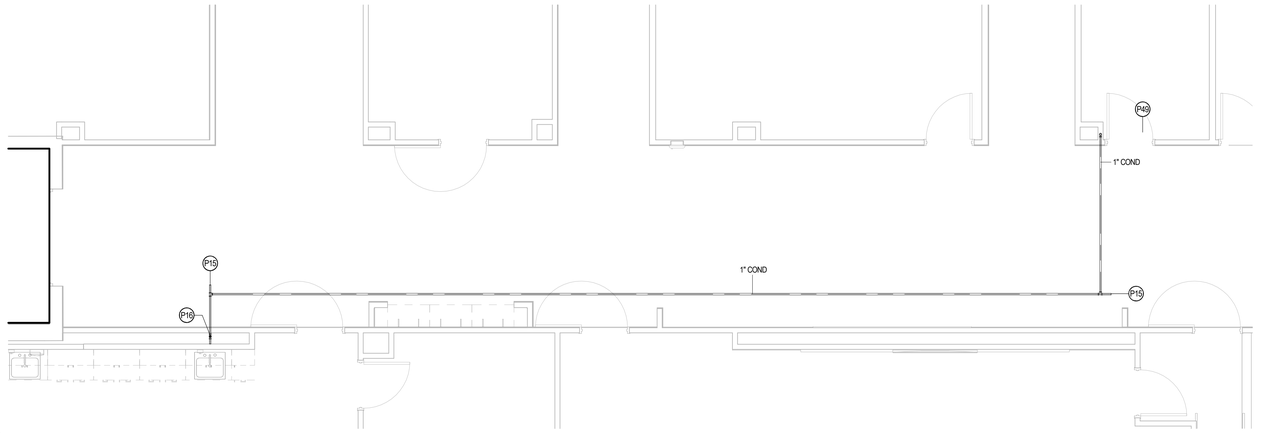
M1	REFRIGERANT LINES TO ROUTE DOWN CHASE PROVIDED BY ARCHITECT.
M2	ROUTE REFRIGERANT LINES NEATLY ON ROOF THROUGH HOODED ROOF PENETRATION.

PLUMBING PLAN NOTES

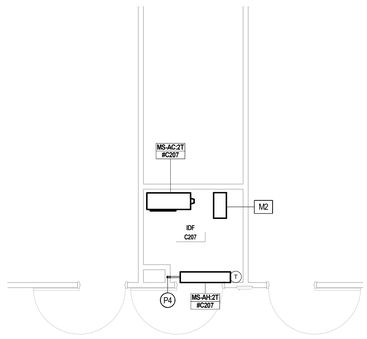
P4	DOWN IN WALL/CHASE
P15	CONDENSATE DRAIN CLEANOUT
P16	CONDENSATE DRAIN DOWN IN WALL, TIE-IN TO P-TRAP AT SINK WITH TAILPIECE
P19	PRESSURIZED CONDENSATE DRAIN LINE UP IN WALL. TIE-INTO NON-PRESSURIZED LINE.
P49	DOWN FROM LEVEL ABOVE



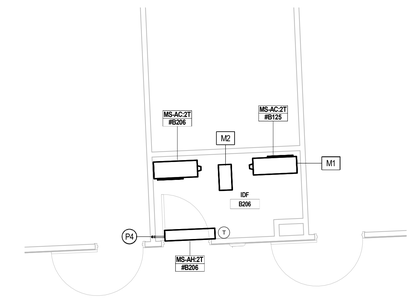
1 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - B125 IDF
1/4" = 1'-0"



2 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - C112B & C114
1/4" = 1'-0"



3 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - C207 IDF
1/4" = 1'-0"



4 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - B206 IDF
1/4" = 1'-0"

ALL NEW MINI SPLITS TO BE ADDED TO EXISTING EMCS. REFER TO SPEC SECTIONS 23 09 23 AND 23 09 23A FOR FURTHER INFORMATION.

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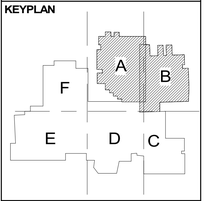
	REVISIONS	

JAVIER GARCIA
118760
LICENSED
PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

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KEYPLAN



MECHANICAL & PLUMBING ENLARGED FLOOR PLANS

JOB 23162.000
DATE 02/26/2026
SHEET

MP04-01

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MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

MECHANICAL PLAN NOTES

M2 ROUTE REFRIGERANT LINES NEATLY ON ROOF THROUGH HOODED ROOF PENETRATION.



1 MECHANICAL & PLUMBING ROOF PLAN
1" = 20'-0"

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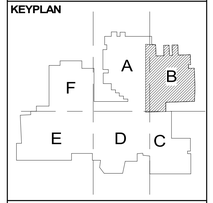
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KEYPLAN

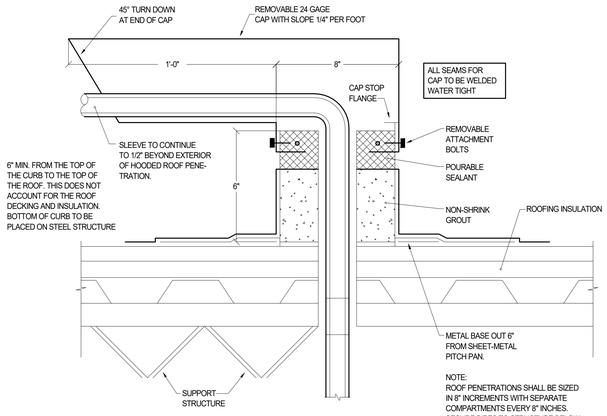


MECHANICAL & PLUMBING ROOF PLAN

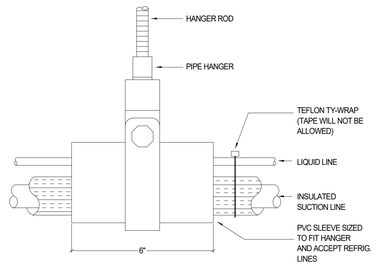
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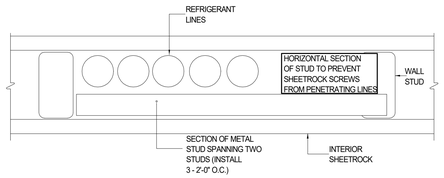
JOB 23162.000
DATE 02/26/2026
SHEET
MP06-01



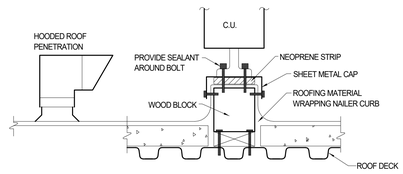
1 HOODED ROOF PENETRATION
N.T.S.



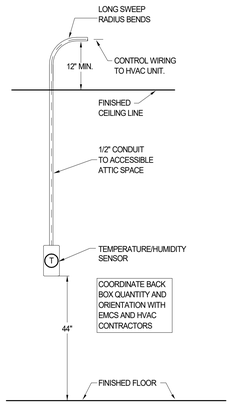
2 REFRIGERANT LINE ABOVE CEILING SUPPORT
N.T.S.



3 REFRIGERNAT LINE IN WALL
N.T.S.



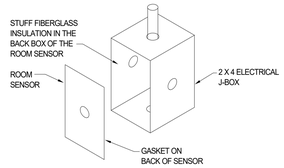
4 MINI SPLIT CONDENSING UNIT SUPPORT
N.T.S.



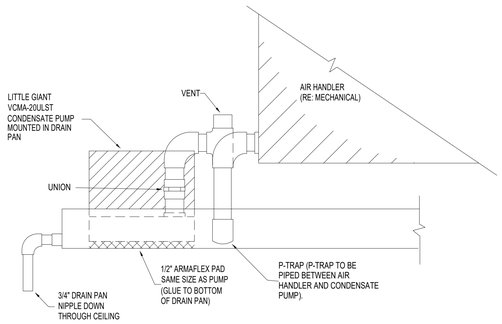
T AT LOCATIONS SIMILAR TO THIS ARRANGEMENT ON MECHANICAL AND ELECTRICAL DRAWINGS, PROVIDE TEMPERATURE SENSOR.

NOTES:
1. ELECTRICAL, MECHANICAL AND CONTROLS CONTRACTORS MUST COORDINATE ALL REQUIREMENTS.
2. ALL CONDUIT AND BACKBOXES ARE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR
3. ALL SENSORS, CONTROL WIRING AND ASSOCIATED DEVICES ARE FURNISHED AND INSTALLED BY CONTROLS CONTRACTOR.

5 SENSOR MOUNTING
N.T.S.



6 ROOM SENSOR INSULATION
N.T.S.



7 CONDENSATE PUMP DETAIL
N.T.S.

MECHANICAL SYMBOLS

THERMOSTAT/SENSOR (PER SPEC.)		(T)
CO2 SENSOR		(C2)
HUMIDISTAT		(H)
THERMOSTAT/HUMIDISTAT		(TH)
DUCT DETECTOR WITH CONTROL RELAY		D
GRILLE TYPE		XX / ###
CFM (CUBIC FT. PER MIN.)		
DUCT TYPE TAG DENOTATION	RECTANGULAR	XX" x XX"
	FLAT OVAL	XX"/XX"
	ROUND	XX"Ø
RETURN AIR GRILLE		
SUPPLY GRILLE		
MANUAL VOLUME DAMPER		
MOTORIZED DAMPER		M
BACKDRAFT DAMPER WITH DIRECTIONAL ARROW		BDD
FIRE DAMPER/SMOKE FIRE DAMPER	RECTANGULAR	FD SFD
	ROUND	FD SFD
CAP		
SPIRAL DUCT		
FLEX DUCT		
MEDIUM PRESSURE DUCT		
EXTERIOR DUCT		
INTERNALLY LINED - PAINT GRIP DUCT		

NOTE: SOME SYMBOLS MAY NOT BE USED.

PLUMBING GENERAL NOTES

1. PLUMBING CONTRACTOR TO COORDINATE ALL PIPING ROUTING ABOVE CEILING WITH MECHANICAL AND ELECTRICAL CONTRACTORS BEFORE INSTALLING.
2. PLUMBING CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR MOUNTING HEIGHTS OF ALL AIR HANDLERS TO GUARANTEE POSITIVE DRAINAGE OF ALL CONDENSATE DRAINS (1/8" PER FT. SLOPE - MINIMUM).
3. MECHANICAL CONTRACTOR TO PROVIDE TO THE PLUMBING CONTRACTOR THE RECOMMENDED AC MANUFACTURERS' DATA FOR CONDENSATE TRAPS PER EACH TYPE OF UNIT.

MECHANICAL GENERAL NOTES

1. MECHANICAL CONTRACTOR TO PROVIDE TO THE PLUMBING CONTRACTOR THE RECOMMENDED AC MANUFACTURER'S DATA FOR CONDENSATE TRAPS PER EACH TYPE OF UNIT.
2. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OR ADJUSTMENT OF ALL HOLD DOWN BOLTS ON COMPRESSORS AT HVAC EQUIPMENT TO ALLOW FOR PROPER VIBRATION ISOLATION.
3. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL ABANDONED SCREWS, PIPING, TAPE, PAPERS, PACKING PRODUCTS, ETC.
4. ALL EQUIPMENT SHALL BE PROPERLY LABELED PER SPECIFICATIONS.
5. CLOSE ALL OUTSIDE AIR DAMPERS UPON INSTALLATION AND KEEP ALL OUTSIDE AIR DAMPERS CLOSED UNTIL THE "TEST AND BALANCE" IS PERFORMED.
6. PROVIDE AND INSTALL MANUAL VOLUME CONTROL DAMPERS ON SUPPLY AND RETURN BRANCH DUCT SERVING A DIFFUSER OR REGISTER. ALL MANUAL DAMPERS INSTALLED ABOVE HARD CEILINGS OR AT OTHER INACCESSIBLE AREAS SHALL BE SUPPLIED WITH A CABLE OPERATED DAMPER EQUAL TO "YOUNG REGULATOR MODEL 830A-CC".
7. DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY THE FIRE ALARM CONTRACTOR, INSTALLED BY THE MECHANICAL CONTRACTOR, AND FINAL TIE-IN BY THE FIRE ALARM CONTRACTOR.
8. SEAL WITH FIRE RETARDING SEALANT AROUND PIPE THROUGH ANY PENETRATION OF FIRE WALLS. REFER TO ARCHITECTURAL SHEETS FOR FIRE WALLS.
9. ALL GRILLES ARE SHOWN IN APPROXIMATE LOCATION. FIELD VERIFY PLACEMENT WITH CEILING GRID.
10. ALL DIFFUSERS/FLEX CONNECTIONS SHALL HAVE A RIGID METAL ELBOW UNLESS COMING DIRECTLY DOWN FROM A UNIT OR HEIGHT OF CEILING IS EXTREME. ALL FLEX DUCT TO HAVE AT LEAST ONE SUPPORT STRAP.
11. THE SPACE AROUND DUCTS AND PENETRATING ITEMS OF SMOKE PARTITION WALLS SHALL BE FILLED WITH AN IBC APPROVED MATERIAL LIMITING THE FREE PASSAGE OF SMOKE.
12. ALL FAN CURBS TO BE INSTALLED LEVEL. PROVIDE SEAL BETWEEN CURB AND ROOF.
13. COORDINATE WITH THE PLUMBING CONTRACTOR LOCATION OF ALL SUPPLY FANS WITH PLUMBING VENTS. MAINTAIN 10'-0" MINIMUM SEPARATION.
14. NO MECHANICAL EQUIPMENT THAT REQUIRES SERVICE (i.e. FANS, ROOFTOP UNITS, CONDENSERS, ETC.) ON ROOF SHALL BE CLOSER THAN 10'-6" TO EDGE OF BUILDING.
15. THE MECHANICAL CONTRACTOR SHALL NOT INSTALL ANY ROOF EQUIPMENT CLOSER THAN 5'-0" TO ANY ADJACENT WALLS, EXPANSION JOINTS, AND/OR PARAPETS.
16. COORDINATE WITH THE PLUMBING CONTRACTOR LOCATION OF ALL ROOFTOP UNITS WITH ALL PLUMBING VENTS. MAINTAIN 10'-0" MINIMUM SEPARATION.
17. COORDINATE ALL UNITS, DUCTWORK, GRILLES, REFRIGERANT LINES WITH ALL TRADES BEFORE INSTALLING.
18. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE ROOFING CONTRACTOR ALL COUNTER FLASHING REQUIRED AT ROOF CURBS.
19. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE STEEL ERECTOR AND ROOFING CONTRACTOR THE INSTALLATION OF ALL ROOF MOUNTED EQUIPMENT.
20. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING SLOPE OF STRUCTURAL STEEL TO ALLOW ROOF CURBS TO BE INSTALLED LEVEL.
21. ALL ROOFTOP UNITS AND CURBS TO BE INSTALLED LEVEL. ROOFTOP UNIT MFG. TO PROVIDE SEAL BETWEEN UNIT AND CURB.
22. INSTALL CONDENSERS PER MANUFACTURER CLEARANCES.
23. MECHANICAL CONTRACTOR SHALL SUBMIT TO ARCHITECT / ENGINEER REFRIGERANT LINE SET DESIGN AND ROUTING PER MANUFACTURER FOR REVIEW BEFORE INSTALLATION BEGINS.
24. THE MECHANICAL CONTRACTOR SHALL APPLY ULTRA-VIOLET PROTECTIVE COATING OVER REFRIGERANT INSULATION PER MANUFACTURER.
25. ALL AIR HANDLERS: NO PIPING, CONDUITS, DUCTS, WIRING, DISCONNECTS, ETC. WILL BE ALLOWED TO BE INSTALLED CLOSER THAN 3'-0" (THREE FEET) IN FRONT OF THE SERVICE ACCESS PANEL.

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	REVISIONS	

JAVIER GARCIA 118760 LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

MECHANICAL & PLUMBING GENERAL NOTES, SYMBOLS & DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET MP07-01

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Texas Firm Registration No. F-893
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COMcheck Software Version COMcheckWeb
Mechanical Compliance Certificate

Project Information

Energy Code: 2021 IECC
Project Title: Cain MS
Location: Rockwall, Texas
Climate Zone: 3a
Project Type: Alteration

Construction Site:
Heath, Texas

Owner/Agent:
Rockwall ISD
Texas

Designer/Contractor:
Chelsea Casady
EMA Engineering
328 S Broadway Ave
Tyler, Texas 75702
903-581-2677
ccasady@emaenginneer.com

Mechanical Systems List

Quantity System Type & Description

3 2T Mini-split (Single Zone):
Heating: 1 each - Central Furnace, Electric, Capacity = 25 kBtu/h
No minimum efficiency requirement applies
Cooling: 1 each - Split System, Capacity = 25 kBtu/h, Air-Cooled Condenser, Unknown Economizer
Proposed Efficiency = 20.00 SEER2, Required Efficiency = 13.40 SEER2
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Chelsea Casady — Chelsea Casady — 2/23/26
Name - Title — Signature — Date

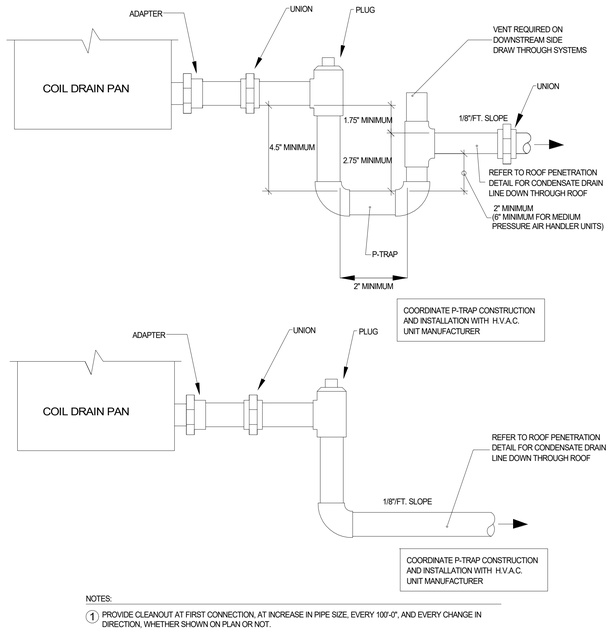
Project Title: Cain MS
Data filename:
Report date: 02/23/26

SMALL CAPACITY SPLIT SYSTEM SCHEDULE

MS MARKS	DESIGN MANUFACTURER	MODEL	TONS	SEER2 | IEER	EER2	HSPF2	FAN CFM HIGH SPEED	FAN CFM LOW SPEED	COOLING CAPACITY (MBTUH)	HEATING CAPACITY (MBTUH)	ELECTRICAL VOLT.	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	MAXIMUM PIPE (FT) ELEV.	MAXIMUM PIPE (FT) LENGTH	UNIT WEIGHT (LBS)	REMARKS | PROVIDE	MS TAGS
MS-AH:2T	LG	KNSAC241A	2T		12.3	8.8	650	370			208 V	1	0 A	0 A			30	POWERED FROM AC UNIT, CONDENSATE PUMP, WIRED SENSOR	B125, B206, C207
MS-AC:2T	LG	KUSAC241A	2T	20					25	25	208 V	1	15 A	20 A	33	65 1/2	100	A2L REFRIGERANT, HAIL COIL GUARD	B125, B206, C207

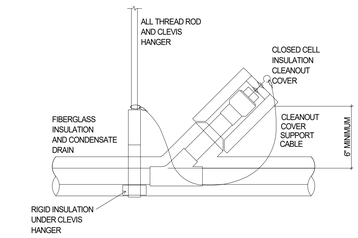
PUMPS

MARK	DESCRIPTION	MANUFACTURER & NO	SUPPLY	ELEC. DATA	ACCESSORIES	PAIRING ACCESSORY
J1	CONDENSATE PUMP	LITTLE GIANT VCMA-20ULST		120 V. 1.5 AMPS	20 G.P.M. AT 15 FEET TOTAL HEAD, 6' POWER CORD, PROVIDE CHECK VALVE ON DISCHARGE LINE	



NOTES:
1. PROVIDE CLEANOUT AT FIRST CONNECTION, AT INCREASE IN PIPE SIZE, EVERY 100'-0", AND EVERY CHANGE IN DIRECTION, WHETHER SHOWN ON PLAN OR NOT.

1 CONDENSATE DRAIN DETAIL
N.T.S.



2 IN-LINE CONDENSATE CLEANOUT DETAIL
N.T.S.

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ISSUES

1	02/26/2026	ISSUE FOR CONSTRUCTION
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REVISIONS

JAVIER GARCIA 118760 LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

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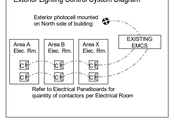
SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

MECHANICAL & PLUMBING SCHEDULES, DETAILS, & COMCHECK

JOB 23162.000
DATE 02/26/2026
SHEET MP08-01

Exterior Lighting Controls					
Provide and install mechanically-held contactors as required in electrical rooms throughout the building to control the exterior lighting in groups as indicated in plan notes and on drawings, to satisfy the requirements of IECC 2021. Provide and install control wiring as required to all contactors throughout the building so that each group of luminaires operates together. On/off control of all exterior luminaires shall be by photocell and existing Energy Management Control System (EMCS), as specified. See information to the right for dimming control and additional requirements.	Parking Lot and Walkway Lighting	Motion Sensor - 15 minutes	Control - Dim to 50%	Photocell - Req'd.	Schedule - Not Req'd
	All Other Lighting	Motion Sensor - N/A	Control - On / Off	Photocell - Req'd.	Schedule - Automatically shut off from midnight to 6:00AM

Exterior Lighting Control System Diagram



ALL LUMINAIRES LISTED ON THE SPECIALTY LUMINAIRE SCHEDULE ARE TO BID SEPARATELY FROM LUMINAIRES LISTED ON THE STANDARD LUMINAIRE SCHEDULE

SPECIALTY LUMINAIRE SCHEDULE: CAIN MIDDLE SCHOOL ADDITIONS AND RENOVATIONS

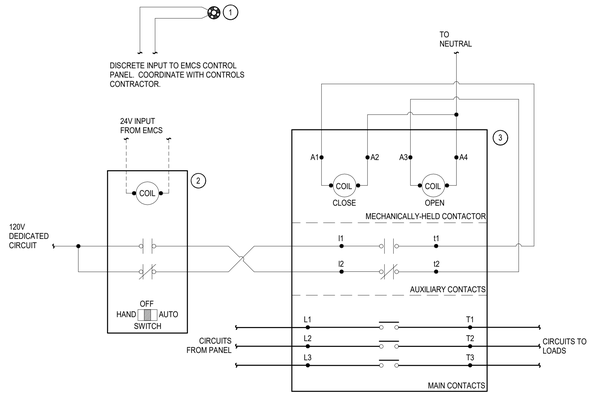
Nada F - (903) 581-2677
nfierro@emaengineer.com
EMA Project # 26 0017

General Requirements:
See Luminaire Schedule for all General Requirements. No equals accepted to any listed fixture on this schedule only.

Project Specific Comments and Requirements:

Comments Key:
FS- Fused, MS/PC- Integral Motion Sensor / Photocell, VD- Vibration Damper,

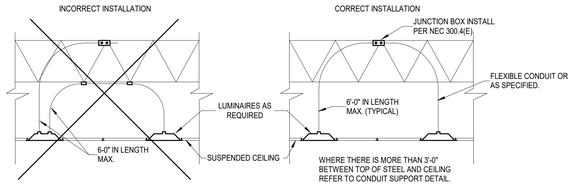
Type	Description	Luminaire Equivalents	Delivered Lumens	Comments	Volts	Watts Max
Z2D	Pole-Mounted LED Area Luminaire, 25' Square Straight Steel Pole with Base Cover (5" shaft, 7-gauge wall thickness, 100MPH), with 2 Heads @ 180deg, T2 Medium Distribution, Color: By Architect	Lithonia DSX1 LED P5, No Equal, No Equal	16000	FS, MS/PC, VD	480V	138
ZF	Pole-Mounted LED Area Luminaire, 25' Square Straight Steel Pole with Base Cover (5" shaft, 7-gauge wall thickness, 100MPH), with 1 Head, Forward Throw Medium Distrbution, Color: By Architect	Lithonia DSX1 LED P5, No Equal, No Equal	16000	FS, MS/PC, VD	480V	138
ZZZ	END OF SCHEDULE, , with , Color:					



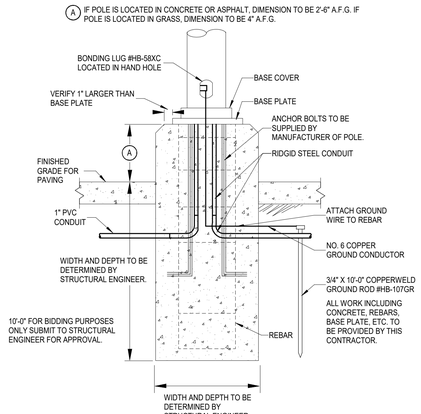
NOTES:
1. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF THE FOLLOWING:
   - WALL PACKS
   - SOFFIT LUMINAIRES
   - FLAG POLE LUMINAIRES
   - WALKWAY LUMINAIRES
   - PARKING LOT LUMINAIRES DESIGNATED AS SECURITY LIGHTING
   - EACH INDIVIDUAL PARKING LOT
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL WIRING, CONDUIT, CONTROLS ETC. AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM. CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL LOW VOLTAGE CONTROLS WIRING AS CONTROL RELAY.

1. PHOTOCELL - 24V, RAINTIGHT, ROOF-MOUNTED, FACING NORTH
2. CONTROL RELAY WITH OVERRIDE SWITCH - 120 V WITH 24V COIL, SPDT, 20A OR AS REQUIRED BY CONTROLS CONTRACTOR (FUNCTIONAL DEVICES INC. #RIB2101SBC OR APPROVED EQUAL)
3. MECHANICALLY-HELD LIGHTING CONTACTOR - 480V WITH 120V COILS, 30A, POLE AS REQUIRED

1 EXTERIOR LIGHTING CONTROL BY EMCS
N.T.S.



3 LUMINIARE WIRING
N.T.S.



SUBMIT POLE BASE DRAWINGS TO STRUCTURAL ENGINEER FOR APPROVAL. COORDINATE EACH POLE WITH STREETS, CURBS AND SIDEWALKS SUCH THAT THE POLE BASE IS AT LEAST 12" AWAY.

2 POLE BASE - 12'-30'
N.T.S.

LIGHTING GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

1. VERIFY ALL CEILING HEIGHTS AND TYPES WITH ARCHITECTURAL DRAWINGS BEFORE PROVIDING LUMINAIRES AND WIRING.
2. REFER TO SPECIFICATIONS, LUMINAIRE SCHEDULE AND LIGHTING CONTROL CHART FOR ADDITIONAL REQUIREMENTS AND MORE INFORMATION.
3. ROUTE CONDUIT IN EXPOSED AREAS PERPENDICULAR OR PARALLEL TO WALLS. ROUTE CONDUIT AS HIGH AS POSSIBLE AND ROUTE CONDUIT RUNS ADJACENT TO EACH OTHER. CONDUIT SHALL BE ORDERLY AND NEAT.
4. EXISTING LUMINAIRES REMOVED AND NOT REUSED SHALL REMAIN PROPERTY OF THE OWNER.

ELECTRICAL LEGEND - LIGHTING SYMBOLS

SYMBOL	DESCRIPTION
———	BRANCH CIRCUIT - CONDUIT IN WALL or ABOVE CEILING, INDICATES DEVICES AND EQUIPMENT ON A CIRCUIT. NOT INTENDED TO SHOW ROUTING
— — — —	BRANCH CIRCUIT OR FEEDER CONDUIT UNDER FLOOR or UNDERGROUND
- - - - - -	SWITCH WIRE / SWITCH CIRCUIT, TYPICAL CONTROL PER SPACE
-DZ- -DZ- -DZ- -P-DZ- -P-DZ- -P-DZ- -S-DZ- -S-DZ- -S-DZ-	DAYLIGHT ZONE - REFER TO LIGHTING CONTROL CHART FOR MORE INFORMATION (P-DZ = PRIMARY DAYLIGHT ZONE, S-DZ = SECONDARY DAYLIGHT ZONE)
CL-1,3,5	ARROW INDICATES HOMERUN, TEXT INDICATES PANEL AND CIRCUIT
$; $3 ; $4	SWITCH LOCATION MOUNTED AT 44" A.F.F. UNLESS NOTED - STANDARD / PROGRAMMABLE ; 3-WAY ; 4-WAY
$K ; $3K; $4K	KEYED SWITCH LOCATION - (SAME AS ABOVE) - KEY OPERATED, PROVIDE 12 EXTRA KEYS FOR OWNER
HV ; WM ; CM	MOTION SENSOR CONTROLS, SEE SPECS FOR LOCATION, QUANTITY, COMMISSIONING ETC. (HV = HIGH VOLUME, WM = WALL MOUNT, CM = CORNER MOUNT)
HV	PHOTOCELL SENSOR CONTROLS, SEE SPECS FOR LOCATION, QUANTITY, COMMISSIONING ETC. (HV = HIGH VOLUME)
; ;	LUMINAIRE. SEE LUMINAIRE SCHEDULE & SPECS FOR MORE INFO, LETTER INDICATES TYPE RECESSED ; SURFACE ; PENDANT
; ;	EMERGENCY LUMINAIRE - (SAME AS ABOVE) - SWITCHED, WITH BATTERY, GENERATOR OR UPS BACKUP MOUNTED AT 7'-6" A.F.F. UNLESS NOTED
; ;	CRITICAL BRANCH LUMINAIRE - (SAME AS ABOVE) - SWITCHED, WITH GENERATOR BACKUP MOUNTED AT 7'-6" A.F.F. UNLESS NOTED
	EMERGENCY LUMINAIRE - (SAME AS ABOVE) - NOT SWITCHED, WITH BATTERY, GENERATOR OR UPS BACKUP
;	EXIT SIGN - NOT SWITCHED, CONTINUOUSLY LIT, BATTERY OPERATED - CEILING MOUNT ; WALL MOUNT
	EXTERIOR LUMINAIRE - SEE LUMINAIRE SCHEDULE FOR MORE INFORMATION

NOTES:
1. SOME SYMBOLS MAY NOT BE USED.
2. ALL DASHED SYMBOLS ARE SAME AS ABOVE BUT EXISTING.
3. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 46" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ELECTRICAL DETAILS AND ARCHITECTURAL DRAWINGS.
4. SEE LIGHTING CONTROL CHART FOR SWITCH, MOTION SENSOR AND PHOTOCELL INFORMATION AND CONTROL.

COMcheck Software Version COMcheckWeb

Exterior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	Cain MS Athletic Site Renovation
Project Type:	New Construction
Exterior Lighting Zone	2 (Residential mixed use area (LZ2))

Construction Site:
6620 FM-3097
Rockwall, Texas 75032

Owner/Agent:
Rockwall ISD
Texas

Designer/Contractor:
Nada Fierro
EMA Engineering & Consulting, Inc.
328 S Broadway Ave
Tyler, Texas 75702
9035812677
nfierro@emaengineer.com

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts /	D Tradable Wattage	E Allowed Watts (B X C)
Parking area	41500 ft2	0.04	Yes	1660
			Total Tradable Watts (a) =	1660
			Total Allowed Watts =	1660
			Total Allowed Supplemental Watts (b) =	400

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 400 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Parking area (41500 ft2): Tradable Wattage				
LED: ZF: Other:	1	2	150	300
LED: Z2D: Other:	1	2	300	600
			Total Tradable Proposed Watts =	900

Exterior Lighting PASSES: Design 56% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Nada Fierro - Lighting Designer (Name - Title) — Signature — 02/24/2026 (Date)

Project Title: Cain MS Athletic Site Renovation — Report date: 02/24/26
Data filename:

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JAMES M. TATE III
102427
LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

LIGHTING DETAILS, SYMBOLS, & GENERAL NOTES

JOB 23162.000
DATE 02/26/2026
SHEET EL07-01

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Louisiana Firm Registration No. EF-5818
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2/25/2026 11:10:21 AM EL07-01 LIGHTING DETAILS, SYMBOLS, & GENERAL NOTES



1 ELECTRICAL FLOOR PLAN - LEVEL ONE
1" = 20'-0"

ELECTRICAL GENERAL NOTES

1. SEE SHEET **EP02-01** FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

ELECTRICAL DEMOLITION PLAN NOTES

ED11 CAP ALL EMPTY CONDUIT AND J BOXES IN THIS SPACE.

ELECTRICAL PLAN NOTES

E17 AIR HANDLER TO BE POWERED FROM AIR CONDENSER. SEE MECHANICAL SCHEDULE FOR MORE INFORMATION.

ELECTRICAL TECHNOLOGY PLAN NOTES

T6 PROVIDE AND INSTALL RECEPTACLE AT THIS APPROXIMATE LOCATION FOR POWER TO FLAT SCREEN TV. COORDINATE EXACT INSTALLATION HEIGHT WITH TECHNOLOGY.

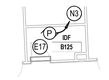
T13 PROVIDE A HUBBELL TWIST-LOCK L6-30 (208V 30A) #IG2620 RECEPTACLE OR EQUAL.

T14 MDF/IDF - ROUTE CONDUIT DOWN THROUGH CEILING FOLLOWING CABLE PATHS TO RECEPTACLE MOUNTED 18" A.F.F. ON EQUIPMENT RACK. COORDINATE RACK LOCATIONS WITH COMMUNICATIONS CONTRACTOR.

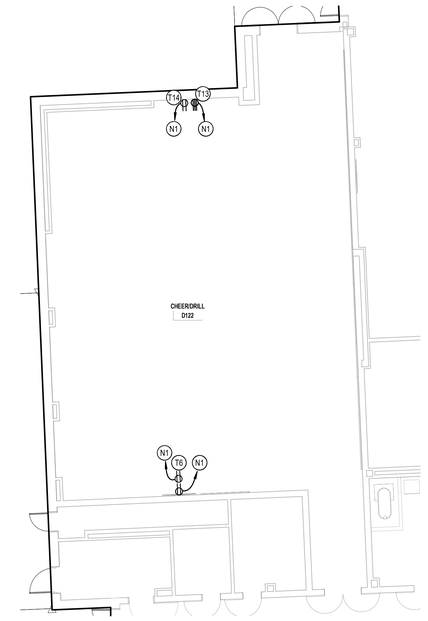
ELECTRICAL RENOVATION PLAN NOTES

N1 PROVIDE POWER TO RECEPTACLES USING EXISTING AVAILABLE BREAKER SPACE OR EXISTING AVAILABLE SPARE BREAKER IN NEAREST ACCEPTABLE 120/208V PANEL. A MAXIMUM OF 8 RECEPTACLES MAY BE ON 1 CIRCUIT. PROVIDE A NEW 1P 20A BREAKER AND #12 WIRE.

N3 PROVIDE POWER TO MOTOR USING EXISTING AVAILABLE BREAKER SPACE OR EXISTING AVAILABLE SPARE BREAKER IN NEAREST ACCEPTABLE 120/208V PANEL PROVIDE A NEW 1P 20A BREAKER AND #12 WIRE.



2 ELECTRICAL FLOOR PLAN - LEVEL ONE - IDF
1" = 10'-0"



3 ELECTRICAL FLOOR PLAN - LEVEL ONE - GYMNASTICS
1" = 10'-0"



4 ELECTRICAL FLOOR PLAN - LEVEL ONE - ELEVATOR MECHANICAL ROOM
1" = 10'-0"

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02-26-2026

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ELECTRICAL FLOOR PLAN - LEVEL ONE - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET EP02-01

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1 ELECTRICAL FLOOR PLAN - LEVEL TWO
1" = 20'-0"

ELECTRICAL GENERAL NOTES

1. SEE SHEET **EP02-01** FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

ELECTRICAL PLAN NOTES

E1 WEATHERPROOF GFCI MAINTENANCE RECEPTACLE INSTALLED BELOW DISCONNECT.

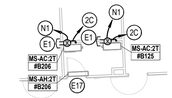
E17 AIR HANDLER TO BE POWERED FROM AIR CONDENSER. SEE MECHANICAL SCHEDULE FOR MORE INFORMATION.

ELECTRICAL AC RENOVATION PLAN NOTES

2C PROVIDE POWER TO 2-TON AIR CONDENSER USING EXISTING BREAKER SPACE IN EXISTING 208V PANEL. PROVIDE A NEW 2P 20A BREAKER, #10 WIRE, 30A DISCONNECT AND 20A FUSES.

ELECTRICAL RENOVATION PLAN NOTES

N1 PROVIDE POWER TO RECEPTACLES USING EXISTING AVAILABLE BREAKER SPACE OR EXISTING AVAILABLE SPARE BREAKER IN NEAREST ACCEPTABLE 120/208V PANEL. A MAXIMUM OF 8 RECEPTACLES MAY BE ON 1 CIRCUIT. PROVIDE A NEW 1P 20A BREAKER AND #12 WIRE.



2 ELECTRICAL FLOOR PLAN - LEVEL TWO - B206
1" = 10'-0"



3 ELECTRICAL FLOOR PLAN - LEVEL TWO - C207
1" = 10'-0"

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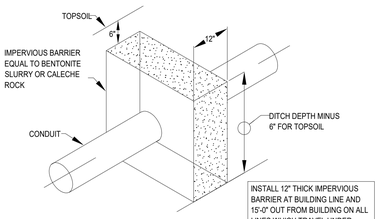
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ELECTRICAL FLOOR PLAN - LEVEL TWO - OVERALL

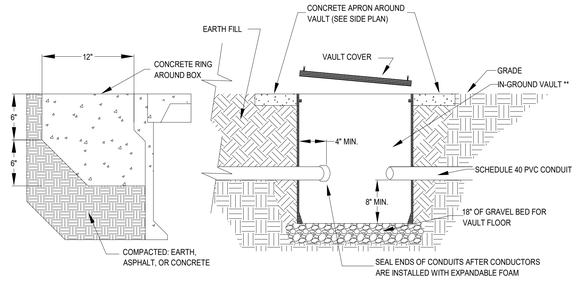
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DATE 02/26/2026
SHEET EP02-02

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1 IMPERVIOUS BARRIER
N.T.S.



** IN-GROUND VAULT: CONSTRUCTION SHALL BE FIBERGLASS OR POLYMER-CONCRETE WITH A LOAD RATING APPROPRIATE FOR THE INSTALLED LOCATION. EACH ENCLOSURE SHALL BE AN IN-GROUND VAULT WITH A SURFACE-LEVEL COVER AND GRAVEL FLOOR. THE ENCLOSURE SHOULD BE SIZED FOR THE NUMBER OF CONDUITS AND CONFIGURATION REQUIRED. HATCH COVER SHALL BE SECURED WITH AT LEAST TWO PENTAGONAL-HEAD BOLTS.

4 PULL BOX
N.T.S.

ELECTRICAL LEGEND - POWER SYMBOLS

	BRANCH CIRCUIT - CONDUIT IN WALL or ABOVE CEILING. INDICATES DEVICES AND EQUIPMENT ON A CIRCUIT. NOT INTENDED TO SHOW ROUTING.
	BRANCH CIRCUIT OR FEEDER CONDUIT UNDER FLOOR or UNDERGROUND.
	SWITCH WIRE - SWITCH CIRCUIT
D-1, 3, 5	HOME RUN WITH CIRCUIT DESIGNATION(S) - LETTER DENOTES PANEL
	PANELBOARD or SWITCHGEAR (SEE PANEL SCHEDULES AND RISER DIAGRAM)
	SPECIAL PANEL, EQUIPMENT RACK, CABINET, ETC. - SURFACE MOUNT; FLUSH MOUNT
TX	POWER TRANSFORMER - SEE PANEL SCHEDULE, RISER, AND SPECIFICATIONS.
	DISCONNECT / SAFETY SWITCH - SEE SCHEDULES FOR MORE INFORMATION.
	GROUND ; WEATHERHEAD
	CONCRETE IN-GRADE PULL BOX / HAND HOLE - PROVIDE AS SHOWN OR AS REQUIRED.
J ; J	JUNCTION BOX - @ 18" AFF OR AS NOTED ; FLUSH WALLS / FLUSH CEILING or FLOOR or ELSE.
;	RECEPTACLE @ 18" AFF OR AS NOTED - DUPLEX ; QUAD; SIMPLEX.
;	MULTI-POLE RECEPTACLE @ 18" AFF or AS NOTED ; NON-LINEAR TWISTLOCK MULTIPOLE @ 18" AFF or AS NOTED.
;	GFCI DUPLEX RECEPTACLE @ 6" ABOVE BACKSPLASH IF SHOWN AT MILLWORK or 18" AFF ; WEATHERPROOF GFCI.
	DUPLEX RECEPTACLE W/ DUAL USB @ 6" ABOVE BACKSPLASH IF SHOWN AT MILLWORK or 18" AFF. SEE SPECIFICATIONS FOR MORE INFORMATION.
;	NON-LINEAR RECEPTACLE @ 18" AFF or AS NOTED - DUPLEX ; QUAD.
	DUPLEX FLOOR W/ BRASS COVER PLATE & 3/4" C TO ACCESSIBLE ATTIC SPACE or AS NOTED.
	FLOOR BOX - 2 GANG (RFB2/CFB2) W/1X DUPLEX; 4 GANG (RFB4/CFB4) W/2X DUPLEX. SEE SPECS FOR MORE INFO.
	FLOOR BOX - 6 GANG ; 8 GANG. SEE SPECS FOR MORE INFO.
	FLOOR BOX - 10 GANG; CUSTOM FLOORBOX AS NOTED. SEE SPECS FOR MORE INFO.
	POKE-THRU FLOOR BOX - 3X RECEPTACLES & COMM. SEE SPECS FOR MORE INFO. WALKERBOX EVOLUTION 8AT or APPROVED EQUAL, OR AS NOTED.
	POWER POLE - POWER & DATA.
	PLUGMOLD WITH RECEPTACLES AT 12" OC
SR	SURFACE - MOUNT RACEWAY - SEE SPECIFICATIONS FOR MORE INFORMATION.
	MOTOR - W / MOTOR-RATED SWITCH PER SPECIFICATIONS FOR ALL MOTORS THAT DO NOT REQUIRE OVERLOAD PROTECTION. FINAL CONNECTION BY ELECTRICAL CONTRACTOR - MOTOR (GENERAL) ; EXHAUST FAN ; SUPPLY FAN ; PUMP.
	MOTOR TOGGLE SWITCH.
	DOOR HOLD BACK - PROVIDE POWER SHOWN TO LOW VOLTAGE TX TO SERVE DEVICE(S).
	EMERGENCY POWER OFF (EPO) - SEE SPECIFICATIONS FOR MORE INFORMATION.
	PHOTOVOLTAIC ARRAY BOUNDARY
	PHOTOVOLTAIC MODULE ; BALLASTED MODULE
	BUZZER - EDWARDS #156G-6G1 OR APPROVED EQUAL AT 80" AFF.
;	PUSH BUTTON - EDWARDS #695 OR APPROVED EQUAL AT 44" AFF ; SIGNAL TX ABOVE CEILING.
	WATER HEATER - SEE PLUMBING SCHEDULE FOR MORE INFORMATION.
	PLUMBING SENSORS - PROVIDE POWER SHOWN TO LOW VOLTAGE TX TO SERVE DEVICE(S).
	DUPLEX RAISED FLOOR RECEPTACLE.

NOTES:
1. SOME SYMBOLS MAY NOT BE USED.
2. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 46" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ARCHITECTURAL DRAWINGS.
3. DIMENSIONS GIVEN A.F.F. ARE TO BOTTOM OF BOX.

ELECTRICAL GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

BRANCH CIRCUITS
1. PROVIDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT. MULTIPLE CIRCUITS SHALL NOT SHARE A COMMON NEUTRAL. NEUTRAL CONDUCTORS SHALL BE SIZED AS LARGE AS THE PHASE CONDUCTORS. NEUTRAL CONDUCTORS SHALL NOT BE SHARED OR BE OF A REDUCED SIZE.
2. UNLESS OTHERWISE NOTED, ALL COMPUTER POWER RECEPTACLES TO HAVE A NORMAL EQUIPMENT GROUND AND AN ISOLATED GROUND WITH #10 AWG NEUTRAL. DIFFERENT CIRCUITS SHALL NOT SHARE A COMMON NEUTRAL.
3. WHERE GFCI PROTECTION IS SHOWN ON PLANS OR SCHEDULE OR OTHERWISE REQUIRED BY NEC (210.8 AND 230.95), PROVIDE A GFCI PERMANENT MOUNTED IN-LINE DEVICE BY NORTH SHORE SAFETY OR HUBBELL OR LITTELFUSE SHOCK BLOCK IN LIEU OF GFCI PROTECTION AT THE RECEPTACLE OR GFCI PROTECTION AT THE OCPD. THESE PRODUCTS OR SIMILAR WILL TYPICALLY WORK FOR 20A, 30A, 40A, 50A AND 60A AT 120/208V 1PH AND 3PH. PRODUCT MUST BE LISTED FOR THE USE. NOTE: GFCI PROTECTION MUST BE PROVIDED WHERE REQUIRED SO COORDINATE GFCI LIMITATIONS WITH PANEL MANUFACTURER CAREFULLY BEFORE BIDDING.

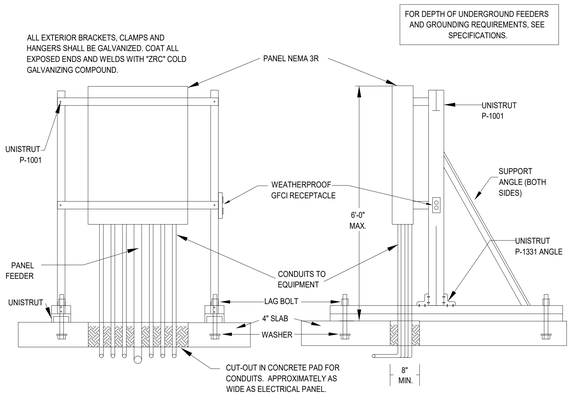
CONDUITS
1. WHERE POSSIBLE, ALL CONDUIT AND / OR CABLING SHALL BE INSTALLED BETWEEN THE BOTTOM AND TOP CHORD OF JOIST. WHERE NO CEILINGS ARE SCHEDULED, ALL CONDUIT SHALL BE UP AGAINST BOTTOM OF THE TOP CHORD. DO NOT SUPPORT OR REST CONDUITS ON BOTTOM CHORD OF JOISTS.
2. ROUTE EACH CONDUIT IN EXPOSED AREAS PERPENDICULAR OR PARALLEL TO WALLS. ROUTE CONDUIT AS HIGH AS POSSIBLE AND ROUTE CONDUIT RUNS ADJACENT TO EACH OTHER. CONDUITS SHALL BE ORDERLY AND NEAT.
3. PROVIDE TWO (2) SPARE ON INCH (1") CONDUITS STUBBED UP INTO ATTIC SPACE AT ALL FLUSH MOUNTED ELECTRICAL CABINETS.
4. COORDINATE CONDUIT ROOF PENETRATIONS WITH MECHANICAL ROOF TOP UNITS AND / OR THRU HOODED PLUMBING PENETRATIONS TO CONDENSING UNITS.

DEVICES
1. AT CASEWORK, VERIFY ALL INSTALLATION HEIGHTS OF RECEPTACLES WITH ARCHITECTURAL DETAILS BEFORE ROUGH-IN.
2. TAMPER RESISTANT RECEPTACLES SHALL BE PROVIDED IN ACCORDANCE WITH NEC ARTICLE 406.12.
3. DO NOT INSTALL DEVICES IN AREAS ON WALLS WHERE MIRRORS, WHITEBOARDS OR OTHER PERMANENT WALL FURNISHINGS WILL BE INSTALLED. DO NOT INSTALL DEVICES IN THESE AREAS UNLESS REVIEWED AND APPROVED BY THE OWNER REPRESENTATIVE.
4. EXACT LOCATION OF ALL RECEPTACLES, DEVICES, & ETC. INSTALLED IN MOVEABLE FURNITURE SHALL BE COORDINATED WITH OWNER REPRESENTATIVE.
5. REFER TO TECHNOLOGY / COMMUNICATION DRAWINGS FOR GENERAL LOCATION OF CONDUITS AND BACK BOXES SUPPLIED BY THIS CONTRACTOR IN BASE BID.
6. UNLESS OTHERWISE NOTED ALL DEVICES THAT PROVIDE POWER TO COMMERICAL AND RESIDENTIAL STYLE LAUNDRY EQUIPMENT TO BE INSTALLED 42" A.F.F. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT AND OWNER REPRESENTATIVE FOR EXACT MOUNTING HEIGHT AND LOCATION PRIOR TO INSTALLATION.

EQUIPMENT
1. DURING SUBMITTAL PHASE, THIS CONTRACTOR SHALL SUBMIT LAYOUT OF ALL PANELS, SWITCHGEAR, TRANSFORMERS, CONTRACTORS, ETC. IN EACH EQUIPMENT ROOM WHERE THIS EQUIPMENT IS LOCATED. ALL LAYOUTS MUST BE DRAWN TO SCALE AND DIMENSIONED.

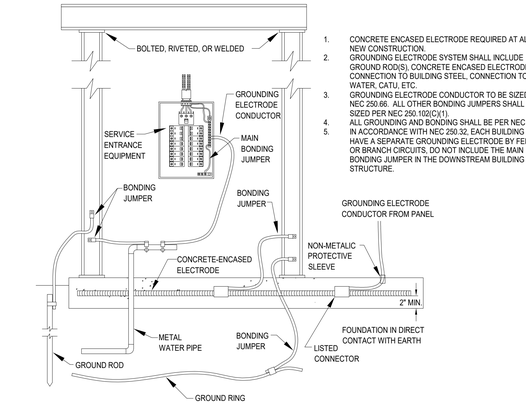
UTILITY
1. THE CONTRACTOR AND SUBCONTRACTORS SHALL COORDINATE WITH ALL UTILITY COMPANIES AND THE OWNER'S REPRESENTATIVE TO DETERMINE THE LOCATION OF ALL EXISTING LINES AND UTILITIES BEFORE DITCHING IS PERFORMED. THE CONTRACTOR AND SUB CONTRACTORS SHALL BE RESPONSIBLE FOR REPAIR OF ANY CUT OR DAMAGED LINES OR UTILITIES THAT ARE NOT SHOWN ON ANY PLANS.

COORDINATION
1. MECHANICAL - EXACT MECHANICAL EQUIPMENT LOCATIONS AND TYPE SHALL BE COORDINATED WITH MECHANICAL PLANS AND MECHANICAL CONTRACTOR. DO NOT INSTALL CONDUIT / CABLING WITHIN 3'-0" OF ANY HVAC UNIT UNLESS THE CONDUIT AND / OR CABLING SERVES THAT UNIT.
2. MECHANICAL - SEE EXHAUST FAN SCHEDULE ON MECHANICAL SHEET FOR EXHAUST FAN SWITCHING, UNLESS CONTROLS ARE SPECIFICALLY NOTED ON THE DRAWINGS. WHERE "EMCS" IS MENTIONED, PROVIDE MECHANICALLY-HELD CONTACTORS AS NECESSARY FOR FAN CONTROL. COORDINATE CONTACTOR COIL ELECTRICAL REQUIREMENTS WITH MECHANICAL CONTROLS CONTRACTOR. WHERE "24/7" IS MENTIONED, PROVIDE A MOTOR-RATED SWITCH AT THE MOTOR ONLY. WHERE "SWITCH" IS MENTIONED, DO ONE OF THE FOLLOWING:
   - IN KITCHEN, TIE ALL HOOD SUPPLY AND EXHAUST FANS TO HOOD CONTROLS. PROVIDE SWITCHES AS NECESSARY AT HOOD. FOR MORE INFORMATION, SEE KITCHEN HOOD DETAIL.
   - IN SCIENCE LABS, TIE EXHAUST FANS TO UTILITY CONTROLLER PER LABORATORY UTILITY SHUT OFF SYSTEM DETAIL.
   - IN ART, PROVIDE CONTROLS FOR KILN EXHAUST PER KILN EXHAUST FAN CONTROL DETAIL.
   - IN BATHROOMS AND JANITORIAL, EXHAUST FAN TO BE SWITCHED WITH THE LUMINAIRES IN THE SPACE PER THE EXHAUST FAN SWITCHING DETAIL.
   - ELSEWHERE, SWITCH THE FAN WITH A MOTOR-RATED SWITCH ON THE WALL IN THE SPACE THE EXHAUST FAN SERVES.
3. MECHANICAL - REFER TO THE MECHANICAL SHEETS FOR ALL SENSOR LOCATIONS (THERMOSTAT, HUMIDISTAT, CO2, ETC.), DUCT DETECTORS, CONTROL RELAYS, MOTORIZED DAMPERS, SFDs, ETC. THIS CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONDUIT, BACK BOXES AND LINE VOLTAGE WIRING TO SENSORS, DEVICES, ETC. AS REQUIRED TO ENSURE A COMPLETE AND OPERATIONAL SYSTEM. FOR MORE INFORMATION, REFER TO SPECIFICATIONS AND SENSOR INSTALLATION DETAIL.
4. MECHANICAL - ALL VARIABLE FREQUENCY DRIVES (VFD's) ARE TO BE PROVIDED BY THE MECHANICAL CONTRACTOR, INSTALLED AND POWERED BY THE ELECTRICAL CONTRACTOR, AND CONTROLLED BY THE CONTROLS CONTRACTOR. THIS CONTRACTOR TO PROVIDE ALL NECESSARY LINE-VOLTAGE WIRING FROM PANEL TO VFD's AND FROM VFD's TO EACH MOTOR.
5. PLUMBING - PROVIDE POWER TO ALL ELECTRIC TRAP PRIMER BY TYING INTO NEAREST 120V GENERAL PURPOSE RECEPTACLE CIRCUIT IN ROOM USING #12 WIRE.



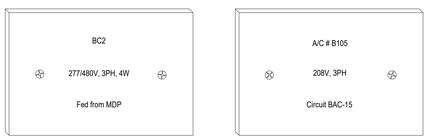
2 EQUIPMENT MOUNTED ON SLAB
N.T.S.

5 WALL PENETRATION
N.T.S.



1. CONCRETE ENCASED ELECTRODE REQUIRED AT ALL NEW CONSTRUCTION.
2. GROUNDING ELECTRODE SYSTEM SHALL INCLUDE GROUND ROD(S), CONCRETE ENCASED ELECTRODE, CONNECTION TO BUILDING STEEL, CONNECTION TO WATER, CATV, ETC.
3. GROUNDING ELECTRODE CONDUCTOR TO BE SIZED PER NEC 250.66. ALL OTHER BONDING JUMPERS SHALL BE SIZED PER NEC 250.102(C)(1).
4. ALL GROUNDING AND BONDING SHALL BE PER NEC 250.
5. IN ACCORDANCE WITH NEC 250.32, EACH BUILDING SHALL HAVE A SEPARATE GROUNDING ELECTRODE BY FEEDERS OR BRANCH CIRCUITS, DO NOT INCLUDE THE MAIN BONDING JUMPER IN THE DOWNSTREAM BUILDING OR STRUCTURE.

7 GROUNDING ELECTRODE SYSTEM
N.T.S.



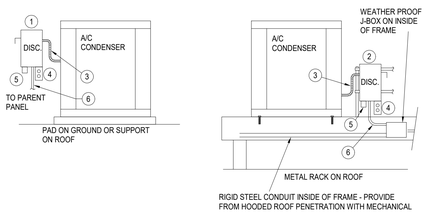
PANELBOARD LABEL (TYPICAL) HVAC DISCONNECT SWITCH LABEL (TYPICAL)

NOTES:
1. ATTACH SECURELY WITH NON-CORRODING STAINLESS STEEL SCREWS, NON-CORRODING POP RIVETS ARE ACCEPTABLE, ADHESIVE ATTACHMENT IS NOT ACCEPTABLE.
2. LABEL ALL PANELBOARDS, SWITCHBOARDS, TRANSFORMERS, HVAC DISCONNECT SWITCHES, AND MOTOR CONTROL CENTERS AS REQUIRED, REFERENCE SPECIFICATION SECTION 260553.

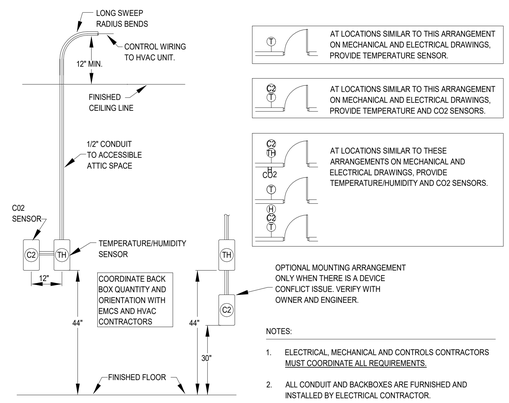
8 ELECTRICAL EQUIPMENT IDENTIFICATION
N.T.S.

NEVER MOUNT DISCONNECTING MEANS TO ACCESS PANEL OR OVER ANY DATA LABELS OR COVER PLATES. IF ADEQUATE SPACE DOES NOT EXIST ON THE SIDE OF THE UNIT, MOUNT DISCONNECT TO UNISTRUT ASSEMBLY, NOT THE UNIT. SEE PANEL ROOF SUPPORT OR RTU POWER SUPPLY FOR SUITABLE DISCONNECT MOUNTING OPTIONS.

1. NEMA 3R HEAVY DUTY DISCONNECT. AT ANY UNIT WHERE MOUNTING THE DISCONNECT WOULD COVER AN ACCESS PANEL OR THE LABEL AND THERE IS NO SUITABLE DISCONNECT MOUNTING LOCATION NEAR THE UNIT, MOUNT TO UNISTRUT SUPPORTS PER PANEL ROOF SUPPORT.
2. NEMA 3R HEAVY DUTY DISCONNECT ON UNISTRUT SUPPORTS ATTACH UNISTRUT TO STEEL FRAME NOT CONDENSING UNIT
3. SEALTIGHT FLEXIBLE CONDUIT FROM DISCONNECT TO UNIT.
4. GFCI WEATHERPROOF RECEPTACLE AS REQUIRED.
5. LIGHTNING SURGE ARRESTOR. SEE SPECIFICATION 264300.
6. ALL PENETRATIONS THROUGH THE ROOF TO BE IN RIGID CONDUIT. NO FLEXIBLE CONDUIT OR SEALTIGHT.

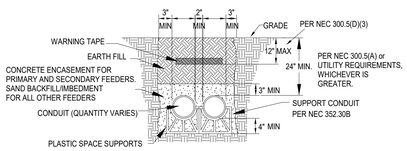


3 AC DISCONNECT MOUNTING
N.T.S.



NOTES:
1. ELECTRICAL, MECHANICAL AND CONTROLS CONTRACTORS MUST COORDINATE ALL REQUIREMENTS.
2. ALL CONDUIT AND BACKBOXES ARE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
3. ALL SENSORS, CONTROL WIRING AND ASSOCIATED DEVICES ARE FURNISHED AND INSTALLED BY CONTROLS CONTRACTOR.

6 SENSOR MOUNTING DETAIL
N.T.S.



SEE SPECIFICATION SECTION 26 20 00 PART 3 & 26 05 33 FOR MORE INFORMATION.

9 UNDERGROUND CONDUITS
N.T.S.

CORGAN
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	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
2		
3		
4		
5		
6		
7		
8		
9		
10		

	REVISIONS	

JAMES M. TATE III
102427
LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

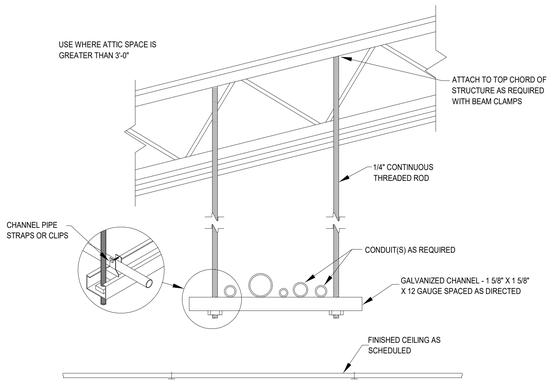
6620 FM-3097, Rockwall, TX 75032

ELECTRICAL DETAILS, SYMBOLS, & GENERAL NOTES

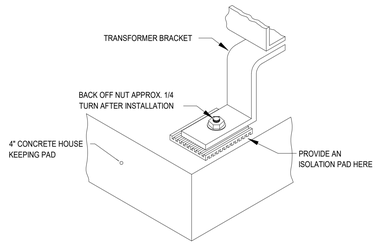
JOB 23162.000
DATE 02/26/2026
SHEET EP07-01

EMA Engineering & Consulting, Inc.
Tyler | Austin | Houston | El Paso
DFW | San Antonio | Shreveport
Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
DESIGN SOLVE ENHANCE www.EMAengineer.com

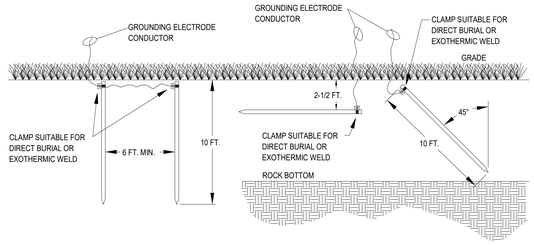
SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.



1 CONDUIT SUPPORT
N.T.S.

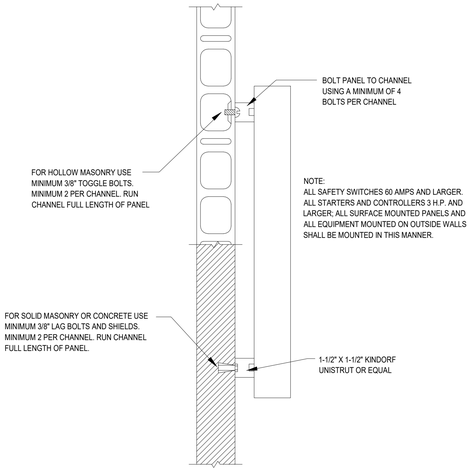


4 ISOLATION PAD
N.T.S.

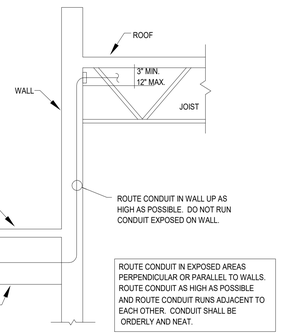


NOTE: ALL PIPE AND ROD ELECTRODES MUST HAVE 8 FEET OF LENGTH IN CONTACT WITH SOIL REGARDLESS OF ROCK BOTTOM IN ORDER TO ENSURE THAT THE UPPER END OF THE ELECTRODE IS FLUSH WITH OR BELOW GROUND LEVEL UNLESS THE ABOVEGROUND PORTION IS PROTECTED FROM PHYSICAL DAMAGE.

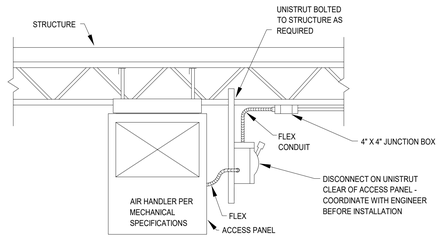
7 NEC GROUND ROD
N.T.S.



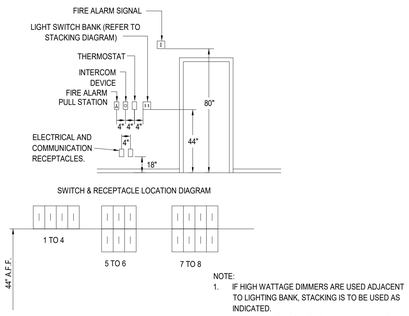
2 EQUIPMENT MOUNTED ON SURFACE/WALL
N.T.S.



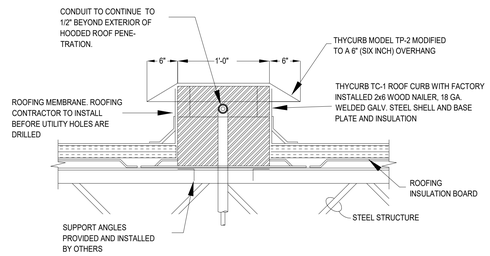
5 EXPOSED CONDUIT ROUTING
N.T.S.



8 AH DISCONNECT FOR ABOVE CEILING
N.T.S.



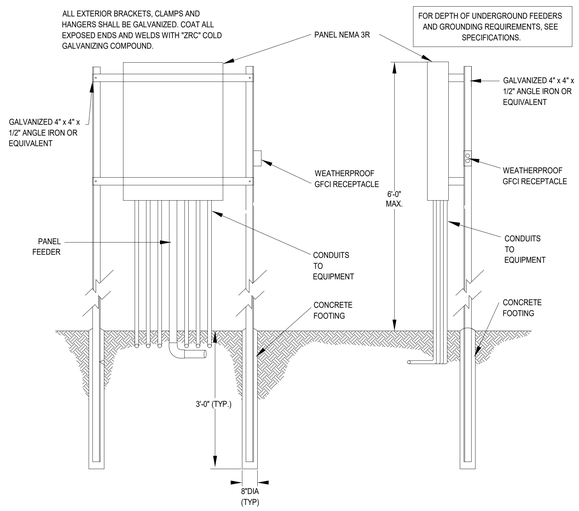
3 OUTLET DIAGRAM
N.T.S.



GENERAL NOTES:

1. DO NOT INSTALL IN ROOF VALLEYS.
2. DO NOT INSTALL CLOSER THAN 3'-0" FROM ANY OTHER EQUIPMENT OR ROOF COMPONENT REQUIRING ROOF FLASHING.

6 HOODED ROOF PEN THYCURB
N.T.S.



9 EQUIPMENT MOUNTED ON GROUND
N.T.S.

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	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
2		
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	REVISIONS	

JAMES M. TATE III
102427
LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

ELECTRICAL DETAILS

EMA Engineering & Consulting, Inc.
Tyler | Austin | Houston | El Paso
DFW | San Antonio | Shreveport
Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
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SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

JOB 23162.000
DATE 02/26/2026
SHEET

EP07-02

Panel - FBH

Fed From - EXISTING

Bus - 225 A / MCB - 225 A

Service - **480/277 3ph 4w**

In Room -
Mount - **Surface Mnt / NEMA 3R**
Branch AIC - **14,000 AIC**
Total Demand Load - **320 A**
% Imbalance - **20**

Notes: See Riser Diagram for feeder info.

#	Load Name	P	Bkr	Wire	A	B	C	Wire	Bkr	P	Load Name	#
1	TXFBL - 75 kVA, 115C Rise	3	125 A	#1/0	88 A / 39 A			#4	60 A	2	Football Field Lighting - Pole "F4" Thru Sports Lighting Cabinet	2
3	--	--	--	--		82 A / 35 A		--	--	--	--	4
5	--	--	--	--			51 A / 11 A	#10	30 A	2	Football Field Security Lighting - Pole "F1" Thru Sports Lighting...	6
7	Football Field Lighting - Pole "F1" Thru Sports Lighting Cabinet	2	60 A	#4	31 A / 11 A			--	--	--	--	8
9	--	--	--	--		31 A / 11 A		#10	30 A	2	Football Field Security Lighting - Pole "F2" Thru Sports Lighting...	10
11	Football Field Lighting - Pole "F2" Thru Sports Lighting Cabinet	2	60 A	#4			31 A / 11 A	--	--	--	--	12
13	--	--	--	--	31 A / 11 A			#10	30 A	2	Football Field Security Lighting - Pole "F3" Thru Sports Lighting...	14
15	Football Field Lighting - Pole "F3" Thru Sports Lighting Cabinet	2	60 A	#4		35 A / 11 A		--	--	--	--	16
17	--	--	--	--			35 A / 11 A	#10	30 A	2	Football Field Security Lighting - Pole "F4" Thru Sports Lighting...	18
19	SPARE - 100A	2	--	--	0 A / 11 A			--	--	--	--	20
21	--	--	--	--		0 A / 0 A		--	--	--	--	22
23	SPARE - 100A	2	--	--			0 A / 0 A	--	--	--	--	24
25	--	--	--	--	0 A / 0 A			--	--	3	SPARE - 50A	26
27	SPARE - 100A	2	--	--		0 A / 0 A		--	--	--	--	28
29	--	--	--	--			0 A / 0 A	--	--	--	--	30
31	EXISTING LOAD	3	70 A	#4	50 A / 25 A			#8	40 A	3	EXISTING LOAD	32
33	--	--	--	--		50 A / 25 A		--	--	--	--	34
35	--	--	--	--			50 A / 25 A	--	--	--	--	36
37	EXISTING LOAD	3	70 A	#4	50 A / 0 A			--	--	3	SPD - 60A	38
39	--	--	--	--		50 A / 0 A		--	--	--	--	40
41	--	--	--	--			50 A / 0 A	--	--	--	--	42

Legend: Phase A,B,C values are in Amps.

Load Classification	Demand Factor	Estimated Demand	Connected Load	Panel Totals	
Lighting	125.00%	108186 VA	86549 VA		
Power	100.00%	161835 VA	161835 VA	**Total Conn. Load:**	**245116 VA**
				Total Est. Demand:	**266262 VA**
				Total Conn.:	**295 A**
				Total Est. Demand:	**320 A**

Panel - FBL

Fed From - **TXFBL**

Bus - 250 A / MCB - 250 A

Service - **120/208 3ph 4w**

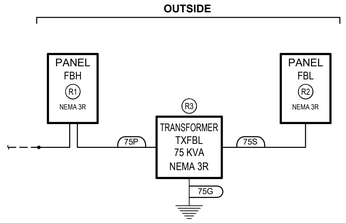
In Room -
Mount - **Surface Mnt / NEMA 1**
Branch AIC - **14,000 AIC**
Total Demand Load - **164 A**
% Imbalance - **42**

Notes: See Riser Diagram for feeder info.

#	Load Name	P	Bkr	Wire	A	B	C	Wire	Bkr	P	Load Name	#
1	Pressbox Thru 100A Disc.	2	100 A	#1	80 A / 80 A			#1	100 A	3	EXISTING LOAD	2
3	--	--	--	--		80 A / 80 A		--	--	--	--	4
5	Sports Lighting Control Cabinet	1	30 A	#12			8 A / 80 A	--	--	--	--	6
7					0 A / 15 A			#12	20 A	1	EXISTING LOAD	8
9	SPACE	1	--	--		0 A / 15 A		#12	20 A	1	EXISTING LOAD	10
11	SPACE	1	--	--			0 A / 15 A	#12	20 A	1	EXISTING LOAD	12
13	SPACE	1	--	--	0 A / 15 A			#12	20 A	1	EXISTING LOAD	14
15	SPACE	1	--	--		0 A / 15 A		#12	20 A	1	EXISTING LOAD	16
17	SPACE	1	--	--			0 A / 15 A	#12	20 A	1	EXISTING LOAD	18
19	SPACE	1	--	--	0 A / 15 A			#12	20 A	1	EXISTING LOAD	20
21	SPACE	1	--	--		0 A / 0 A		--	--	1	SPACE	22
23	SPACE	1	--	--			0 A / 0 A	--	--	1	SPACE	24
25	SPACE	1	--	--	0 A / 0 A			--	--	1	SPACE	26
27	SPACE	1	--	--		0 A / 0 A		--	--	1	SPACE	28
29	SPACE	1	--	--			0 A / 0 A	--	--	1	SPACE	30
31	SPACE	1	--	--	0 A / 0 A			--	--	1	SPARE	32
33	SPACE	1	--	--		0 A / 0 A		--	--	1	SPARE	34
35	SPACE	1	--	--			0 A / 0 A	--	--	1	SPARE	36
37	SPACE	1	--	--	0 A / 0 A			--	--	3	SPD - 60A	38
39	SPARE	1	--	--		0 A / 0 A		--	--	--	--	40
41	SPARE	1	--	--			0 A / 0 A	--	--	--	--	42

Legend: Phase A,B,C values are in Amps.

Load Classification	Demand Factor	Estimated Demand	Connected Load	Panel Totals	
Lighting	125.00%	1250 VA	1000 VA		
Power	100.00%	57976 VA	57976 VA	**Total Conn. Load:**	**58973 VA**
				Total Est. Demand:	**59223 VA**
				Total Conn.:	**164 A**
				Total Est. Demand:	**164 A**



PRIMARY SIDE OF XFMR [480v 3ph]

75P 3-#1/0, 1-#6 GRN, 1 1/2"C.

SECONDARY SIDE OF XFMR [208v 3ph]

75S 4-#250 MCM, 1-#2 GRN, 2 1/2"C.

TRANSFORMER GROUNDS

75G #2 GRN



SAMPLE REDUCING PIN TERMINAL

AT ALL TERMINATIONS USE ANTIOXIDANT PER MANUFACTURE'S RECOMMENDATION.

ELECTRICAL RISER PLAN NOTES

R1 EXISTING NEMA 3R 480V 3PH 225A PANEL TO BE REMOVED AND REPLACED WITH NEW NEMA 3R PANEL 'FBH'. ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS INTERCEPTED AND CAPPED DURING DEMOLITION TO BE EXTENDED TO NEW PANEL 'FBH' LOCATION.

R2 EXISTING NEMA 3R 208V 3PH 100A PANEL TO BE REMOVED AND REPLACED WITH NEW NEMA 3R PANEL 'FBL'. ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS INTERCEPTED AND CAPPED DURING DEMOLITION TO BE EXTENDED TO NEW PANEL 'FBL' LOCATION.

R3 EXISTING NEMA 3R 480-208V 30KVA TRANSFORMER TO BE REMOVED AND REPLACED WITH NEW 75KVA NEMA 3R TRANSFORMER 'TXFBL'. PROVIDE NEW PRIMARY AND SECONDARY FEEDERS.

ELECTRICAL RISER GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

GENERAL

1. COORDINATE EXACT LOCATION OF ALL EXTERIOR SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, METERS, ETC. WITH OWNER AND ARCHITECT BEFORE FINAL INSTALLATION. AVOID INSTALLING AL SUCH ITEMS NEAR THE FRONT ENTRANCE.
2. FEEDERS AND BRANCH CIRCUITS CAN EXIT THE BOTTOM OR TOP OF EACH PANELBOARD OR SWITCHBOARD AS REQUIRED. FEEDERS CAN EXIT THE SIDES OF TRANSFORMERS IF ACCEPTABLE PER MANUFACTURER.

UTILITIES

1. THE UTILITY WORK SHOWN HERE IS PROPOSED AND MAY NOT INCLUDE ALL UTILITY COMPANY REQUIREMENTS AND CLEARANCES. COORDINATE FINAL UTILITY EQUIPMENT LOCATIONS, ROUTING, EASEMENTS, PAD INFORMATION, ETC. WITH UTILITY COMPANY BEFORE BIDDING.

SERVICE ENTRANCE

1. EXCEPT FOR OVERHEAD AND UNDERGROUND SERVICE ENTRANCE, PROVIDE GROUNDING CONDUCTOR PER RISER NOTES (NEC 250.119, SIZED PER 250.122).
2. GROUNDING ELECTRODE CONDUCTOR (NEC 250.24) SHALL BE INSTALLED AT MAIN SERVICE DISCONNECT UNLESS REQUIRED ELSEWHERE BY CITY ORDINANCE.
3. LABEL ALL SERVICE ENTRANCE EQUIPMENT WITH THE CALCULATED FAULT CURRENT AND DATE OF CALCULATIONS (NEC 110.24(A) THE DATE OF CALCULATIONS SHALL BE THE DATE ON THE SEAL. SEE SPECIFICATIONS FOR MORE INFORMATION.
4. PROVIDE A METER AND AN SPD PER SPECIFICATIONS AT EACH MAIN SWITCHBOARD.
5. WHEN A MAIN SERVICE DISCONNECT IS INSTALLED OUTSIDE, THE MAIN DISTRIBUTION PANEL INSIDE THE BUILDING MUST NOT HAVE THE GROUNDED CONDUCTOR TIED TO THE GROUNDING ELECTRODE SYSTEM.

DRY TYPE TRANSFORMERS (480V-208/240)

1. ALL TRANSFORMERS TO BE 115°C RISE.
2. ALL TRANSFORMERS SERVING PANELS WITH ISOLATED GROUND OR DOUBLE-SIZED NEUTRAL SHALL HAVE A MINIMUM RATING OF K-13. ALL OTHERS MAY BE RATED K-1.
3. WHEREVER THE LENGTH OF THE SECONDARY CONDUCTORS FROM A TRANSFORMER EXCEED TEEN FEET (10'), PROVIDE AN OCPD (CIRCUIT BREAKER OR FUSED DISCONNECT) WITHIN 10' (TEN FEET) OF THE TRANSFORMER SECONDARY TERMINALS PER NEC 240-21(C)(2). UNLESS OTHERWISE NOTED, SIZE THE OCPD TO MATCH THE PANELBOARD THAT THE TRANSFORMER SERVES.

OVERCURRENT PROTECTION / DISCONNECTING MEANS

1. PROVIDE ARC ENERGY REDUCTION PER SPECIFICATIONS AND SHALL MEET NEC 240.67 AND 240.87.
2. ALL SERVICE DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 230.95). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
3. ALL FEEDER DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 215.10). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
4. ALL FEEDER DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 210.13). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
5. PROVIDE GFPE PROTECTION AT GENERATOR PER SPECIFICATIONS AND NEC (NEC 215.10, 230.95, 702).

TERMINATIONS

1. THE USE OF BURNDY OR NSI (OR APPROVED EQUIVALENT) UL RATED COMPRESSION REDUCING PIN TERMINALS ON COPPER AND ALUMINUM CONDUCTORS IS ACCEPTABLE WHERE INSTALLED PER NEC AND PER MANUFACTURERS INSTRUCTIONS. SEE IMAGE ON THIS SHEET.

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CAIN MS ADDITIONS AND RENOVATIONS

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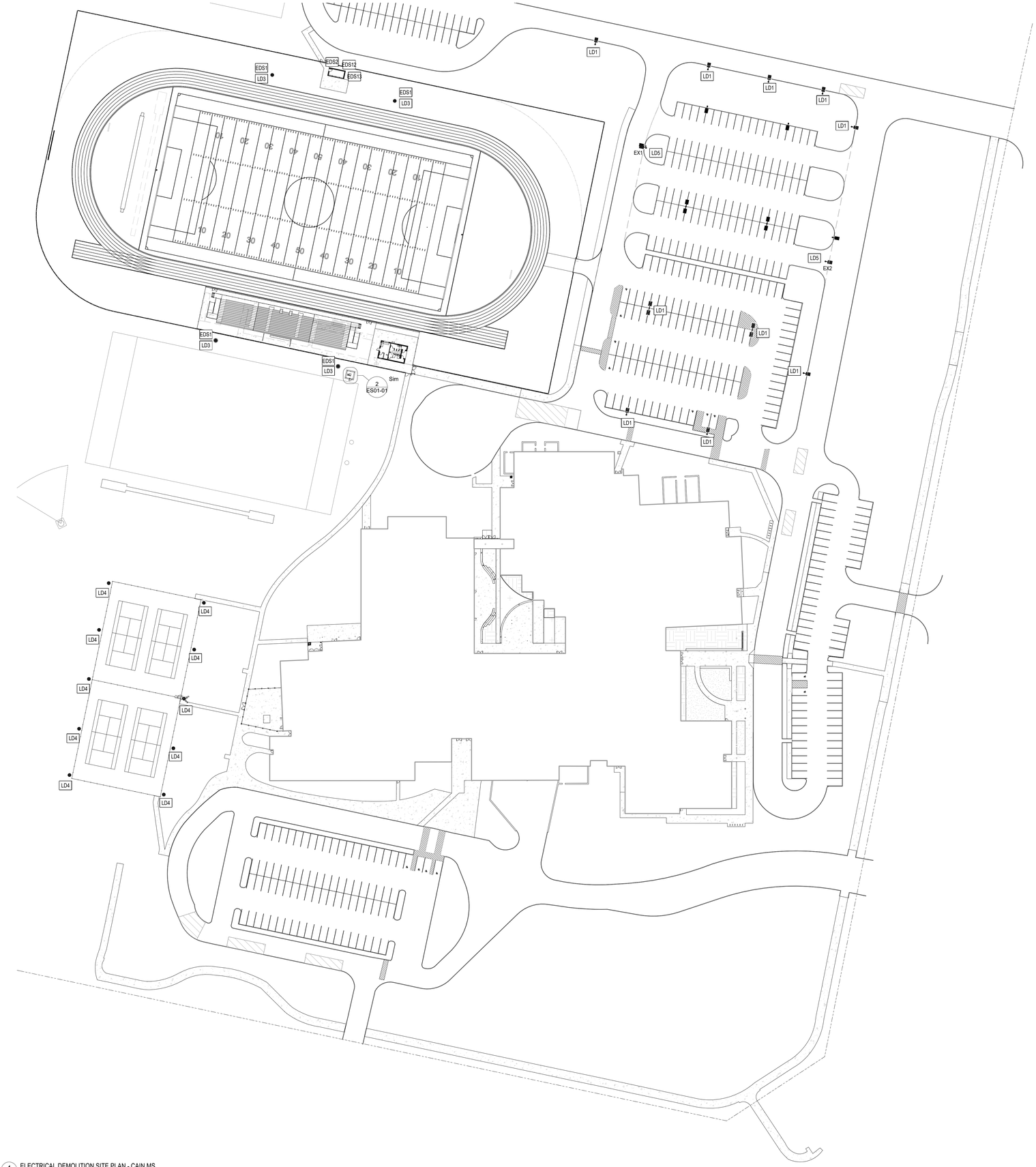
ELECTRICAL PANELBOARD SCHEDULES AND RISER DIAGRAM

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DATE 02/26/2026
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EP08-01

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1 ELECTRICAL DEMOLITION SITE PLAN - CAIN MS
1" = 50'-0"

ELECTRICAL DEMOLITION GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

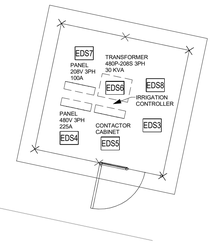
1. UNLESS NOTED ON DRAWINGS, ALL LIGHTING, SWITCHES, RECEPTACLES AND OTHER ELECTRICAL DEVICES ARE TO REMAIN.
2. REFER TO SPECIFICATION SECTION 26 05 05, ELECTRICAL DEMOLITION REMODELING, FOR GENERAL DEMOLITION REQUIREMENTS.
3. ALL MATERIAL REMOVED AND NOT RETAINED BY THE OWNER SHALL BE DISPOSED OF OFF SITE IN A LAWFUL MANNER.
4. BEFORE DEMOLISHING PANELS, TRACE ALL BRANCH CIRCUITS TO CONFIRM THAT EXISTING LOADS HAVE BEEN RELOCATED TO NEW PANELS. IF A LOAD EXISTS THAT HAS NOT BEEN RELOCATED TO NEW PANELS, CONTACT THE ENGINEER FOR INSTRUCTIONS.

LIGHTING DEMOLITION PLAN NOTES

LD1	EXISTING LIGHTING TO REMAIN IN PLACE AND OPERATIONAL.
LD3	EXISTING FOOTBALL FIELD LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LIGHTING. EXISTING LIGHT POLE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING.
LD4	ALTERNATE 02 - EXISTING TENNIS COURT LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LIGHTING. EXISTING LIGHT POLE AND BASE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING.
LD5	EXISTING DRIVEWAY LUMINAIRE TO BE RELOCATED. CONTRACTOR TO PROPERLY STORE LUMINAIRE DURING DEMOLITION PHASE.

ELECTRICAL DEMO SITE PLAN NOTES

EDS1	EXISTING SPORTS LIGHTING PANEL MOUNTED ON LIGHT POLE TO BE REMOVED. REMOVE EXISTING CONDUIT AND WIRING DOWN TO GROUND LEVEL TO BE EXTENDED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. CAP AND MARK CONDUIT. COORNATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION.
EDS2	SCOREBOARD DISCONNECT IN EXISTING STORAGE BUILDING TO BE RELOCATED INTO NEW PREFAB PRESSBOX. EXISTING CONDUIT TO BE INTERCEPTED AND EXTENDED AS NEEDED TO NEW LOCATION.
EDS3	EXISTING FENCED ELECTRICAL AREA TO BE DEMOLISHED. A NEW CONCRETE PAD, FENCING AND UNISTRUT ASSEMBLY TO BE INSTALLED IN EXISTING LOCATION. ALL EXISTING ELECTRICAL EQUIPMENT IN EXISTING FENCED AREA TO BE REMOVED AND REPLACED BY NEW EQUIPMENT ON NEW CONCRETE PAD. INTERCEPT ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS UNDERGROUND OUTSIDE OF EXISTING FENCED ELECTRICAL AREA TO BE EXTENDED TO NEW EQUIPMENT LOCATIONS. CAP AND MARK CONDUIT. REFER TO SUBSEQUENT ELECTRICAL DEMO SITE PLAN NOTES FOR MORE DETAILED DESCRIPTIONS OF EXISTING EQUIPMENT BEING REPLACED.
EDS4	EXISTING NEMA 3R 480V 3PH 225A PANEL TO BE REMOVED AND REPLACED. INTERCEPT ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS UNDERGROUND OUTSIDE OF EXISTING FENCED ELECTRICAL AREA TO BE EXTENDED TO NEW PANEL. CAP AND MARK CONDUIT.
EDS5	EXISTING NEMA 3R SPORTS LIGHTING CABINET TO BE REMOVED AND REPLACED. INTERCEPT ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS UNDERGROUND OUTSIDE OF EXISTING FENCED ELECTRICAL AREA TO BE EXTENDED TO NEW PANEL. CAP AND MARK CONDUIT.
EDS6	EXISTING NEMA 3R 480-208V 30KVA TRANSFORMER TO BE REMOVED AND REPLACED REMOVE ALL PRIMARY AND SECONDARY FEEDERS BACK TO SOURCE.
EDS7	EXISTING NEMA 3R 208V 3PH 100A PANEL TO BE REMOVED AND REPLACED. INTERCEPT ALL EXISTING TO REMAIN BRANCH CIRCUITS UNDERGROUND OUTSIDE OF EXISTING FENCED ELECTRICAL AREA TO BE EXTENDED TO NEW PANEL. CAP AND MARK CONDUIT.
EDS8	EXISTING IRRIGATION CONTROLLER AND ALL ASSOCIATED EQUIPMENT TO BE REMOVED DURING DEMOLITION AND REINSTALLED ON NEW UNISTRUT ASSEMBLY. REMOVED EXISTING CONDUIT AND WIRING BACK TO SOURCE.
EDS12	PLAY CLOCK DISCONNECT IN EXISTING STORAGE BUILDING TO BE RELOCATED INTO NEW PREFAB PRESSBOX. EXISTING CONDUIT TO BE INTERCEPTED AND EXTENDED AS NEEDED TO NEW LOCATION.
EDS13	SCOREBOARD DISCONNECT IN EXISTING STORAGE BUILDING TO BE RELOCATED INTO NEW PREFAB PRESSBOX. EXISTING CONDUIT TO BE INTERCEPTED AND EXTENDED AS NEEDED TO NEW LOCATION.



2 ELECTRICAL ENLARGED DEMOLITION SITE PLAN - FENCED ELEC. AREA
1/4" = 1'-0"

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CAIN MS ADDITIONS AND RENOVATIONS

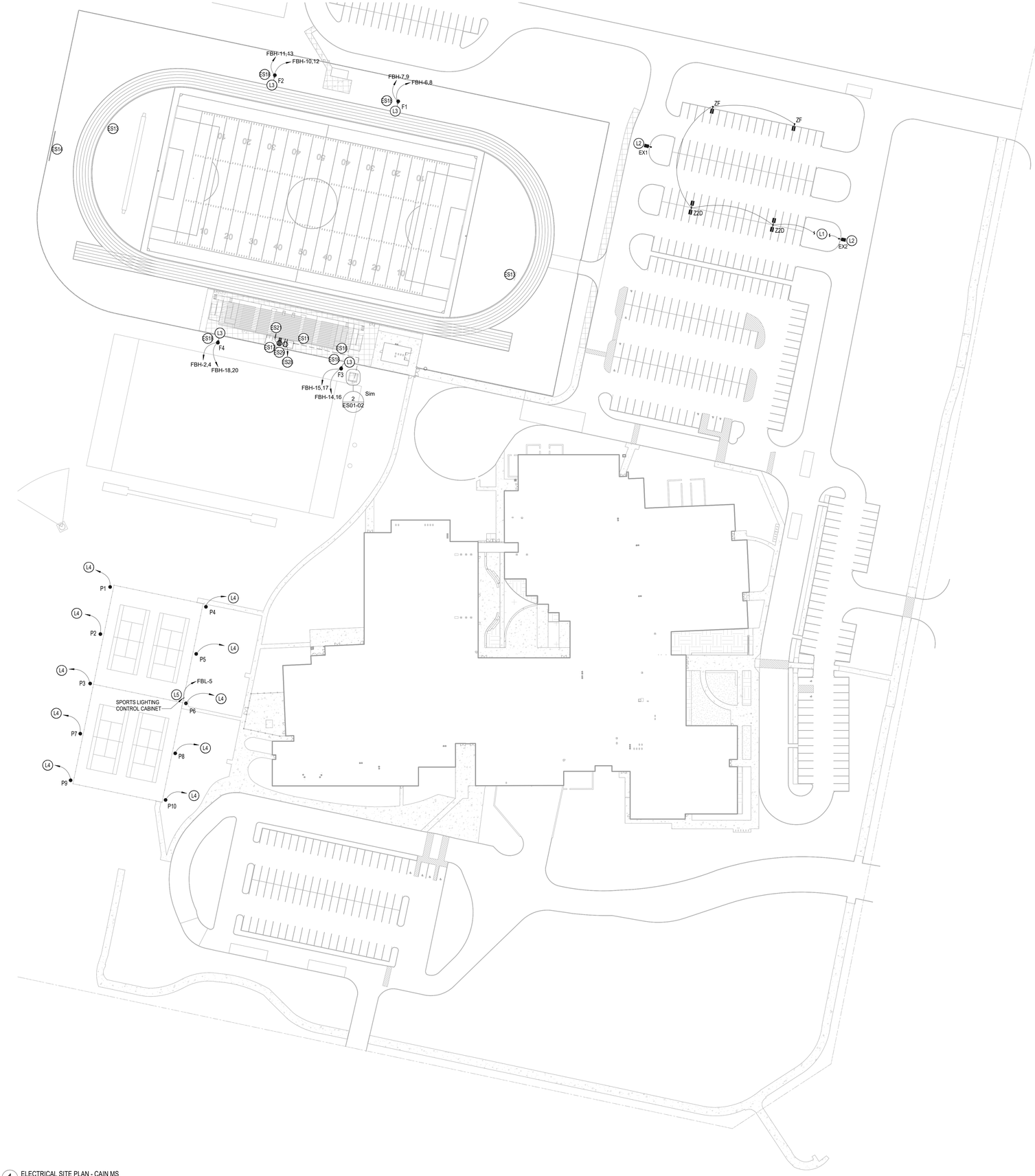
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ELECTRICAL DEMOLITION SITE PLAN - CAIN MS

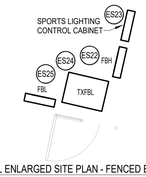
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1 ELECTRICAL SITE PLAN - CAIN MS
1" = 50'-0"



2 ELECTRICAL ENLARGED SITE PLAN - FENCED ELEC. AREA
1/4" = 1'-0"

ELECTRICAL SITE PLAN GENERAL NOTES

1. CONTRACTORS AND SUBCONTRACTORS SHALL VERIFY LOCATION, CONDUCT TEST AND INSPECTIONS, COORDINATE WITH UTILITIES, OWNER'S REPRESENTATIVES, AND CHECK FOR ALL UNDERGROUND UTILITIES AND LINES BEFORE DITCHING TAKES PLACE. CONTRACTOR AND SUBCONTRACTORS PERFORMING THESE DUTIES SHALL BE RESPONSIBLE FOR ANY REPAIRS OF CUT OR DAMAGED LINES AND UTILITIES NOT SHOWN ON PLANS.
2. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF EXTERIOR LIGHTING GROUPS PER LIGHTING CONTROL DETAIL.

LIGHTING PLAN NOTES

L1 CIRCUIT TO EXISTING EXTERIOR LIGHTING DRIVEWAY CIRCUIT. EXTEND CONDUIT AND WIRING AS NECESSARY. NEW LED LIGHTING TO BE CONTROLLED BY EXISTING EMCS.

L2 NEW LOCATION OF EXISTING DRIVEWAY LUMINAIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

L3 PROVIDE POLE MOUNTED SPORTS LIGHTING REMOTE DRIVER ENCLOSURE AT 10'-0" A.F.G. COORDINATE WITH SPORTS LIGHTING MANUFACTURER BEFORE INSTALLATION. EXTEND EXISTING CONDUIT AND WIRING TO REMOTE DRIVER ENCLOSURE LOCATION AS REQUIRED.

L4 ALTERNATE 02 - CIRCUIT NEW TENNIS COURT LIGHTING TO THE EXISTING CIRCUIT AT THIS POLE. EXISTING CIRCUIT TO BE ROUTED THROUGH THE NEW MUSCO SPORTS LIGHTING CONTROL CABINET. PROVIDE A NEW 2 POLE 30A BREAKER TO FEED NEW TENNIS COURT LIGHTING USING EXISTING WIRE.

L5 ALTERNATE 02 - NEW MUSCO SPORTS LIGHTING CONTROL CABINET. EXISTING TENNIS COURT LIGHTING CIRCUITS SHALL BE ROUTED THROUGH THE NEW CONTROL CABINET. EXTEND CONDUIT AND WIRING AS NECESSARY TO THE CONTROL CABINET. NEW CONTROL CABINET TO BE MOUNTED ON A UNISTRUT FRAMING SYSTEM. PROVIDE LOCAL OVERRIDE PUSH BUTTON ON CONTROL CABINET.

ELECTRICAL SITE PLAN NOTES

ES11 NEMA 3R PANEL "FBL" TO PROVIDE POWER FOR NEMA 3R DISCONNECT THAT PROVIDES POWER TO PRE-FABRICATED PRESSBOX. COORDINATE WITH ARCHITECT FOR EXACT LOCATION OF DISCONNECT. REFER TO RISER DIAGRAM FOR MORE INFORMATION.

ES13 TIME CLOCK TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

ES14 SCOREBOARD TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

ES16 PROVIDE AND ROUTE UNDERGROUND FEEDERS FROM PANEL "FBL" TO NEMA 3R DISCONNECT TO FEED PRE-FABRICATED PRESSBOX. REFER TO RISER DIAGRAM FOR MORE INFORMATION.

ES17 NEW LOCATION OF SCOREBOARD DISCONNECT FROM EXISTING STORAGE BUILDING TO NEW PREFABRICATED PRESSBOX. INTERCEPT EXISTING CONDUIT AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED TO REACH NEW DISCONNECT LOCATION.

ES18 EXISTING CONDUIT AND WIRING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. PROVIDE NEW CONDUIT AND WIRING FROM REMOTE DRIVER ENCLOSURE MOUNTED ON POLE TO NEW LUMINAIRE HEADS AS REQUIRED. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING AND MOUNTING OF REMOTE DRIVER ENCLOSURE WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

ES21 L6-30 TO BE CIRCUITED FROM LOAD CENTER LOCATED INSIDE PREFAB PRESSBOX. PROVIDE 30A 2P BREAKER AND #10 WIRE. COORDINATE WITH PREFAB PRESSBOX MANUFACTURER PRIOR TO INSTALLATION.

ES22 EXISTING NEMA 3R 480V 3PH 225A PANEL TO BE REMOVED AND REPLACED WITH NEW NEMA 3R PANEL 'FBH'. ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS INTERCEPTED AND CAPPED DURING DEMOLITION TO BE EXTENDED TO NEW PANEL 'FBH' LOCATION. COORDINATE EXACT LOCATION OF PANEL 'FBH' AND CONDUIT ROUTING PRIOR TO POURING OF NEW SLAB. REFER TO RISER DIAGRAM AND EQUIPMENT MOUNTED ON SLAB DETAIL FOR MORE INFORMATION.

ES23 EXISTING NEMA 3R SPORTS LIGHTING CONTROL CABINET TO BE REMOVED AND REPLACED. ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS INTERCEPTED AND CAPPED DURING DEMOLITION TO BE EXTENDED TO NEW NEMA 3R CONTROL CABINET LOCATION. COORDINATE EXACT LOCATION OF NEW NEMA 3R CONTROL CABINET AND CONDUIT ROUTING PRIOR TO POURING OF NEW SLAB. REFER TO EQUIPMENT MOUNTED ON SLAB DETAIL FOR MORE INFORMATION. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION ON CONTROL CABINET.

ES24 EXISTING NEMA 3R 480-208V 30KVA TRANSFORMER TO BE REMOVED AND REPLACED WITH NEW 75KVA NEMA 3R TRANSFORMER 'TXFBL'. PROVIDE NEW PRIMARY AND SECONDARY FEEDERS. REFER TO RISER DIAGRAM FOR MORE INFORMATION.

ES25 EXISTING NEMA 3R 208V 3PH 100A PANEL TO BE REMOVED AND REPLACED WITH NEW NEMA 3R PANEL 'FBL'. ALL EXISTING TO REMAIN FEEDERS AND BRANCH CIRCUITS INTERCEPTED AND CAPPED DURING DEMOLITION TO BE EXTENDED TO NEW PANEL 'FBL' LOCATION. COORDINATE EXACT LOCATION OF PANEL 'FBL' AND CONDUIT ROUTING PRIOR TO POURING OF NEW SLAB. REFER TO RISER DIAGRAM AND EQUIPMENT MOUNTED ON SLAB DETAIL FOR MORE INFORMATION.

ES28 TECH RACK TO BE CIRCUITED FROM LOAD CENTER LOCATED INSIDE PREFAB PRESSBOX. PROVIDE 20A 1P BREAKER AND #12 WIRE. COORDINATE WITH PREFAB PRESSBOX MANUFACTURER PRIOR TO INSTALLATION.

ES29 NEW LOCATION OF PLAY CLOCK DISCONNECT FROM EXISTING STORAGE BUILDING TO NEW PREFABRICATED PRESSBOX. INTERCEPT EXISTING CONDUIT AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED TO REACH NEW DISCONNECT LOCATION.

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CAIN MS ADDITIONS AND RENOVATIONS

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ELECTRICAL SITE PLAN - CAIN MS

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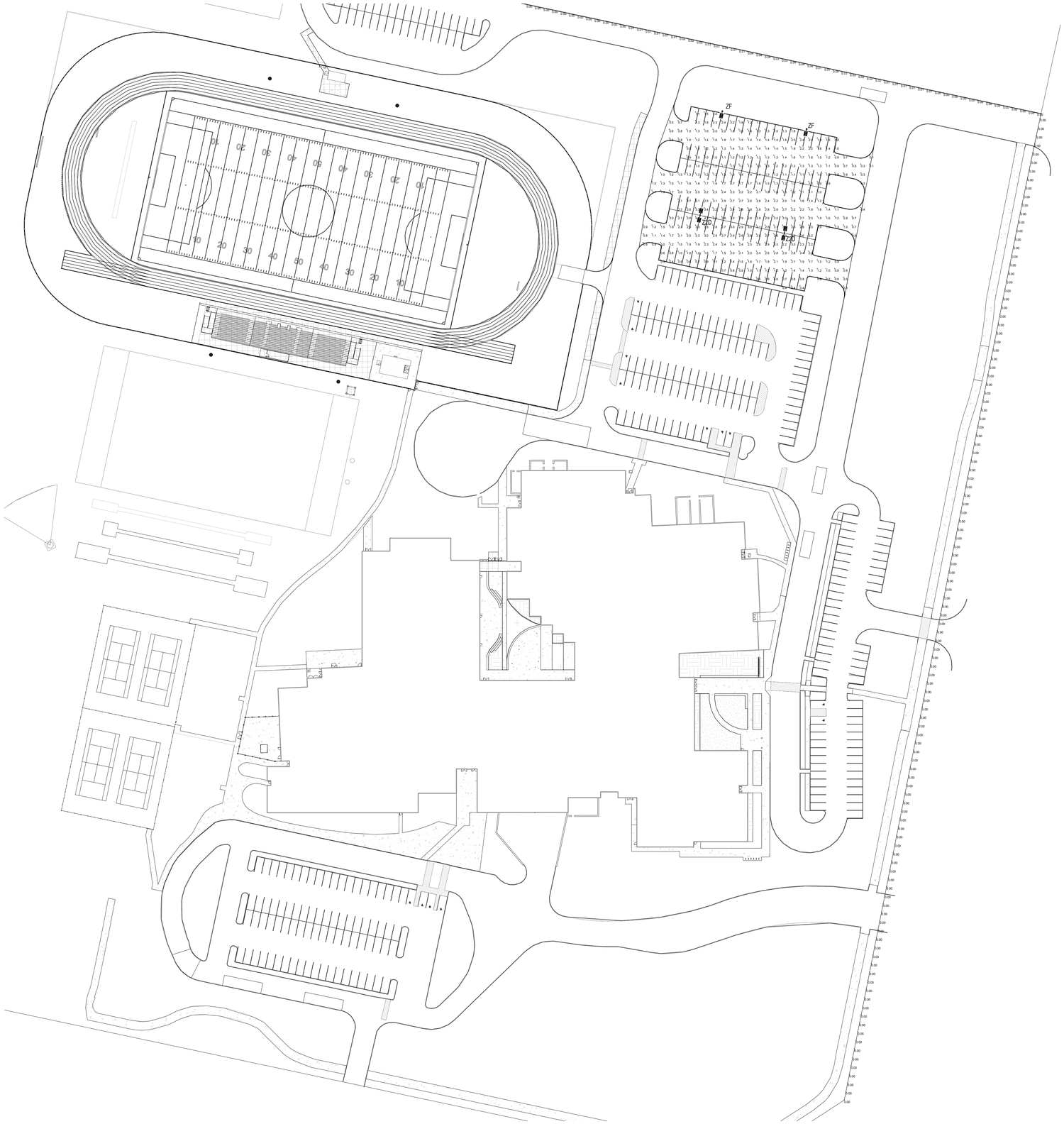
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Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PARKING LOT_Top	Illuminance	Fc	1.67	4.3	0.1	16.70	43.00
PROPERTY LINE	Illuminance	Fc	0.00	0.04	0.00	N.A.	N.A.

PHOTOMETRIC SITE PLAN GENERAL NOTES

1. THESE PLANS ARE ACCURATE AND DESIGNED IN COMPLIANCE WITH AND MEET THE REQUIREMENTS OF THE **CITY OF ROCKWALL** OUTDOOR LIGHTING ORDINANCE IN EFFECT AT THE TIME OF THE SUBMISSION OF PLANS.
2. ALL CALCULATION POINTS SHOWN ARE AT THE GROUND LEVEL AND ARE MEASURED HORIZONTALLY.
3. LIGHTING CALCULATIONS HAVE BEEN PRODUCED USING AGI32 LIGHTING SOFTWARE BY LIGHTING ANALYSTS, INC.



1 PHOTOMETRIC SITE PLAN
1" = 50'-0"

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PHOTOMETRIC SITE PLAN - CAIN MS

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1 TECHNOLOGY SITE PLAN
1" = 30'-0"

TECHNOLOGY SITE PLAN GENERAL NOTES

1. SEE ET700 SERIES SHEETS FOR GENERAL NOTES, DETAILS AND SCHEDULES APPLICABLE TO THE ENTIRE DRAWING SET.
2. ALL PRESS BOX A/V DEVICE LOCATIONS TO BE COORDINATED WITH OWNER/ARCHITECT PRIOR TO INSTALLATION.

TECHNOLOGY SITE PLAN NOTES

W1 PROVIDE AND RUN UNDERGROUND TWO 2" CONDUITS BETWEEN EXISTING CAIN MS AND NEW PRESS BOX, ONE FOR FIBER CABLING AND ONE FOR SPARE. STUB UP INTO FLOOR OF PRESS BOX, CAP AND MARK. PROPOSED ROUTING SHOWN, COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION.

W2 EQUIPMENT RACK FOR NEW TRACK SOUND SYSTEM TO BE COMBINED WITH NETWORK EQUIPMENT. TOP 6RU TO BE RESERVED FOR NETWORK EQUIPMENT. COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO INSTALLATION.

W3 PROVIDE AND RUN UNDERGROUND ONE 1.25" CONDUIT FOR COMMUNICATIONS CABLING TO THE LIGHT POLE MOUNTED SPEAKERS. PROPOSED ROUTING SHOWN, COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION. FIELD VERIFY EXACT LIGHT POLE LOCATION.

W4 MOUNT SPEAKER ON POLE AT 22'-0" A.F.G. AIMED TOWARDS BLEACHERS. COORDINATE EXACT POLE LOCATION WITH OWNER/ARCHITECT PRIOR TO INSTALLATION.

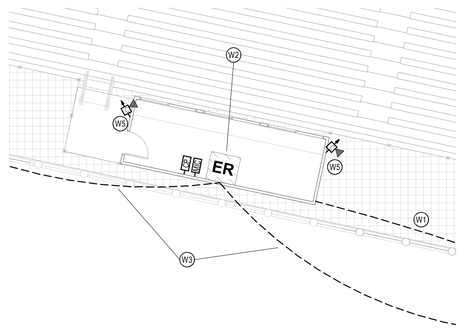
W5 MOUNT CAMERAS ON FACE OF PRESS BOX AIMED TOWARDS THE FIELD. COORDINATE EXACT HEIGHT AND REQUIREMENTS PRIOR TO INSTALLATION.

W6 MOUNT CAMERA ON POLE AT 12'-0" A.F.G. AIMED TOWARDS BLEACHERS. COORDINATE EXACT HEIGHT AND REQUIREMENTS PRIOR TO INSTALLATION. FIELD VERIFY EXACT LIGHT POLE LOCATION

W7 CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING NEEDED PRECAUTIONS FOR CORE DRILLING THROUGH STORM SHELTER.

W8 PROVIDE AND RUN UNDERGROUND ONE 2" CONDUIT FOR COMMUNICATIONS CABLING FOR CAMERAS. CONTINUE CONDUITS AND STUB UP WALL INTO ACCESSIBLE ATTIC SPACE AND CONTINUE OSP CABLING TO NETWORKED DEVICE. SAW-CUT OR BORE UNDER AS REQUIRED, PROPOSED ROUTING SHOWN. COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION.

W9 PROVIDE TWENTY-FIVE (25) FEET MINIMUM LENGTH POLES FOR SPEAKER MOUNTING. SHALL BE ONE PIECE, GROUND SMOOTH. POLE SHALL RATED FOR 100 MILES PER HOUR WIND SPEED WITH GUST FACTOR OF 1.3. PROVIDE ALL WINDSTORM CERTIFICATES AS REQUIRED. CONCRETE POLES SHALL CONFORM TO ASTM C150, TYPE I OR III, OR OTHER TYPES FOR SPECIAL CONDITIONS. PROVIDE HOT-DIPPED GALVANIZED ANCHOR BOLTS, POLE BASE COVER (NO EXPOSED HARDWARE ACCEPTABLE), TEMPLATES, GROUND RODS, RIGID METAL CONDUIT ELBOWS, CONCRETE BASE, ETC., FOR THE INSTALLATION OF CONCRETE BASES AS DETAILED ON THE DRAWINGS. FINISH SHALL BE COORDINATED WITH ARCHITECT FOR FACTORY UV RATED POWDER COAT FINISH OR CLEAR ANODIZED FINISH ON ALL POLES AND ASSOCIATED HARDWARE.



2 TECHNOLOGY SITE PLAN - PRESSBOX
1/8" = 1'-0"

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JAMES M. TATE III
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LICENSED PROFESSIONAL ENGINEER
02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

TECHNOLOGY SITE PLAN - CAIN MS

JOB 23162.000
DATE 02/26/2026
SHEET

ES01-04

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LIGHTING DEMOLITION PLAN NOTES

LD3	EXISTING FOOTBALL FIELD LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LIGHTING. EXISTING LIGHT POLE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING.

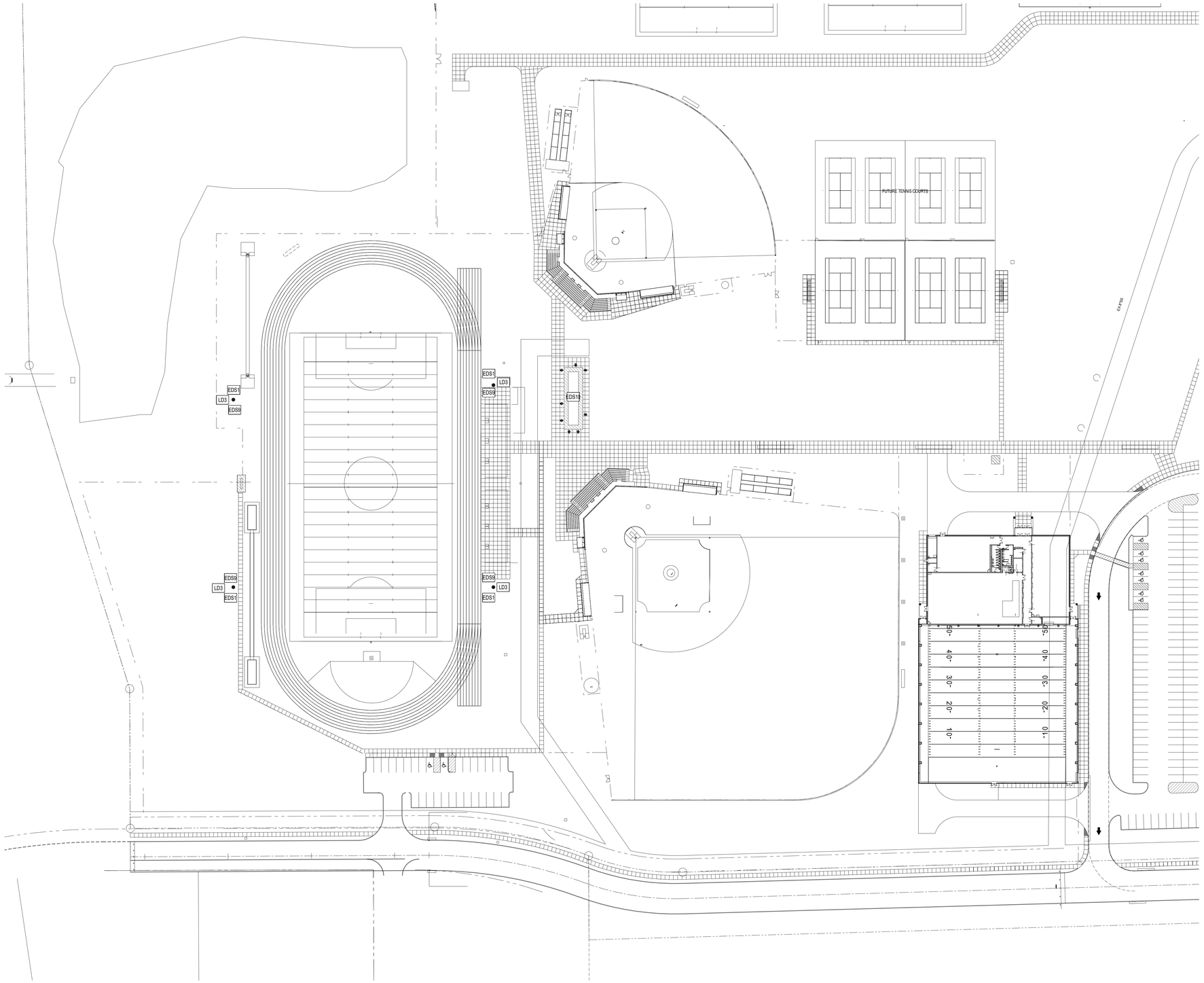
ELECTRICAL DEMOLITION GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

1. UNLESS NOTED ON DRAWINGS, ALL LIGHTING, SWITCHES, RECEPTACLES AND OTHER ELECTRICAL DEVICES ARE TO REMAIN.
2. REFER TO SPECIFICATION SECTION 26 05 05, ELECTRICAL DEMOLITION REMODELING, FOR GENERAL DEMOLITION REQUIREMENTS.
3. ALL MATERIAL REMOVED AND NOT RETAINED BY THE OWNER SHALL BE DISPOSED OF OFF SITE IN A LAWFUL MANNER.
4. BEFORE DEMOLISHING PANELS, TRACE ALL BRANCH CIRCUITS TO CONFIRM THAT EXISTING LOADS HAVE BEEN RELOCATED TO NEW PANELS. IF A LOAD EXISTS THAT HAS NOT BEEN RELOCATED TO NEW PANELS, CONTACT THE ENGINEER FOR INSTRUCTIONS.

ELECTRICAL DEMOLITION PLAN NOTES

EDS1	EXISTING SPORTS LIGHTING PANEL MOUNTED ON LIGHT POLE TO BE REMOVED. REMOVE EXISTING CONDUIT AND WIRING DOWN TO GROUND LEVEL TO BE EXTENDED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. CAP AND MARK CONDUIT. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION.
EDS9	EXISTING POLE MOUNTED SECURITY LIGHTING TO BE REPLACED. CONDUIT AND WIRING FEEDING EXISTING POLE MOUNTED SPORTS LIGHTING TO BE REUSED FOR NEW POLE MOUNTED SPORTS LIGHTING.
EDS10	ALL EXISTING SPORTS LIGHTING CONTROL CABINETS, CONTACTORS, SWITCHES, ETC IN ELECTRICAL ROOM IN THIS BUILDING TO BE REMOVED AND REPLACED WITH NEW SPORTS LIGHTING CONTROL CABINET WITH INTEGRAL CONTACTORS. EXISTING CONDUIT AND WIRING FROM ELECTRICAL ROOM TO SPORTS LIGHTING POLES TO REMAIN IN PLACE. EXISTING CONDUIT AND WIRING WITHIN ELECTRICAL ROOM TO BE INTERCEPTED AND REMOVED AS REQUIRED TO ACCOMMODATE ROUTING THROUGH NEW SPORTS LIGHTING CONTROL CABINET WITH INTEGRAL CONTACTORS. CAP AND MARK ALL EXISTING CONDUIT AND WIRING REMOVED DURING DEMOLITION TO BE EXTENDED TO NEW TO NEW SPORTS LIGHTING CONTROL CABINET.



1 ELECTRICAL DEMOLITION SITE PLAN - HEATH HS
1" = 50'-0"

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CAIN MS ADDITIONS AND RENOVATIONS

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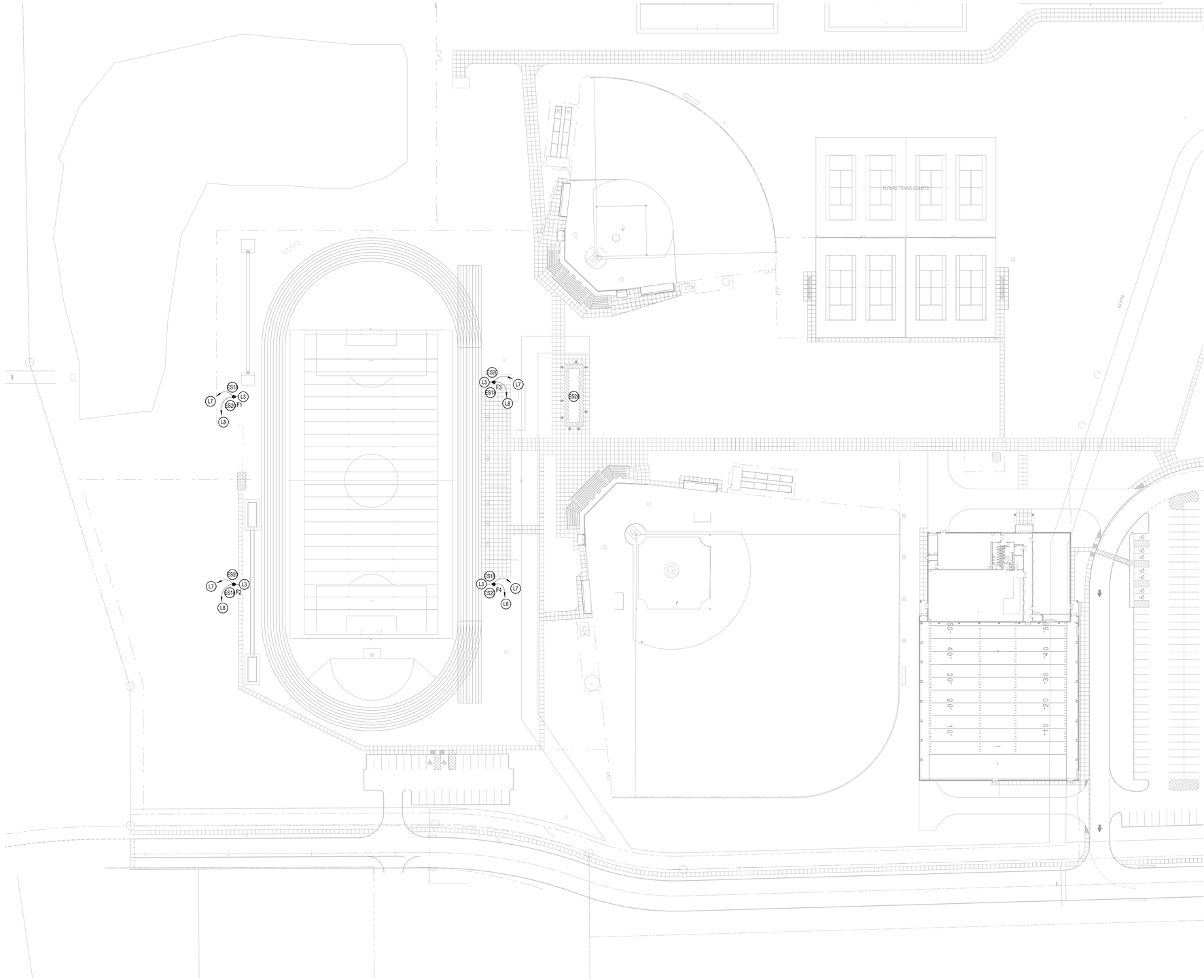
ELECTRICAL DEMOLITION SITE PLAN - HEATH HS

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1 ELECTRICAL SITE PLAN - HEATH HS
1" = 50'-0"

ELECTRICAL SITE PLAN GENERAL NOTES

1. CONTRACTORS AND SUBCONTRACTORS SHALL VERIFY LOCATION, CONDUCT TEST AND INSPECTIONS, COORDINATE WITH UTILITIES, OWNER'S REPRESENTATIVES, AND CHECK FOR ALL UNDERGROUND UTILITIES AND LINES BEFORE DITCHING TAKES PLACE. CONTRACTOR AND SUBCONTRACTORS PERFORMING THESE DUTIES SHALL BE RESPONSIBLE FOR ANY REPAIRS OF CUT OR DAMAGED LINES AND UTILITIES NOT SHOWN ON PLANS.
2. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF EXTERIOR LIGHTING GROUPS PER LIGHTING CONTROL DETAIL.

LIGHTING PLAN NOTES

L3 PROVIDE POLE MOUNTED SPORTS LIGHTING REMOTE DRIVER ENCLOSURE AT 10'-0" A.F.G. COORDINATE WITH SPORTS LIGHTING MANUFACTURER BEFORE INSTALLATION. EXTEND EXISTING CONDUIT AND WIRING TO REMOTE DRIVER ENCLOSURE LOCATION AS REQUIRED.

L7 PROVIDE POWER TO NEW FOOTBALL FIELD LUMINAIRE HEADS FROM EXISTING MSB THROUGH SPORTS LIGHTING CONTROL CABINET LOCATED IN EXISTING PRESS BOX ELECTRICAL ROOM. PROVIDE A NEW 3 POLE 60A BREAKER TO FEED NEW FIELD, TRACK AND BLEACHER LIGHTING USING EXISTING WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

L8 PROVIDE POWER TO NEW FOOTBALL FIELD SECURITY LUMINAIRE HEADS FROM EXISTING PANEL "SH" THROUGH SPORTS LIGHTING CONTROL CABINET LOCATED IN EXISTING PRESS BOX ELECTRICAL ROOM. PROVIDE A NEW 1 POLE 30A BREAKER TO FEED NEW SECURITY LIGHTING USING EXISTING WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

ELECTRICAL SITE PLAN NOTES

ES18 EXISTING CONDUIT AND WIRING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. PROVIDE NEW CONDUIT AND WIRING FROM REMOTE DRIVER ENCLOSURE MOUNTED ON POLE TO NEW LUMINAIRE HEADS AS REQUIRED. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING AND MOUNTING OF REMOTE DRIVER ENCLOSURE WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

ES20 EXISTING CIRCUIT PROVIDING POWER TO EXISTING POLE MOUNTED SECURITY LIGHTING TO BE REUSED AND PROVIDE POWER FOR NEW POLE MOUNTED SECURITY LIGHTING. CONDUIT AND WIRING TO BE REROUTED THROUGH SPORTS LIGHTING CONTROL CABINET. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

ES26 EXISTING CONDUIT AND WIRING FOR SPORTS LIGHTING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED IN ELECTRICAL ROOM IN THIS BUILDING TO NEW SPORTS LIGHTING CONTROL CABINET AND TO EXISTING BREAKER SPACE IN EXISTING PANEL THAT POWERED THE EXISTING SPORTS LIGHTING BEING REPLACED. PROVIDE NEW BREAKER(S) AS CALLED OUT FOR EACH POLE. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION ON CONTROL CABINET.

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ELECTRICAL SITE PLAN - HEATH HS

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JOB 23162.000
DATE 02/26/2026
SHEET
ES01-06

2/25/2026 11:10:02 AM ES01-06 ELECTRICAL SITE PLAN - HEATH HS

TECHNOLOGY GENERAL NOTES

1. SEE ET700 SERIES SHEETS FOR GENERAL NOTES, DETAILS AND SCHEDULES APPLICABLE TO THE ENTIRE DRAWING SET.

TECHNOLOGY PLAN NOTES

(1) SPEAKER TO BE MOUNTED 12'-0" A.F.F. SPEAKERS TO BE AIMED 20 DEGREES DOWNWARD. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION PRIOR TO INSTALLATION.



1 TECHNOLOGY FLOOR PLAN - LEVEL ONE
1" = 20'-0"

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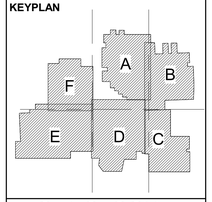
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KEYPLAN



TECHNOLOGY FLOOR PLAN - LEVEL ONE - OVERALL

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RESPONSIBILITY MATRIX

TASK	FURNISHED BY: CONTRACTOR	FURNISHED BY: OWNER	INSTALLED BY: CONTRACTOR	INSTALLED BY: OWNER	NOTES
DATA CABLING PLANT	○		○		DEVICES NOTED AS OWNER FURNISHED, OWNER INSTALLED SHALL BE INSTALLED BY OWNER SELECTED CONTRACTOR. OWNER'S INSTALLER SHALL COORDINATE WITH GENERAL CONTRACTOR FOR INSTALLATION OF THESE SYSTEMS.
NETWORK SWITCHES/SERVERS		○		○	
WIRELESS ACCESS POINTS		○	○		
BACK BOX, CONDUIT	○		○		
GYMNASTICS & TRACK FIELD AUDIO SYSTEM	○		○		
BACK BOX, CONDUIT	○		○		
INTERCOM COMMUNICATION SYSTEM	○		○		EXPAND UPON EXISTING.
BACK BOX, CONDUIT	○		○		
VIDEO SURVEILLANCE SYSTEM	○		○		EXPAND UPON EXISTING.
IP CAMERA SERVER		○		○	
BACK BOX, CONDUIT	○		○		

INTERCOM COMMUNICATION SYSTEM SCHEDULE

SYMBOL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS
	Intercom Server	Bogen	NQ-SYSCTRL		○		Expand upon existing as required.
	Intercom Mixer Pre-Amp	Bogen	NQ-P0100		○		
-(P) AR	Administrative Phone	Bogen	NQ-T1100		○		
	Analog Station Bridge	Bogen	NQ-E7030		○		
	Input/Output Controller	Bogen	NQ-E7010		○		
	Phone Adapter	Cisco	ATA-190		○		
-(VC)	Volume Control	Bogen	ATP10			○	Zone exterior separately
	Amplifier	Extron	XPA/MPA Amps			○	Provide as required
-(S)	Lay-in speaker	Bogen	CSD1X2			○	Drop Ceiling Locations
-(S)	Ceiling speaker	Bogen	S86T72SPG8W			○	Hard Ceiling Locations
-(S)	Wall-mount speaker	TOA Electronics	H-2			○	Mounted at 12'-0" A.F.F. unless otherwise noted.
-(S)ext	Interior/Exterior recessed horn speaker	Bogen	FMH15T	Backbox - BBFM6; Grille - SGHD8		○	Mounted at 12'-0" A.F.F. unless otherwise noted.
	Master Clock	Bogen	BCMA-3RO-1000-1				With wireless Transmitter
-(C) 2	4" Digital Clock	Bogen	BCBL-32S-404-4R	Double Mount: BCAB-1BD-00S-0			
-(C)	12" Analog Clock	Bogen	BCAL-4BS-12R-0				Classroom locations
-(C)	16" Analog Clock	Bogen	BCAL-4BS-16R-0				Cafe, Gym, Library, etc.
	UPS	Tripp Lite	1500MXL2U				

NOTES:
1. REFER TO SPECIFICATIONS 27 51 40 FOR ADDITIONAL INFORMATION.

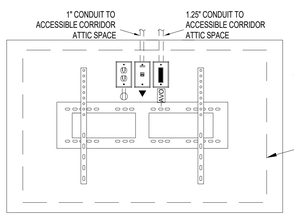
TECHNOLOGY GENERAL NOTES

1. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT AND STANDARD BACK BOXES FOR SYSTEMS SHOWN ON THIS DRAWING IN BASE PROPOSAL.
2. IN ANY EXPOSED CEILING AREAS ALL LOW VOLTAGE CABLING SHALL BE ENCLOSED IN CONDUIT. THIS SHALL INCLUDE SPACES WITH SUSPENDED ACOUSTICAL CLOUD AND/OR CANOPY TYPE CEILINGS.
3. ALL COMMUNICATIONS CABLING SHALL RUN DOWN THE CORRIDORS. TRUNKING SHALL BE RUN PRIMARILY PERPENDICULAR TO BUILDING WALLS.
4. WHERE NO FINISHED CEILINGS ARE SCHEDULED ALL DEVICES, CONDUIT, AND BACK BOXES SHALL BE INSTALLED UP AGAINST BOTTOM OF DECK AND SHALL NOT PROTRUDE BELOW BOTTOM OF STEEL. THE ARCHITECT SHALL APPROVE ROUTING OF ALL EXPOSED ROUGH-INS PRIOR TO PLACEMENT.
5. ANY SIGNAL, OUTLET OR OTHER DEVICE MOUNTED ON A COLUMN, PILASTER, OR SIMILAR WALL OFFSET AREA SHALL BE CENTERED.
6. COORDINATE MOUNTING HEIGHT OF DEVICES ABOVE MILLWORK WITH ARCHITECTURAL PLANS.
7. VERIFY DOOR SWING LOCATIONS AND ARCHITECTURAL WALL FIXTURES WITH ARCHITECTURAL PLANS - DO NOT INSTALL DEVICES IN THESE AREAS.
8. COORDINATE EXACT LOCATION OF ALL DEVICES, ETC. INSTALLED IN MOVEABLE FURNITURE WITH ARCHITECT AND OWNER.
9. CONFIRM ALL COMMUNICATIONS DEVICE LOCATIONS WITH ARCHITECT PRIOR TO ROUGH-IN. THE ARCHITECT RESERVES THE RIGHT TO LOCATE DEVICES ANYWHERE WITHIN EACH ROOM AND DETERMINE SURFACE RACEWAY ROUTING IF APPLICABLE.
10. PROVIDE 4' X 8' X 3/4" C/D FIRE RATED PLYWOOD PANELS AS REQUIRED AND INDICATED ON DRAWINGS. MOUNT BOTTOM OF PLYWOOD AT 24"A.F.F. PAINT TO MEET UL723 REQUIREMENTS WITH RATING STAMP OF PLYWOOD LEFT EXPOSED.
11. REFER TO SPECIFICATION DIVISIONS 27 AND 28 FOR ADDITIONAL INFORMATION.

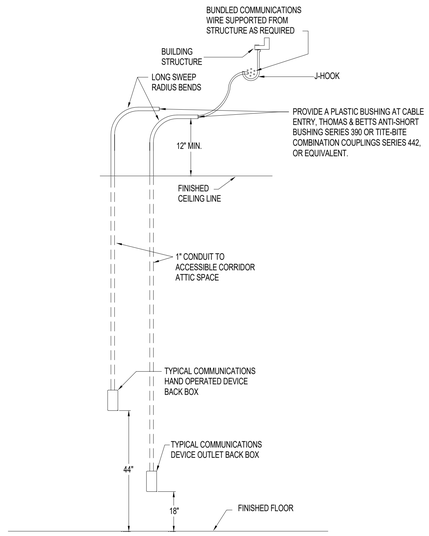
VIDEO SURVEILLANCE SYSTEM SCHEDULE

SYMBOL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
-(C)	Interior IP Camera	Techwin Wisenet	XND-6085	Ceiling Mount: SHP-1680F Wall Mount: SBP-300WM1 SBP-300HM6	○			
-(C)	Exterior IP Camera	Axis	P1468-LE		○			
	Camera License	Salient Systems	CVSW-PRO-IP		○			

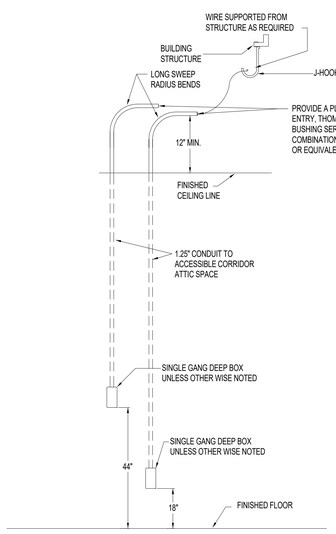
NOTES: 1. REFER TO SPECIFICATIONS 28 21 23 FOR ADDITIONAL INFORMATION.



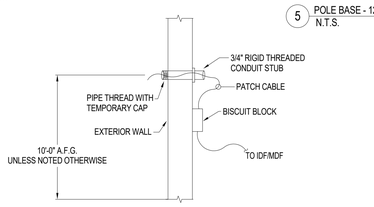
1 TYPICAL FLAT SCREEN MOUNTING DETAIL
N.T.S.



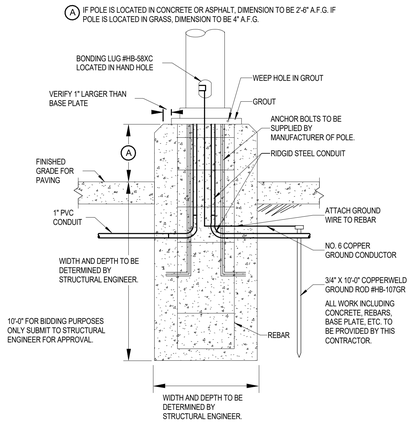
2 TECHNOLOGY DEVICE BACK BOXES
N.T.S.



3 AUDIO VIDEO DEVICE BACK BOXES
N.T.S.



4 EXTERIOR WALL WIRELESS ACCESS POINT/CAMERA MOUNTING DETAIL
N.T.S.



SUBMIT POLE BASE DRAWINGS TO STRUCTURAL ENGINEER FOR APPROVAL. COORDINATE EACH POLE WITH STREETS, CURBS AND SIDEWALKS SUCH THAT THE POLE BASE IS AT LEAST 12" AWAY.

5 POLE BASE - 12' - 30'
N.T.S.

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TECHNOLOGY DETAILS & SYMBOLS

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DATA AND TELEPHONE CABLE PLANT SYSTEM SCHEDULE

PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS
Two Port Faceplates	Panduit	CFPE2xx	Jack Inserts: CJ688TGxx (Cat6)	○		Provide Jack colors per 27 10 30 Part 2.5 Color Coding. Blanks for unused ports. Provide Panduit CFPWR4CIG water resistant faceplate for any exterior or wet area locations.
Four Port Faceplates	Panduit	CFPE4xx		○		
NEMA Duplex Style Two Port Faceplates	Panduit	CF1062xx		○		
NEMA Duplex Style Four Port Faceplates	Panduit	CF1064xx		○		
Decora Style Faceplates	Panduit	CFGXxx		○		
Wall Station Telephone Jacks	Panduit	KWP6PY		○		
Above Ceiling/Structure Mounted Locations	Panduit	CBXQ2xx-A		○		Securely mount to structure. Provide jack inserts and blanks as required.
UTP Station Cabling (Riser)	Panduit	PUR6004XX-UY		○		
Data Patch Panels (Angle)	Panduit	CPPLA24WBLY		o		Provide patch panels to accomodate the drop count to the IDF/MDF room, plus a 20% spare capacity. Permanently Mark Panels with ANSI/TIA-606-C compliant Printed Labels.
Data Patch Panels (Angle)	Panduit	CPPLA48WBLY		o		
Interior Telephone Backbone Cable	Panduit	PUR5525WH-UY				
Interior Armored Multimode Fiber (Riser)	Panduit	FOPRZ12Y			○	All fibers terminated with duplex LC style connectors and bulkhead splice bushings at each end. Labeling shall note cable type, run designation, "Tx" for transmit fiber connectors and "Rx" for receive fiber connectors.
Indoor/Outdoor Fiber (Riser)	Panduit	FOLRX06			○	Refer to specification for use.
Rack Mount Fiber Termination Cabinet (1U)	Panduit	Opticom FRME1U	LC Opticom adaptor panels as required. FAPB blanks as required.	○		Mount in top portion of rack. Provide 4RU in MDF. Size as required for IDF, do not stack multiple 1RU enclosures. Provide blanks for unused spaces.
Rack Mount Fiber Termination Cabinet (2U)	Panduit	Opticom FRME2U		○		
Rack Mount Fiber Termination Cabinet (4U)	Panduit	Opticom FRME4		○		
Four Post Rack	Panduit	R4P23CN			○	Provide two Horizontal Cable Managers per rack; CMPH2
Two Post Rack	Panduit	R2P6S			○	
Vertical Cable Management (8")	Panduit	PR2VD08	(4) PRSP7 spools with each manager (1) PRD8 door with each manager		○	Provide on each side of each rack, double between rack locations
Power Strip	Middle Atlantic Products	PDT-2X320			○	Mount on lower portion of the left side of each rack.
Ladder Rack	Homaco Catalog	TR10-12B			○	Routed over all floor mounted racks from wall to wall.

NOTES: 1. REFER TO SPECIFICATIONS 27 10 30 FOR ADDITIONAL INFORMATION.
2. PATCH CORDS TO BE OFOI.

DATA AND TELEPHONE CABLE PLANT COLOR CODING

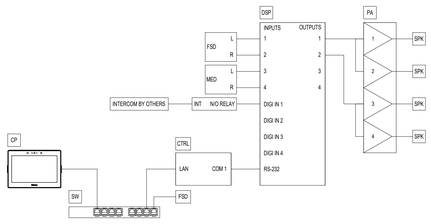
ITEM	DESCRIPTION	HORIZONTAL CABLE	INSERT	PATCH CABLES
1	Data	Blue	Blue	Blue
2	Phone	White	White	White
3	Wireless	Orange	Orange	Orange
4	Security	Green	Green	Green
5	IP Intercom	Red	Red	Red

NOTES: 1.Any Single-mode fiber to be Yellow.
2.Any Multi-mode fiber to be Aqua.

DATA CABLE PLANT SYMBOLS

◁D	TELEPHONE DESKSET JACK - WALL MOUNTED DEVICE JACK 18" A.F.F.
◁W	TELEPHONE WALLSET JACK - WALL MOUNTED DEVICE PLATE WITH MOUNTING STUDS 44" A.F.F.
◀D/2	COMBINATION TELEPHONE DESKSET/DATA JACK WALL PLATE, NUMBER DENOTES DATA LINE QUANTITY - WALL MTD. DEVICE 18" A.F.F.
◀2	DATA JACK, NUMBER DENOTES DATA LINE QUANTITY PER WALL PLATE - WALL MOUNTED DEVICE 18" A.F.F.
◀WL	DATA JACK FOR WIRELESS ACCESS POINT - WALL MOUNT AS NOTED OR USE SURFACE MOUNT BOX ABOVE CEILING, REFER TO SPEC.
◁J	JUNCTION BOX - WALL MOUNTED BACKBOX 18" A.F.F. OR AS NOTED
◑	FLOOR BOX WITH COVER FOR COMMUNICATION AND POWER - SEE DIVISION 26 ELECTRICAL PLANS AND SPECS AND ALSO REFERENCE ARCHITECTURAL PLANS
⏚	COPPER GROUND BAR WITH INSULATED WALL MOUNTING BRACKETS - SEE ELECTRICAL SPECS. SECTION 26 05 34
▨	EQUIPMENT RACK, AS NOTED
EB EQUIPMENT BACKBOARD	EQUIPMENT BACKBOARD, 3/4" C-D GRADE PLYWOOD AS REQUIRED - SEE DIV. 26 ELEC. SPEC.
CABLE TRAY	CABLE TRAY

NOTES: 1. SOME SYMBOLS MAY NOT BE USED.
2. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 48" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ARCHITECTURAL DRAWINGS.
3. DIMENSIONS GIVEN A.F.F. ARE TO BOTTOM OF BOX.



1 GYMNASTICS SOUND SYSTEM ONE-LINE
NTS

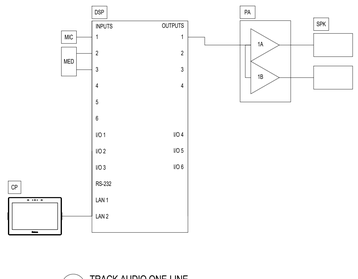
ER - GYMNASTICS

1	POWER
2	BLANK
3	DSP & CONTROLLER
4	BLANK
5	BLANK
6	MEDIA PLAYER
7	BLANK
8	BLANK
9	AMPLIFIER
10	BLANK

2 GYMNASTICS RACK ELEVATION
N.T.S.

GYMNASTICS

LAY-OUT	FUNCTIONAL	PRODUCT	ACCESSORIES	MANUFACTURER	PART NUMBER	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
▨	ER	Main Equipment Rack		Middle Atlantic	DWR-10-22		○		
				Middle Atlantic	LVFD-10		○		
				Middle Atlantic	DWR-RR10		○		
				Middle Atlantic	EB1 and EB2		○		
	PWR	Power Conditioner		Middle Atlantic	PD-920R		○		(1) 120V 20A
	DSP	DSP/Mixer		Extron	DMP 44LC	○			
			Rack mount kit	Extron	RSU 129	○			
	CTRL	Controller		Extron	IPL Pro S1	○			
CP	CP		Control panel	Extron	TLP Pro 725M	○			
	SW	Network switch		Netgear	GS108PP		○	Coordinate with the owner	
	PA	Power Amplifier		Extron	XPA U 4004 FX	○			
SPK	SPK	Loudspeaker		Electro-Voice	EVC-1082-00B	○			
			Wall bracket	Electro-Voice	EVC-WB-BLK	○			
	MED	Media player		Denon	DN-300z	○			
	INT	Paging interrupt		Bogen	VAR-1		○	Use the N/O relay connections	
			Power supply	Bogen	PRS40C		○		
FSD	FSD	Flat screen display		Viewsonic	CDE9830		○		(1) 120V 20A
			Flat screen mount	Chief Mfg.	XTM1U		○	Use the N/O relay connections	
AVI	AVI	A/V Input		Extron	DTP2 T 201 D		○		
AVO	AVO	A/V Output		Extron	DTP2 R 211				
			Audio interface	Extron	ASA 141				
			Brush Grommet	Vanco	120817X		○		
			HDMI cable	C2G	High-Speed Select		○	Length as required	



3 TRACK AUDIO ONE-LINE
NTS

ER - TRACK

1	NETWORK
2	NETWORK
3	NETWORK
4	NETWORK
5	NETWORK
6	NETWORK
7	BLANK
8	BLANK
9	BLANK
10	BLANK
11	POWER
12	BLANK
13	DSP/MIXER
14	BLANK
15	DRAWER
16	
17	BLANK
18	POWER AMPLIFIER

4 TRACK RACK ELEVATION
NTS

TRACK STADIUM

LAY-OUT	FUNCTIONAL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
TOP 6 RU TO BE RESERVED FOR NETWORK EQUIPMENT.									
▨	ER	Main Equipment Rack	Middle Atlantic	DWR-18-22			○		
			Middle Atlantic	LVFD-18			○		
			Middle Atlantic	EB1 and EB2	Blanks		○		
	PWR	Power Conditioner	Middle Atlantic	PD-920R-SP			○		(1) 120V 20A
	DSP	Digital Signal Proccessor	Extron	DMP 64 Plus C			○		
	PA	Amplifier	Dynacord	C1800FDi		○			
SPK	SPK	Loud Speaker	Danley Sound Labs	SH95HO-EW		○		Mount center of speaker @ 22 Ft.	
		Pole mount	Danley Sound Labs	PMK-1		○			
MIC	MIC	Microphone input		Whirlwind	WP1/1FW		○	Single gang, 1 XLR-F	
	BT	Bluetooth receiver		Klark Teknik	DW 20BR		○		
		Hand-over equipment	Microphone	Shure	SM58-LC		○	QTY: 2	
			Microphone stand	Atlas IED	DS7		○	QTY: 2	
			Microphone cable	RAPCO/Horizon	NBM5-10		o	QTY: 2	

CORGAN
www.corgan.com
T: 214.748.2000

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2		
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9		
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△	REVISIONS	

02-26-2026

CAIN MS ADDITIONS AND RENOVATIONS

6620 FM-3097, Rockwall, TX 75032

TECHNOLOGY DETAILS & SYMBOLS

EMA Engineering & Consulting, Inc.
Tyler | Austin | Houston | El Paso
DFW | San Antonio | Shreveport
Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
DESIGN SOLVE ENHANCE www.EMAengineer.com

SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

JOB 23162.000
DATE 02/26/2026
SHEET
ET07-02

2/25/2026 10:54:28 AM ET07-02 TECHNOLOGY DETAILS & SYMBOLS

Rockwall
INDEPENDENT SCHOOL DISTRICT
1050 Williams St.
Rockwall, TX 75087
T: 972. 771. 0605

ROCKWALL ISD
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO
ISSUE FOR CONSTRUCTION

CORGAN
CORGAN
www.corgan.com
T: 214.748.2000

SHEET LIST

SHEET INDEX	
SHEET NO.	SHEET NAME
01 - GENERAL	
COVER	COVER SHEET
02 - CIVIL	
C01.00	CIVIL COVER
C01.03	TOPOGRAPHIC SURVEY
C02.00	DEMOLITION PLAN
C02.01	DEMOLITION PLAN - NORTH
C03.00	SITE/PAVING PLAN
C03.01	SITE/PAVING PLAN - NORTH
C03.50	TRACK DETAILS
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A00-01	DEMO FLOOR PLAN - LEVEL ONE - OVERALL
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MP06-01	MECHANICAL & PLUMBING ROOF PLAN
MP07-01	MECHANICAL & PLUMBING GENERAL NOTES, SYMBOLS & DETAILS
MP08-01	MECHANICAL & PLUMBING SCHEDULES, DETAILS & COMCHECK
15 - ELECTRICAL	
EL07-01	LIGHTING DETAILS, SYMBOLS, & GENERAL NOTES
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ET07-01	TECHNOLOGY DETAILS & SYMBOLS
ET07-02	TECHNOLOGY DETAILS & SYMBOLS

CODE INFORMATION

PROJECT DATA AND CODE INFORMATION

PROJECT DATA	
PROJECT NAME:	WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO
PROJECT ADDRESS:	625 E FM 552, Rockwall, TX 75087
OWNER:	ROCKWALL ISD
APPLICABLE CODES	
BUILDING CODE:	2021 IBC WITH AMENDMENTS
ACCESSIBILITY CODE:	2012 TAS
ELECTRICAL CODE:	2020 NEC WITH AMENDMENTS
ENERGY CODE:	2021 IECC WITH AMENDMENTS
FIRE CODE:	2021 IFC WITH AMENDMENTS
MECHANICAL CODE:	2021 IMC WITH AMENDMENTS
PLUMBING CODE:	2021 IPC WITH AMENDMENTS
REGIONAL OR MUNICIPAL CODE:	CITY OF ROCKWALL, TEXAS
STORM SHELTER CODE:	ICC-500 2020

ALTERNATES

ALTERNATE 01:	TIME CLOCKS AND SCOREBOARD CABINET REPLACEMENT
ALTERNATE 02:	TENNIS COURT LIGHT FIXTURE REPLACEMENT WITH LED
ALTERNATE 03:	KYLE FIELD AND HEATH STADIUM LIGHT FIXTURE REPLACEMENT WITH LED, REFER TO MEP
ALTERNATE 04:	TRIPLE/LONG JUMP RELOCATION

	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
2		
3		
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	REVISIONS

REGISTERED ARCHITECT
HANSBERGER
16318
STATE OF TEXAS

Date of issue:
02/26/2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO
625 E FM 552, Rockwall, TX 75087

PROJECT TEAM

ARCHITECT
CORGAN
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www.corgan.com
CONTACT: Paige Russell
email: Paige.Russell@corgan.com

CIVIL
GLENN ENGINEERING
4500 Fuller Drive, Suite 220 Irving, Texas, 75038
T: 972.717.5151

M E P
ESTES, MCCLURE AND ASSOCIATES, INC.
328 S. Broadway Ave. Tyler, TX 75702
T: 214.893.6132
CONTACT: Will Hill
email: whill@emaengineer.com

COVER SHEET

JOB 26028
DATE 02/26/2026
SHEET
COVER

CONSTRUCTION PLANS FOR

WILLIAMS MIDDLE SCHOOL
ATHLETIC, SITE & INTERIOR RENO

625 EAST FM 552
CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS 75087

GENERAL NOTE:
CONTRACTOR TO UTILIZE CITY APPROVED CONSTRUCTION PLANS FOR CONSTRUCTION OF ALL CIVIL RELATED FACILITIES. CONTRACTOR TO NOTIFY ARCHITECT/ENGINEER IMMEDIATELY OF ANY COST DISCREPANCIES BETWEEN THE CITY APPROVED SET AND BID SET WITH LATEST ADDENDUMS.

VICINITY MAP
N.T.S.

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C05.00	STORM SEWER PLAN
C05.50	STORM SEWER DETAILS
C05.51	STORM SEWER DETAILS
C06.50	PAVING DETAILS

OWNER

ROCKWALL I.S.D.
1050 WILLIAMS STREET
ROCKWALL, TEXAS 75087
972-771-0605

ARCHITECT

CORGAN
401 N. HOUSTON STREET
DALLAS, TEXAS 75202
(972) 977-3587

ENGINEER

GLENN ENGINEERING
4500 FULLER DRIVE, SUITE 220
IRVING, TEXAS 75038
(972) 717-5151

FEBRUARY 2026

Feb. 26, 2026 - 9:30am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

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CORGAN
Dallas, TX 75202
T: 214.748.2000

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GLENN ENGINEERING
TEXAS REGISTRATION # F-303 HUB # 1752575193300
PHONE (972) 717-5151 FAX (972) 717-2176
4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
35059
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Date of issue:
02/26/26

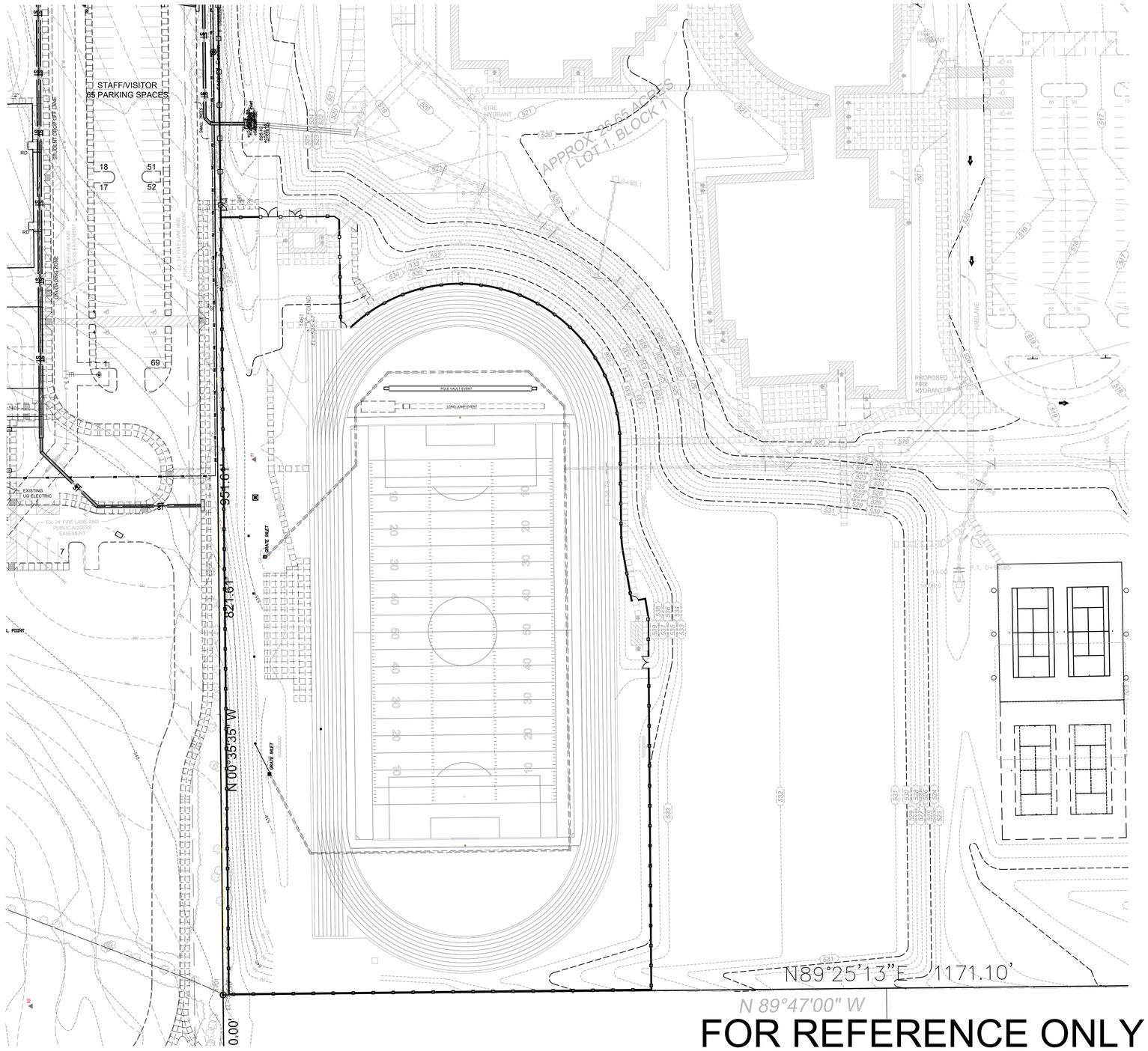
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

COVER SHEET

JOB 23162.000
DATE 02/26/26
SHEET C01.00

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



0 20 40 80
Scale: 1"=40'

FOR REFERENCE ONLY

Feb. 26, 2026 - 9:03am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

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Dallas, TX 75202
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PHONE (972) 717-5151 FAX (972) 717-2176
4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

MIKE GLENN 35059

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Date of issue: 02/26/26

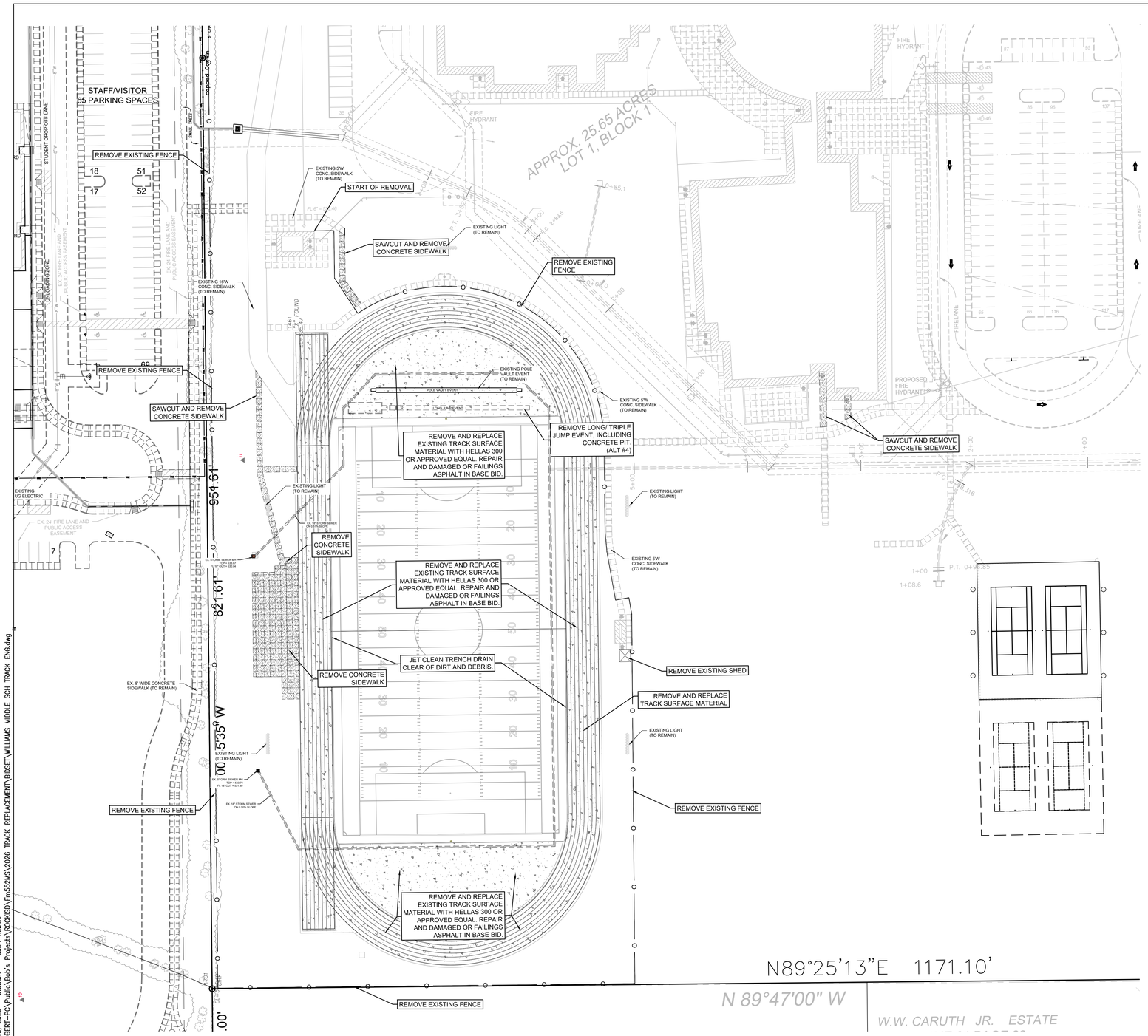
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

TOPOGRAPHIC SURVEY

JOB 23162.000
DATE 02/26/26
SHEET C01.03

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL DEMOLITION NOTES

1. CONTRACTOR SHALL CONSULT ALL UTILITY COMPANIES AND VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DEMOLITION. REMOVAL AND RELOCATION OF ALL UTILITY LINES, METERS, VALVES, ETC. SHALL BE PERFORMED PER REQUIREMENTS OF THE CITY OF ROCKWALL AND UTILITY COMPANIES. ANY DAMAGE TO PUBLIC UTILITIES SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
2. ALL DEMOLITION AND CONSTRUCTION TO BE KEPT WITHIN THE BOUNDARIES OF THE SITE OR AS DESIGNATED BY CONSTRUCTION ENGINEER. ANY DAMAGE BY CONTRACTOR TO ADJOINING PROPERTIES OR ITEMS NOT IN THE DESIGNATED DEMOLITION AREA SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO CORRECT.
3. REMOVE ALL EXISTING UNDERGROUND UTILITIES, CAP AS REQUIRED. BACK FILL AND COMPACT PER TOWN OF ROCKWALL SPECIFICATIONS.
4. REMOVE SURFACE PAVING AS NEEDED TO COMPLETE PAVING PLAN.
5. REMOVE EXISTING SIGNAGE, INCLUDING POSTS AND FOUNDATIONS.
6. REMOVE ANY OTHER ITEMS NOT INDICATED ABOVE BUT WHICH MUST BE DEMOLISHED TO COMPLETE PROJECT AS DESIGNATED BY SITE PLAN.
7. DEMOLITION CONTRACTOR TO CONSULT WITH ARCHITECT OR OWNER ON SALVAGING OR RELOCATING ANY AND ALL PLAYGROUND EQUIPMENT PRIOR TO REMOVING ITEM FROM THE SITE.
8. CONTRACTOR TO USE TREE PROTECTION ON ALL EXISTING TREES THAT ARE TO REMAIN.
9. CONTRACTOR SHALL REMOVE ALL SPRINKLER HEADS AND EQUIPMENT IN THE AREAS OCCUPIED BY THE CONSTRUCTION AND STAGING AREAS. TERMINATE/CAP OFF ALL LINES AS REQUIRED. ALL SPRINKLER HEADS AND EQUIPMENT SHALL BE GIVEN TO THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ALL NECESSARY CHANGES TO THE IRRIGATION SYSTEM THAT ARE REQUIRED TO KEEP THE REMAINING AREAS OUTSIDE THE CONSTRUCTION AREAS IN WORKING ORDER. THIS INCLUDES RELOCATION OF ANY VALVES, PIPING, CONTROLS, ETC., TO OPERATE THE SYSTEM.
10. NO STRUCTURES MAY BE DEMOLISHED WITHOUT A PERMIT FROM THE BUILDING DEPARTMENT. A SEPARATE PERMIT IS REQUIRED FOR EACH STRUCTURE. PAVING, WALLS, FENCES, UTILITIES, AND FLAT WORK CAN BE REMOVED WITHOUT A PERMIT. TREES MAY REQUIRE A PERMIT BASED ON THEIR DESIGNATION PER CITY'S TREE ORDINANCE.
11. ALL PIER TOPS SHOULD BE REMOVED A MINIMUM OF FIVE FEET BELOW PROPOSED FINISHED GRADES.

0 20 40 80
Scale: 1"=40'

DEMOLITION LEGEND

- EXISTING TRACK SURFACING TO BE REMOVED AND HAULED OFF.
- EXISTING SIDEWALK TO BE REMOVED AND HAULED OFF

ALL CONSTRUCTION SHALL BE PER CITY OF ROCKWALL STANDARDS

CONTRACTOR SHALL VERIFY ALL EXISTING INVERTS AND ELEVATIONS PRIOR TO CONSTRUCTION.

CORGAN
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GLENN ENGINEERING
TEXAS REGISTRATION # F-303
PHONE (972) 717-5151
4500 FULLER DRIVE, SUITE 220
HUB # 1752575195300
FAX (972) 717-2176
IRVING, TEXAS 75038

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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

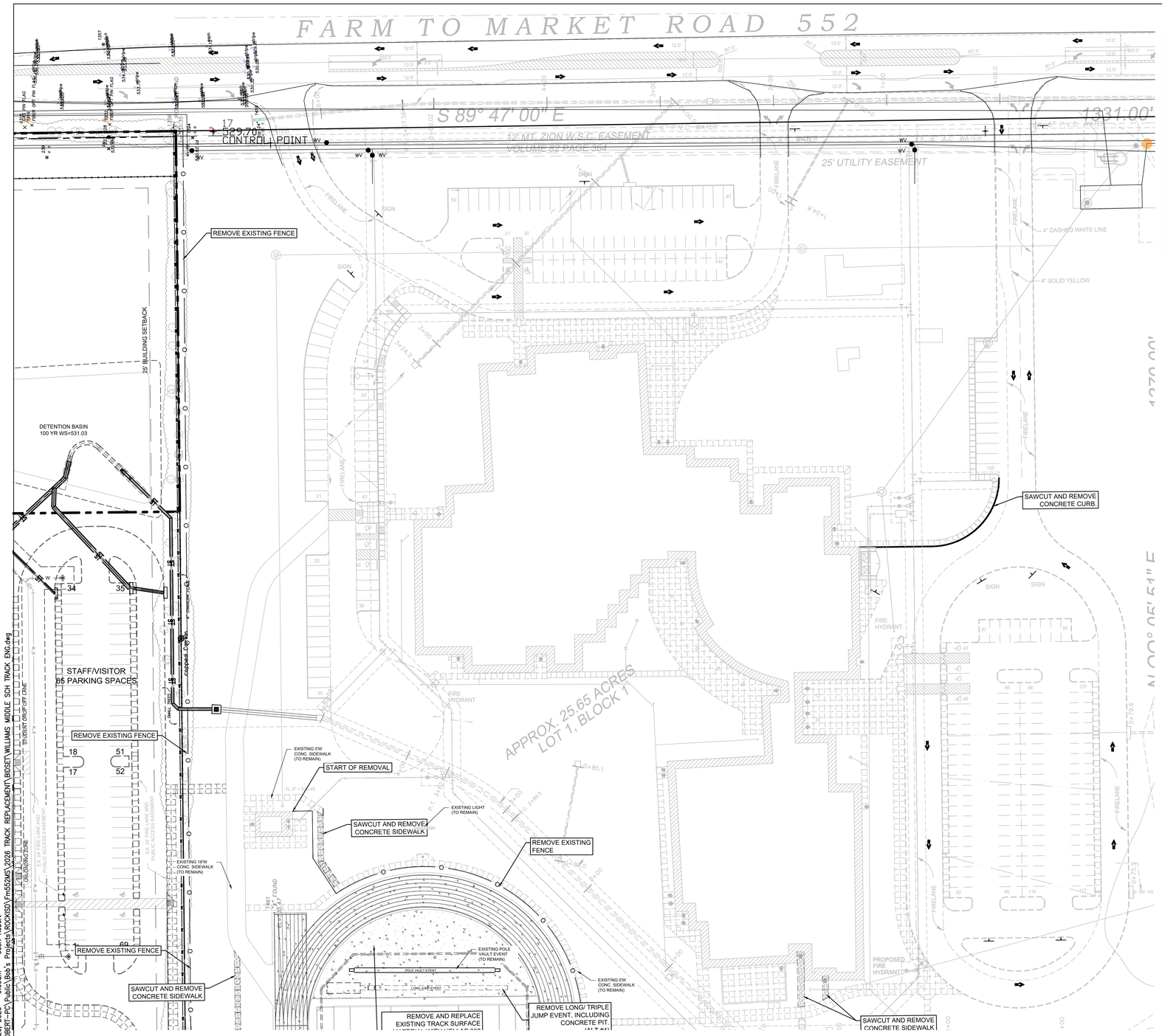
625 E FM 552, Rockwall, TX 75087

DEMOLITION PLAN

JOB 23162.000
DATE 02/26/26
SHEET C02.00

Feb 26, 2026 - 9:08am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



Feb. 26, 2026 - 9:09am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

GENERAL DEMOLITION NOTES

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9. CONTRACTOR SHALL REMOVE ALL SPRINKLER HEADS AND EQUIPMENT IN THE AREAS OCCUPIED BY THE CONSTRUCTION AND STAGING AREAS. TERMINATE/CAP OFF ALL LINES AS REQUIRED. ALL SPRINKLER HEADS AND EQUIPMENT SHALL BE GIVEN TO THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ALL NECESSARY CHANGES TO THE IRRIGATION SYSTEM THAT ARE REQUIRED TO KEEP THE REMAINING AREAS OUTSIDE THE CONSTRUCTION AREAS IN WORKING ORDER. THIS INCLUDES RELOCATION OF ANY VALVES, PIPING, CONTROLS, ETC., TO OPERATE THE SYSTEM.
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0 20 40 80
Scale: 1"=40'

DEMOLITION LEGEND

EXISTING TRACK SURFACING TO BE REMOVED AND HAULED OFF.

EXISTING SIDEWALK TO BE REMOVED AND HAULED OFF

ALL CONSTRUCTION SHALL BE PER CITY OF ROCKWALL STANDARDS

CONTRACTOR SHALL VERIFY ALL EXISTING INVERTS AND ELEVATIONS PRIOR TO CONSTRUCTION.

CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES		
1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS	
1	

GLENN ENGINEERING
TEXAS REGISTRATION # F-303
PHONE (972) 717-5151
4000 FULLER DRIVE, SUITE 220
HUB # 1752575195300
FAX (972) 717-2176
IRVING, TEXAS 75038

MIKE GLENN 35059 REGISTERED PROFESSIONAL ENGINEER

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Date of issue: 02/26/26

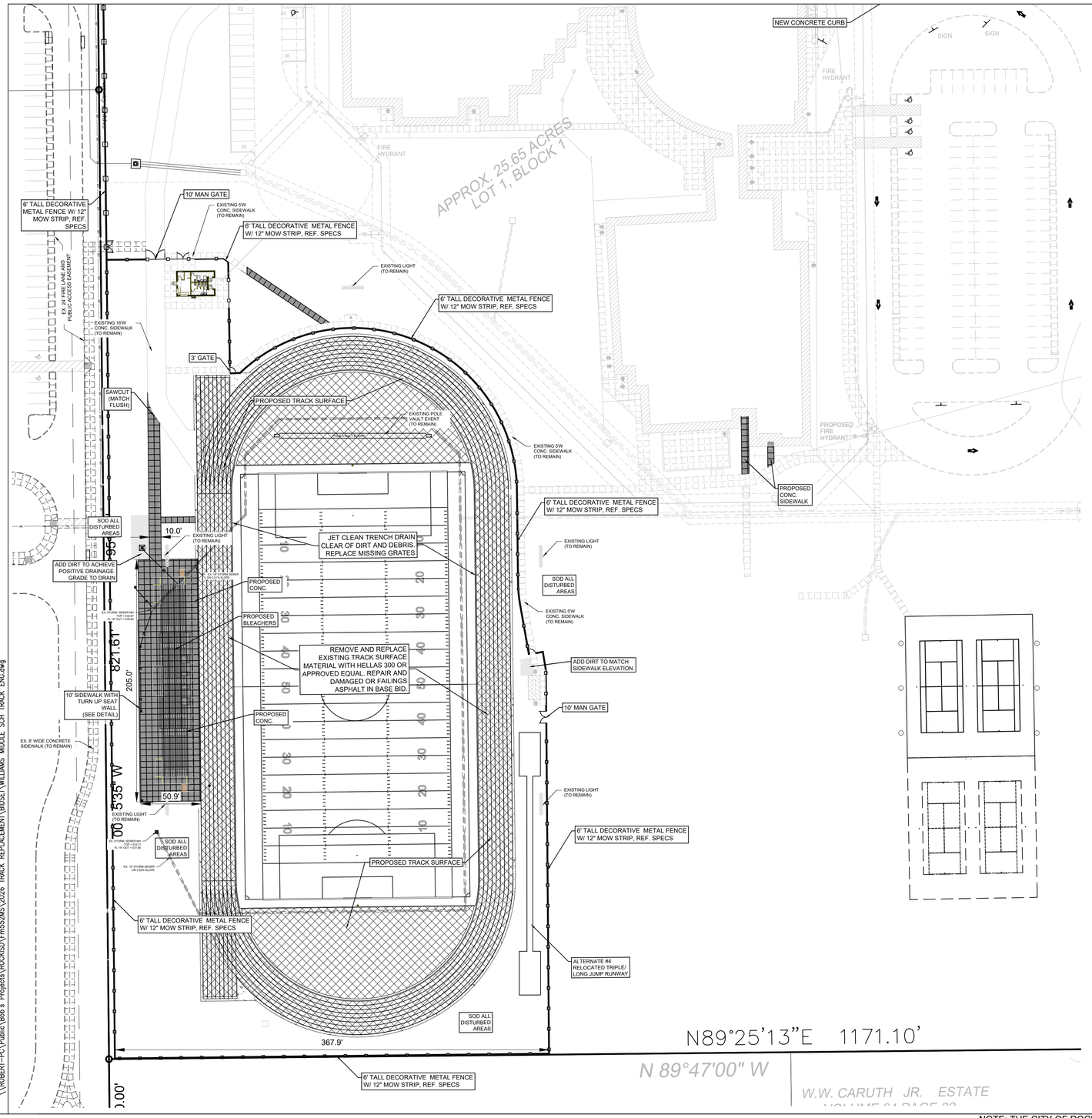
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

DEMOLITION PLAN - NORTH

JOB 23162.000
DATE 02/26/26
SHEET C02.01

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



Feb. 26, 2026 - 9:12am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

GENERAL SITE NOTES

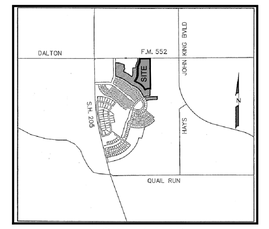
1. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS, THE PLANS INCLUDING ALL NOTES, THE CITY OF ROCKWALL SPECIFICATIONS AND ANY OTHER APPLICABLE STANDARDS OR SPECIFICATIONS RELEVANT TO THE PROPER COMPLETION OF THE WORK SPECIFIED. FAILURE ON THE PART OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL STANDARDS OR SPECIFICATIONS PERTAINING TO THIS WORK SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR PERFORMING THE WORK IN ACCORDANCE WITH ALL SUCH APPLICABLE STANDARDS AND SPECIFICATIONS.
2. CONTRACTOR SHALL HAVE IN HIS POSSESSION, PRIOR TO CONSTRUCTION, ALL NECESSARY PERMITS, LICENSES, ETC. CONTRACTOR SHALL HAVE AT LEAST ONE SET OF APPROVED ENGINEERING PLANS AND SPECIFICATIONS ON-SITE AT ALL TIMES.
3. ALL WORK SHALL CONFORM TO THE CITY OF ROCKWALL SPECIFICATIONS, STANDARDS, AND DETAILS.
4. IF UNFORESEEN PROBLEMS OR CONFLICTS ARE ENCOUNTERED IN THE CONSTRUCTION, FOR WHICH AN IMMEDIATE SOLUTION IS NOT APPARENT, THE ENGINEER, OWNER, AND CITY SHALL BE NOTIFIED IMMEDIATELY.
5. IT WILL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES FOR LINE LOCATIONS, PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL ASSUME FULL LIABILITY TO THOSE COMPANIES FOR ANY DAMAGES CAUSED TO THEIR FACILITIES.
6. CONTRACTORS SHALL BE RESPONSIBLE FOR FIELD LOCATING EXISTING UTILITIES AND IMPROVEMENTS PRIOR TO CONSTRUCTION.
7. TRENCH SAFETY DESIGN WILL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR. CONTRACTOR SHALL SUBMIT DESIGN TO THE CITY OF ROCKWALL ENGINEERING DEPARTMENT FOR REVIEW.
8. ADHERENCE TO ENGINEERING AND FIRE DEPARTMENT STANDARDS SHALL BE REQUIRED.

0 20 40 80
Scale: 1"=40'

PAVING LEGEND

PROPOSED 4" REINFORCED CONCRETE SIDEWALK 3,000 PS 5.5 SACK MACHINE FINISH WITH #3 REBARS ON 18" CENTERS EACH WAY.

PROPOSED TRACK SURFACE



VICINITY MAP
N.T.S.

CORGAN
Dallas, TX 75202
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ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS

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GLENN ENGINEERING
TEXAS REGISTRATION # F-303
PHONE (972) 717-5151
4500 FULLER DRIVE, SUITE 220
HUB # 1752575195300
FAX (972) 717-2176
IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
103059
CENSED
ENGINEER

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Date of issue:
02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

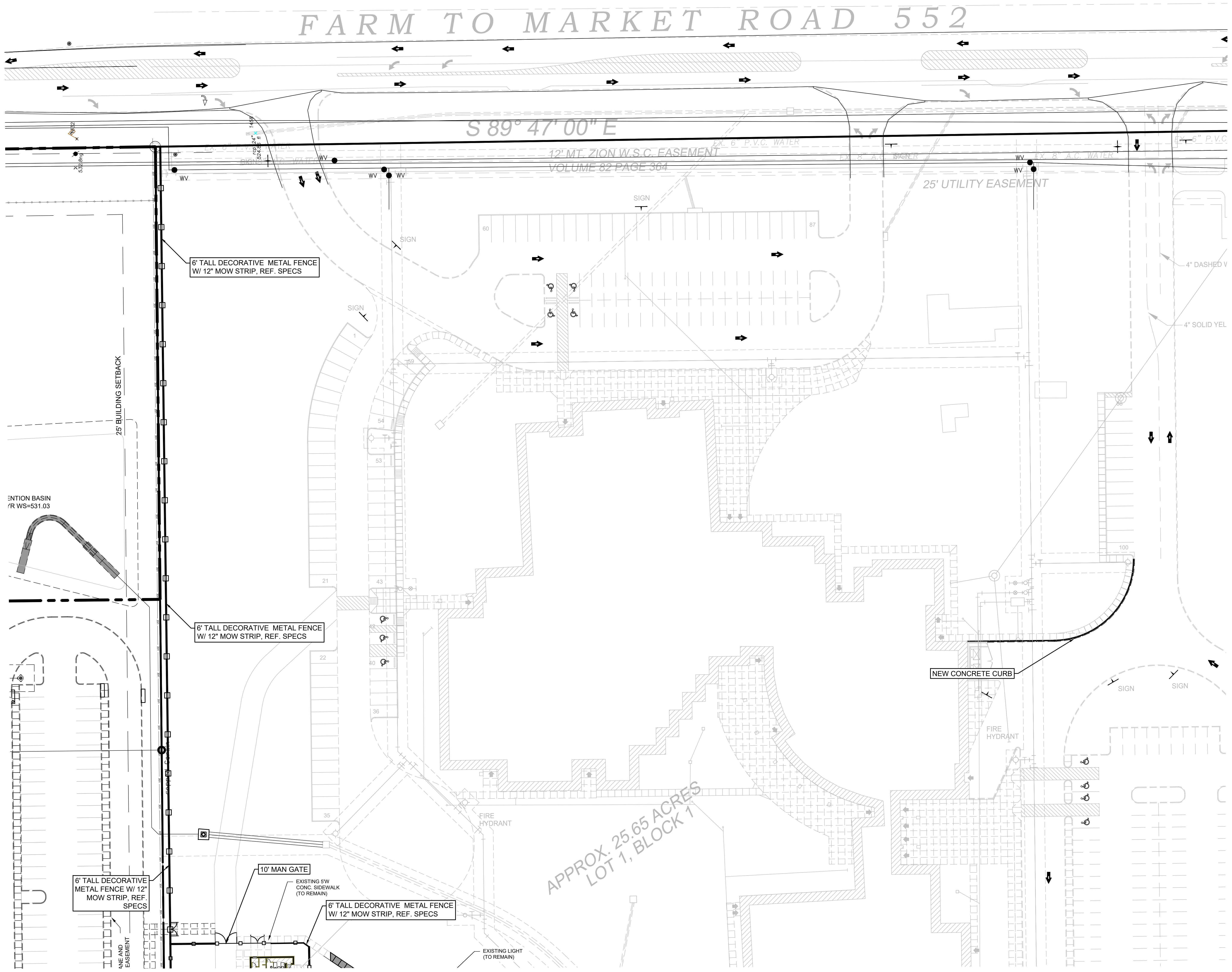
625 E FM 552, Rockwall, TX 75087

SITE/ PAVING PLAN

JOB 23162.000
DATE 02/26/26
SHEET C03.00

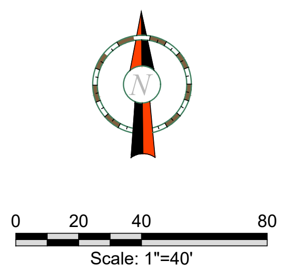
OWNER	ARCHITECT	ENGINEER
ROCKWALL I.S.D. 1050 WILLIAMS STREET ROCKWALL, TEXAS 75087 972-771-0605	CORGAN 401 N. HOUSTON STREET DALLAS, TEXAS 75202 (972) 977-3587	GLENN ENGINEERING 4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038 (972) 717-5151

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



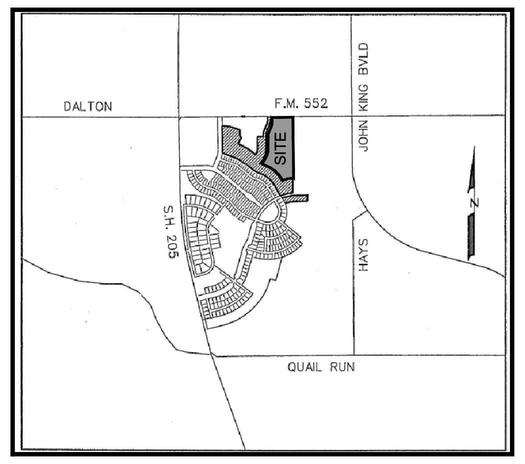
GENERAL SITE NOTES

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PAVING LEGEND

▦	PROPOSED 4" REINFORCED CONCRETE SIDEWALK 3,000 PS 5.5 SACK MACHINE FINISH WITH #3 REBARS ON 18" CENTERS EACH WAY.
⁘	PROPOSED 6" REINFORCED CONCRETE PAVEMENT 3,600 P.S.I. CONCRETE, 6 1/2 SACK HAND FINISH 6 SACK MACHINE FINISH WITH #4 REBARS ON 18" CENTERS EACH WAY OVER 6 INCHES 6% LIME STABILIZED SUBGRADE PER CITY STANDARDS



VICINITY MAP
N.T.S.

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○ ISSUES		
1	02/26/26	ISSUE FOR CONSTRUCTION

△ REVISIONS		
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GLENN ENGINEERING

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IRVING, TEXAS 75038

MIKE GLENN
35059

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Date of issue:
02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

SITE/ PAVING PLAN - NORTH

OWNER

ROCKWALL I.S.D.
1050 WILLIAMS STREET
ROCKWALL, TEXAS 75087
972-771-0605

ARCHITECT

CORGAN
401 N. HOUSTON STREET
DALLAS, TEXAS 75202
(972) 977-3587

ENGINEER

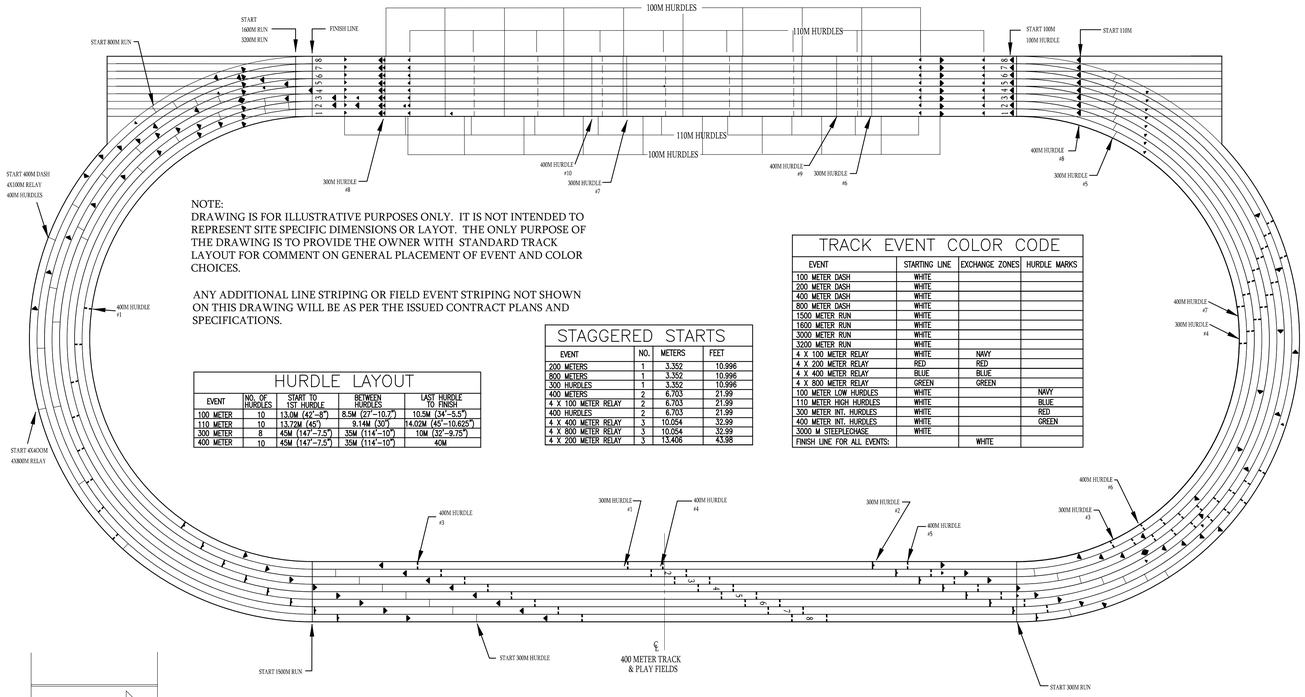
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JOB 23162.000
DATE 02/26/26
SHEET
C03.01

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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

HIGH SCHOOL COMPETITION
400 METER TRACK



NOTE:
DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. IT IS NOT INTENDED TO REPRESENT SITE SPECIFIC DIMENSIONS OR LAYOT. THE ONLY PURPOSE OF THE DRAWING IS TO PROVIDE THE OWNER WITH STANDARD TRACK LAYOUT FOR COMMENT ON GENERAL PLACEMENT OF EVENT AND COLOR CHOICES.

ANY ADDITIONAL LINE STRIPING OR FIELD EVENT STRIPING NOT SHOWN ON THIS DRAWING WILL BE AS PER THE ISSUED CONTRACT PLANS AND SPECIFICATIONS.

TRACK EVENT COLOR CODE

EVENT	STARTING LINE	EXCHANGE ZONES	HURDLE MARKS
100 METER DASH	WHITE		
200 METER DASH	WHITE		
400 METER DASH	WHITE		
800 METER DASH	WHITE		
1500 METER RUN	WHITE		
1600 METER RUN	WHITE		
3000 METER RUN	WHITE		
3200 METER RUN	WHITE		
4 X 100 METER RELAY	WHITE	NAVY	
4 X 200 METER RELAY	RED	RED	
4 X 400 METER RELAY	BLUE	BLUE	
4 X 800 METER RELAY	GREEN	GREEN	
100 METER LOW HURDLES	WHITE		NAVY
110 METER HIGH HURDLES	WHITE		BLUE
300 METER INT. HURDLES	WHITE		RED
400 METER INT. HURDLES	WHITE		GREEN
3000 M STEEPLECHASE	WHITE		
FINISH LINE FOR ALL EVENTS:		WHITE	

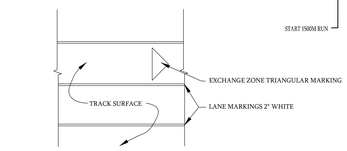
HURDLE LAYOUT

EVENT	NO. OF HURDLES	START TO 1ST HURDLE	BETWEEN HURDLES	LAST HURDLE TO FINISH
100 METER	10	13.0M (42'-8")	8.5M (27'-10.7")	10.5M (34'-5.5")
110 METER	10	13.72M (45')	9.14M (30')	14.02M (45'-10.625")
300 METER	8	45M (147'-7.5")	35M (114'-10")	10M (32'-9.75")
400 METER	10	45M (147'-7.5")	35M (114'-10")	40M

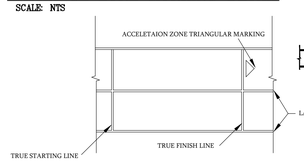
STAGGERED STARTS

EVENT	NO.	METERS	FEET
200 METERS	1	3.352	10.996
800 METERS	1	3.352	10.996
300 HURDLES	1	3.352	10.996
400 METERS	2	6.703	21.99
4 X 100 METER RELAY	2	6.703	21.99
400 HURDLES	2	6.703	21.99
4 X 400 METER RELAY	3	10.054	32.99
4 X 800 METER RELAY	3	10.054	32.99
4 X 200 METER RELAY	3	13.406	43.98

400 METER EVENT MARKING LAYOUT
SCALE: NTS



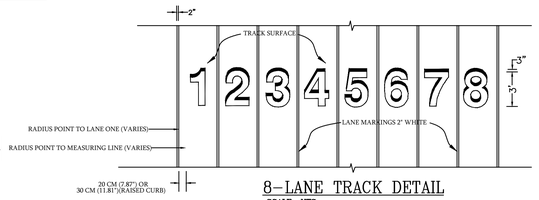
EXCHANGE ZONE MORKING DETAIL
SCALE: NTS



TRACK MARKING DETAIL
SCALE: NTS



TYPICAL RELAY EXCHANGE ZONE
SCALE: NTS



8-LANE TRACK DETAIL
SCALE: NTS

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ISSUES

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STATE OF TEXAS
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

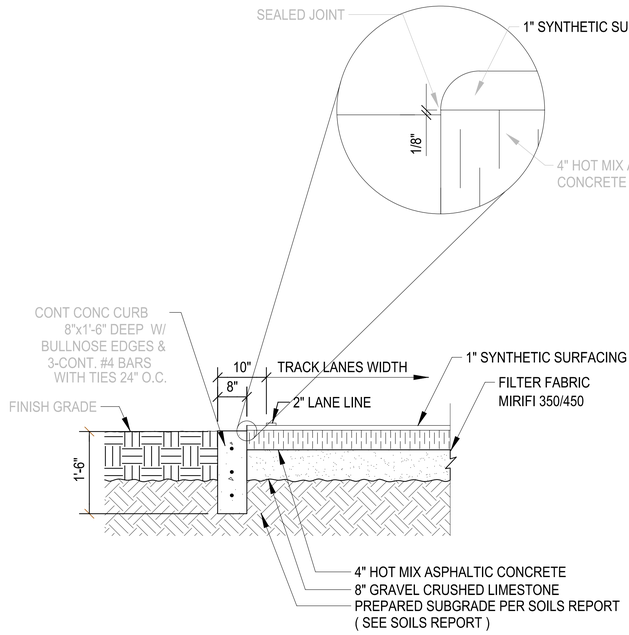
625 E FM 552, Rockwall, TX 75087

TRACK DETAILS

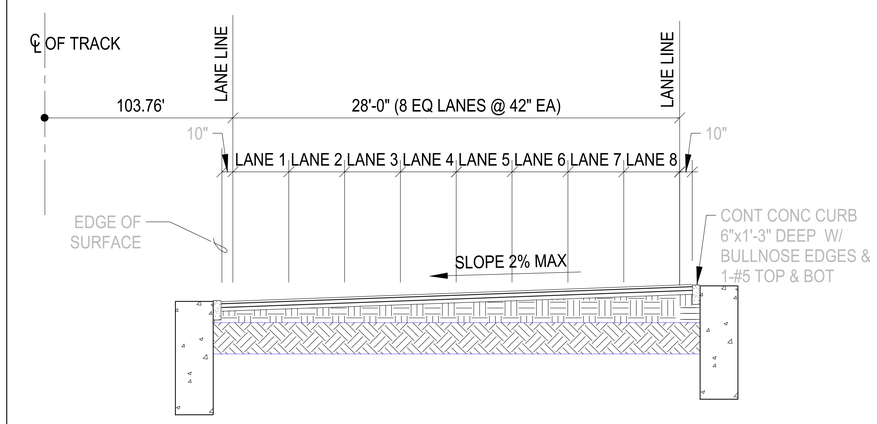
JOB 23162.000
DATE 02/26/26
SHEET C03.50

Feb 26, 2026 - 9:13am User: Robert
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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



A1	TRACK PAVEMENT DETAIL
NTS	



NOTES
1. TRACK LANES SHALL BE 42" WIDE, TYP
2. LANE STRIPING SHALL BE IN ACCORDANCE WITH THE STATE HIGH SCHOOL ASSOCIATION FOR 400 METER TRACKS, TYP
3. REFER TO CIVIL GRADING PLAN FOR STORM DRAIN & FINISHED TRACK ELEVATIONS, TYP

A2	TYPICAL TRACK SECTION
NTS	

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ISSUES

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IRVING, TEXAS 75038

STATE OF TEXAS MIKE GLENN 135559 LICENSED PROFESSIONAL ENGINEER

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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

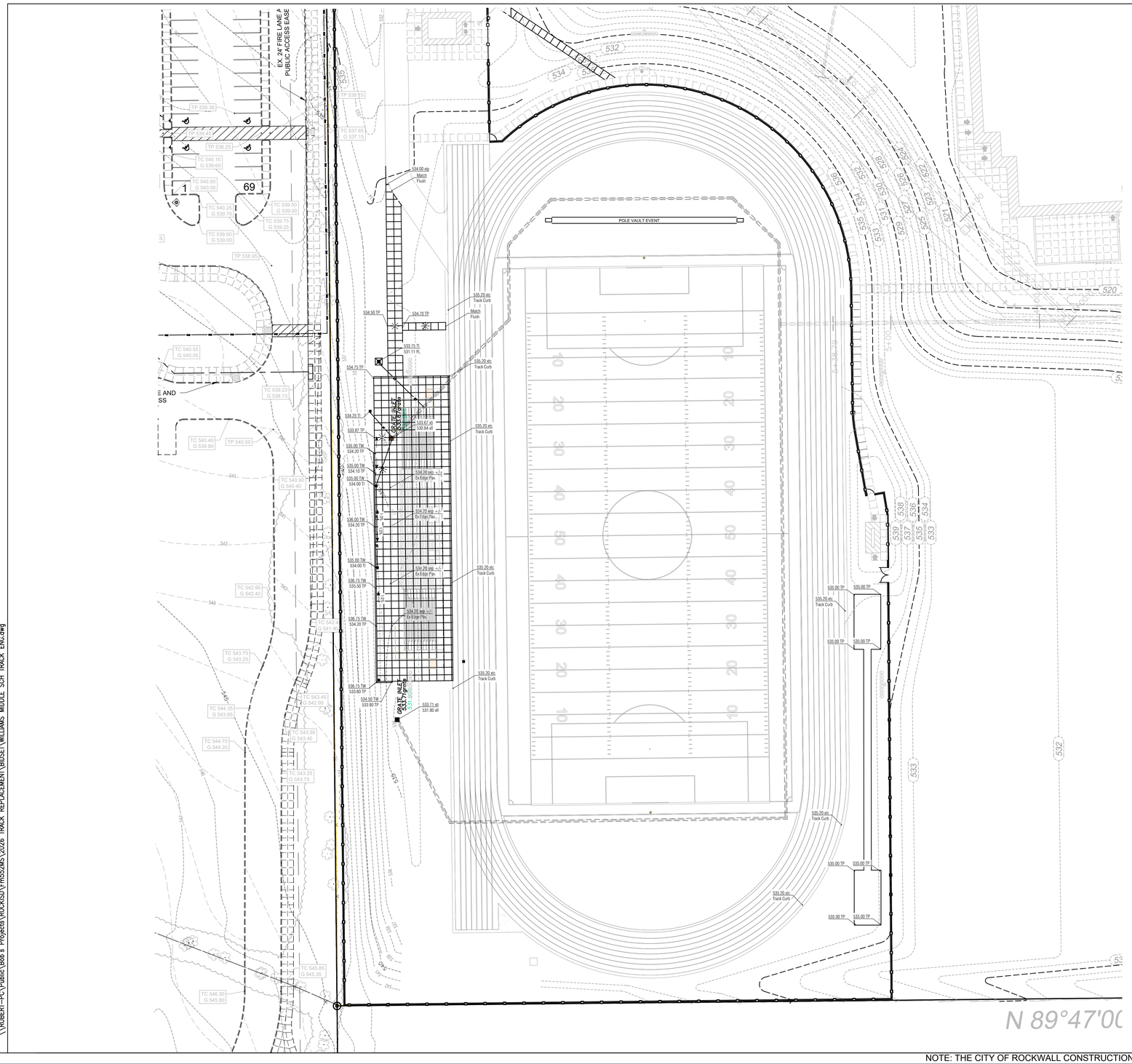
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TRACK PAVING DETAILS

JOB 23162.000
DATE 02/26/26
SHEET C03.51

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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL GRADING NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THESE PLANS AND CITY OF ROCKWALL STANDARDS AND SPECIFICATIONS.
2. ALL PROPOSED CONTOURS ARE APPROXIMATE. PROPOSED SPOT ELEVATIONS AND DESIGNATED GRADIENT ARE TO BE USED IN THE EVENT OF ANY DISCREPANCIES.
3. THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF ANY CONSTRUCTION. IN THE EVENT OF ANY CONFLICT AND PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION, IMMEDIATELY NOTIFY ENGINEER. MINOR ADJUSTMENTS OF FINISHED GRADE TO ACCOMPLISH SPOT DRAINAGE ARE ACCEPTABLE.
4. POSITIVE DRAINAGE SHALL BE PROVIDED AWAY FROM ALL FOUNDATIONS AND STRUCTURES.
5. ALL SPOT ELEVATIONS ARE TOP OF PAVEMENT OR GUTTER. TO OBTAIN TOP OF CURB ELEVATION, ADD 0.5 FEET.
6. GROUND SHALL BE SCARIFIED PRIOR TO PLACING ANY FILL.
7. FILL SHALL BE PLACED IN ACCORDANCE WITH THE GEOTECHNICAL INVESTIGATION AND SOILS REPORT RECOMMENDATIONS.
8. ANY EXCESS EXCAVATION SHALL BE DISTRIBUTED AS DIRECTED BY THE OWNER OR THE ENGINEER.
9. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND/OR ESTABLISH A BENCHMARK PRIOR TO CONSTRUCTION AND MAINTAIN THE BENCHMARK DURING CONSTRUCTION.
10. THE LOCATIONS OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE PUBLIC RECORDS. THE EXACT LOCATION AND DEPTH OF ALL UTILITIES INDICATED MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.
11. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES IN THE CONSTRUCTION OF THIS PROJECT. ANY UTILITIES DAMAGED DURING THE CONSTRUCTION OF THIS PROJECT SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
12. NO WEEP HOLES SHALL BE COVERED.
13. THIS SITE IS ASSUMED TO BE A BALANCED SITE BY ADJUSTING THE THE BENCHMARK ELEVATION . THE CONTRACTOR SHALL INFORM THE ENGINEERING OF THE ADJUSTMENT TO THE BENCHMARK TO ACHIEVE THE BALANCED SITE.

0 15 30 60
Scale: 1"=30'

GRADING LEGEND

F.F.E.=588.00	FINISH FLOOR (NEW)
550	MAJOR CONTOUR (NEW)
551	MINOR CONTOUR (NEW)
550	MAJOR CONTOUR (EXISTING)
551	MINOR CONTOUR (EXISTING)
TC 539.40 G 538.90	TOP OF CURB/GUTTER
TP 538.95	TOP OF PAVEMENT
GR 542.83	FINISHED GRADE
TW 543.40	TOP OF SIDEWALK
TI 540.42	TOP OF INLET

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ISSUES		
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

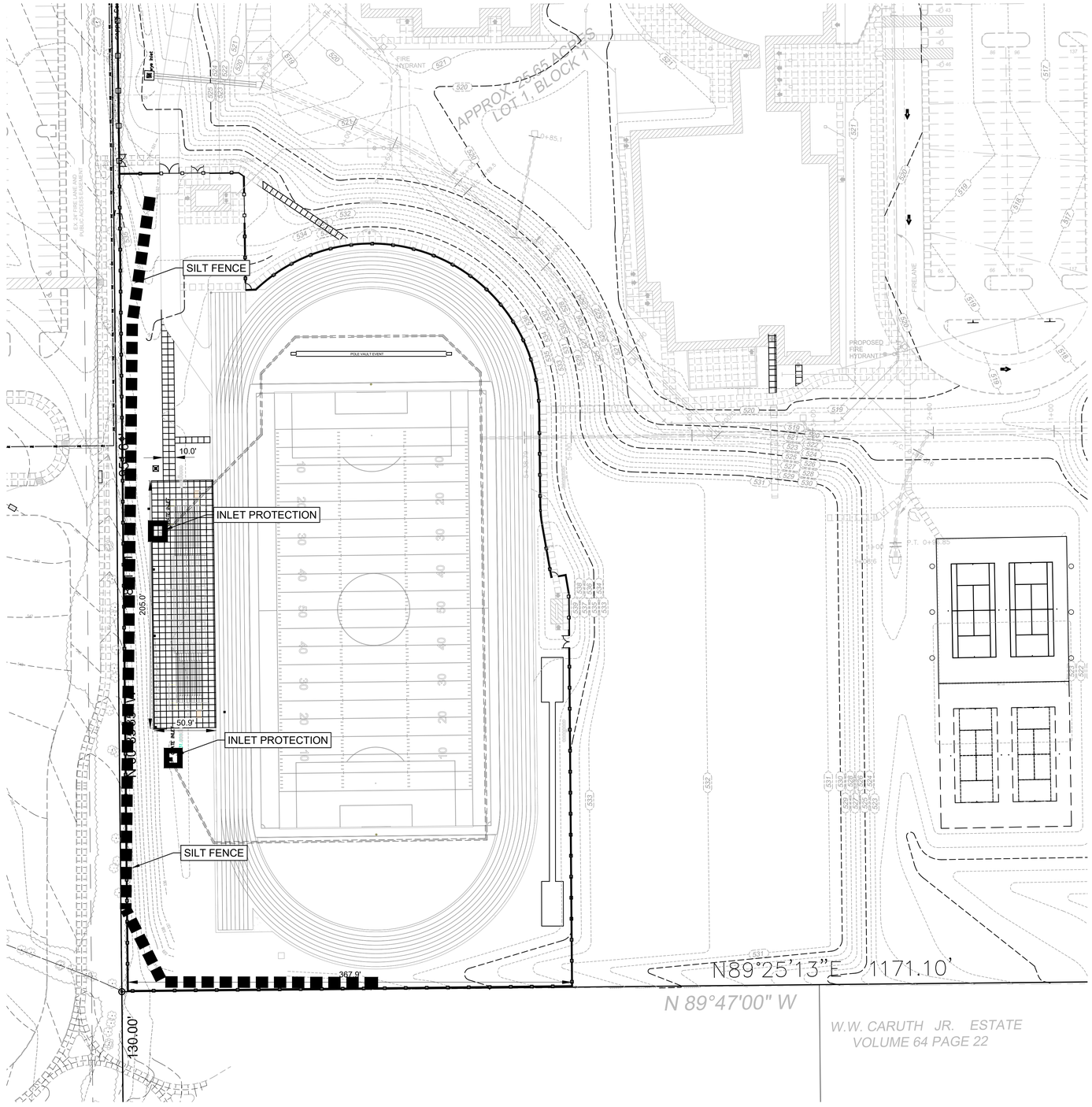
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GRADING PLAN

JOB 23162.000
DATE 02/26/26
SHEET C04.00

Feb 26, 2026 - 9:14am User: Robert
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NOTE:
SEE SWPPP DETAILS
SHEET C04.02-C04.03

SEDIMENT CONTROL NOTES:

1. CONTRACTOR TO CHOOSE LOCATION OF CONSTRUCTION ENTRANCE. THIS ENTRANCE MUST BE USED BY ALL TRAFFIC ENTERING OR EXITING THE SITE. SEE SHEET C4.05 FOR STABILIZED CONSTRUCTION ENTRANCE DETAILS.
2. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD. THE STONE FROM ROCK CHECK DAMS SHALL BE USED AS ENERGY DISSIPATORS FOR PROPOSED STORM SEWER AT CONSTRUCTION COMPLETION.
3. CURB INLET PROTECTION SHALL BE INSTALLED AS SOON AS STORM DRAINAGE HAS BEEN CONSTRUCTED.
4. PLYWOOD INLET PROTECTION TO BE PLACED AT UPSTREAM END OF ALL UNFINISHED PIPING AT DAYS END.
5. ALL SEDIMENT CONTROL MEASURES TO REMAIN IN PLACE UNTIL ENTIRE SITE IS STABILIZED.
6. THE EXTENT AND DURATION OF DISTURBANCE TO THE DRAINAGEWAYS SHALL BE MINIMIZED. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE FOLLOWED:
   A. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
   B. INSTALL SILT FENCE PRIOR TO DISTURBING SOIL. PERIMETER SILT FENCE TO BE INSTALLED OUTSIDE OF ANY POINT TO BE DISTURBED.
   C. DURING CONSTRUCTION, INLET PROTECTION SHALL BE INSTALLED AS NEEDED. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED PER CONTRACT REQUIREMENTS. ALL DISTURBED AREAS WHICH ARE INACTIVE FOR LONG PERIODS OF TIME SHALL BE VEGETATED.
   D. ONLY WHEN ENTIRE SITE IS STABILIZED AND CONSTRUCTION IS COMPLETE, SHALL SEDIMENT CONTROL MEASURES BE REMOVED.
7. CONTRACTOR SHALL CONTROL MUD ACCUMULATION ON ALL STREETS SURROUNDING THE PROJECT. NO MUD ACCUMULATION WILL BE ALLOWED IN PUBLIC STREETS.
8. MAINTAIN ALL FILTERS DURING CONSTRUCTION TO PREVENT ANY BLOCKAGES FROM ACCUMULATED SEDIMENT.
9. ALL PROPOSED PARKING AREAS TO BE PAVED AS SOON AS POSSIBLE AFTER SUBGRADE IS PREPARED.
10. 80% OF ALL DISTURBED AREA SHALL BE COVERED (1 INCH IN HEIGHT) BY GRASS PRIOR TO CITY ACCEPTANCE.
11. ALL DETENTION FACILITIES SHALL BE INSTALLED AND FUNCTIONAL PER PLANS PRIOR TO ANY PAVING BEING PLACED ON SITE INCLUDING BUILDING FOUNDATION.
12. ALL SIDES, SLOPES AND TOP OF DETENTION BASIN SHALL BE SODDED OR ANCHORED ON SEEDED CURLEX PRIOR TO ANY PAVING BEING PLACED INCLUDING BUILDING FOUNDATION.
13. DETENTION BASIN SHALL BE UTILIZED AS SEDIMENT CONTROL BASIN DURING CONSTRUCTION OPERATIONS AND SHALL BE SIZED AND DETAILED PER THE REQUIREMENTS OF TCEQ.
14. ALL RIGHT-OF-WAYS TO BE SODDED.

LEGEND

- = INSTALL SILT FENCE
- = INSTALL ROCK CHECK DAM
- = INSTALL CURB INLET PROTECTION
- = INSTALL AREA DRAIN INLET PROTECTION
- = INSTALL SEDIMENT POND AT CURB INLET, WYE INLET OR AREA DRAIN

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CORGAN
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ISSUES		
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4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

MIKE GLENN 135059 LICENSED PROFESSIONAL ENGINEER

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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

SWPPP PLAN

JOB 23162.000
DATE 02/26/26
SHEET C04.01

Feb. 26, 2026 - 9:16am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.

SITE DESCRIPTION

PROJECT NAME & LOCATION: WILLIAMS MIDDLE SCHOOL
625 FM ROAD 552
ROCKWALL, TEXAS 75087

OWNER NAME & ADDRESS: ROCKWALL INDEPENDENT SCHOOL DISTRICT
1050 WILLIAMS STREET
ROCKWALL, TEXAS

PROJECT DESCRIPTION: TRACK, PAVING REPLACEMENT

SEQUENCE OF MAJOR ACTIVITIES:
PLACEMENT OF EROSION CONTROL DEVICES
REMOVAL OF TOP LAYER OF TRACK
REMOVAL OF CONCRETE PAVEMENT
REMOVAL OF FENCING
PLACEMENT OF TRACK SURFACING
PLACEMENT OF CONCRETE PAVEMENT
PLACEMENT OF FENCING
PLACEMENT OF LANDSCAPE AND GRASS
REMOVAL OF EROSION CONTROL DEVICES

MAJOR SOIL DISTURBING ACTIVITIES:
DENUDE SITE
PLACEMENT OF CONCRETE
PLACEMENT OF LANDSCAPE AND GRASS

PRE-DEVELOPMENT RUNOFF COEFFICIENT: 0.50

FINAL RUNOFF COEFFICIENT AFTER CONSTRUCTION: 0.70

TOTAL PROJECT AREA: 25.0 +/- ACRES

TOTAL AREA TO BE DISTURBED: 9.0 +/- ACRES

DESCRIPTION OF EXISTING SOIL: CLAY SOILS

DESCRIPTION OF STABILIZATION OF EXISTING DRAINAGE WAYS:
SILT FENCE
INLET PROTECTION
DETENTION BASIN / SEDIMENT BASIN

DESCRIPTION OF EXISTING QUALITY OF STORM WATER DISCHARGE FOR SITE (IF AVAILABLE):
CITY STREETS
EXISTING STREAM

NAME OF RECEIVING WATERS:
CITY CURB AND GUTTER
CURB AND GUTTER ALONG ROADWAYS
ENCLOSED STORM SEWERS
COTTONWOOD CREEK/LAKE RAY HUBBARD

ADDITIONAL COMMENTS:

ESTIMATED PROJECT START DATE: FEBRUARY 2026

ESTIMATED PROJECT END DATE: JANUARY 2027

LATITUDE:

LONGITUDE

NAME OF RECEIVING WATER CREEK TO LAKE RAY HUBBARD

SEQUENCE AND TIMING OF INDICATED EROSION CONTROL PRACTICES AND/OR FEATURES

(INCLUDE TREATMENT OF STOCKPILED DIRT FOR FUTURE USE)

PRIOR TO STARTING CONSTRUCTION:
PLACEMENT OF SILT FENCES
INSTALLATION OF INLET PROTECTION FOR STREET INLETS

DURING CONSTRUCTION:
INSPECTION AND MAINTENANCE OF SILT FENCES
INSTALLATION OF INLET PROTECTION FOR ON-SITE PAVING

COMPLETION OF SITE:
INSTALLATION OF LANDSCAPE AND GRASS
REMOVAL OF EROSION CONTROL DEVICES

SITE RATING FACTOR UTILIZING INDICATED EROSION CONTROL & MEASURES = 0.70
(MUST BE 0.70 OR LARGER)

EROSION AND SEDIMENT CONTROLS

STABILIZATION PRACTICES

DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 21 DAYS.

TEMPORARY	PERMANENT	
X	X	SEED OR SOD
	X	VEGETATION OTHER THAN SEED OR SOD
X	X	EROSION CONTROL MATS
		PRESERVATION OF NATURAL VEGETATION
		OTHER (DESCRIBE)

ADDITIONAL COMMENTS:

STRUCTURAL PRACTICES

TEMPORARY	PERMANENT	
X		SILT FENCE
		HAY BALES
		ROCK BERMS
		DIVERSION,INTERCEPTOR, OR PERIMETER DIKES
		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
		PIPE SLOPE DRAIN
		TRIANGULAR SEDIMENT FILTER DIKE
X		INLET PROTECTION
		STONE OUTLET SEDIMENT TRAP
		SEDIMENT BASIN (REQUIRED FOR 10 ACRES OR LARGER WHERE ATTAINABLE)
		CHECK DAM
		TEMPORARY SEDIMENT TANK
X		STABILIZED CONSTRUCTION ENTRY
		SANDBAG BERM
		OTHER (DESCRIBE):

ADDITIONAL COMMENTS:

OTHER ADDITIONAL STORM WATER MANAGEMENT FEATURES

PERMANENT	
X	CURB & GUTTER
X	STORM SEWER INLETS
X	STORM SEWER
X	CULVERTS
	STORM WATER DETENTION POND
	VELOCITY DISSIPATION DEVICES
	OTHER (DESCRIBE):

ADDITIONAL COMMENTS:

EROSION AND SEDIMENT CONTROLS

MAINTENANCE/INSPECTION PROCEDURES

1. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A RAIN GAUGE UTILIZING MIN. 0.1 INCH INCREMENTS AT THE PROJECT SITE.
2. CONTROL MEASURES WILL BE INSPECTED AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF ANY STORM EVENT OF 0.5 INCH OR GREATER. IF A REPAIR IS NECESSARY IT WILL BE DONE AT THE EARLIEST PRACTICABLE DATE.
3. INSPECTION WILL BE PERFORMED BY THE OWNERS REPRESENTATIVE AT LEAST ONCE A WEEK AS WELL AS AFTER EVERY 0.5 INCH OF RAIN OR GREATER. AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE FOR EACH INSPECTION AND KEPT AT THE PROJECT SITE. THE INSPECTION SHOULD USE THE OPERATOR INSPECTION FORM IN THE NCTCOG CONSTRUCTION BMP MANUAL OR OTHER FORM APPROVED BY THE CITY.
4. THE CONTRACTOR SHALL KEEP RECORDS OF THE CONSTRUCTION ACTIVITY ON THE SITE.

OTHER (DESCRIBE)

OTHER BEST MANAGEMENT (HOUSEKEEPING) PRACTICES
THE FOLLOWING INDICATED PRACTICES SHALL BE FOLLOWED:

LIME STABILIZATION
X ATTACHED BMP S-11 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

SOLID WASTE MANAGEMENT
X ATTACHED BMP W-2 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

HAZARDOUS WASTE MANAGEMENT
X ATTACHED BMP W-2 FROM NCTCOG CONSTRUCTION BMP MANUAL
— STORAGE AREAS (DESCRIBE):

— OTHER (DESCRIBE):

CONCRETE WASTE MANAGEMENT
X ATTACHED BMP W-3 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

SANDBLASTING WASTE MANAGEMENT
X ATTACHED BMP W-4 FROM NCTCOG CONSTRUCTION BMP MANUAL
— OTHER (DESCRIBE):

DUST REDUCTION MEASURES
X DISTURBED AREAS DAMPENED PERIODICALLY FOR DUST CONTROL
— EXCESS DIRT ON ADJACENT ROADS REMOVED DAILY
— OTHER (DESCRIBE):

SIGNATORY REQUIREMENTS

THE CITY HAS ADOPTED THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) CONSTRUCTION BMP MANUAL. THESE OUTLINES WERE DEVELOPED AS AN AID FOR THOSE PREPARING STORM WATER POLLUTION PREVENTION PLANS (SW3P'S) FOR VARIOUS CONSTRUCTION ACTIVITIES IN THE CITY. THEIR USE DOES NOT RELIEVE THE DESIGN ENGINEER OR OPERATOR(S) FROM COMPLYING WITH THE NCTCOG BMP MANUAL OR THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGE FROM CONSTRUCTION SITES.

THE SW3P SHALL BE SEALED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND CERTIFIED BY THE OWNER THAT THE INFORMATION IS TRUE AND THAT THEY ASSUME RESPONSIBILITY FOR THE PLAN. ADDITIONALLY, THEY SHALL CERTIFY THAT THE PLAN MEETS STATE AND LOCAL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL AND STORM WATER QUALITY. IN ALL CASES, A DULY AUTHORIZED REPRESENTATIVE AS INDICATED IN THE GENERAL PERMIT MAY CERTIFY THIS PLAN.

PRIOR TO THE COMMENCEMENT OF WORK, THE OWNER AND GENERAL CONTRACTOR MUST SUBMIT NOTICES OF INTENT (NOI) AS CO-PERMITTEES TO DISCHARGE STORM WATER FROM A CONSTRUCTION SITE UNDER THE NPDES PERMIT. ADDITIONALLY, ALL CONTRACTORS AND SUBCONTRACTORS (INCLUDING FRANCHISE UTILITIES) WHOSE ACTIVITIES IMPACT THE SW3P MUST SIGN AN APPROVED CERTIFICATION THAT THEY UNDERSTAND THEIR RESPONSIBILITIES UNDER THE PLAN. NO WORK WILL BE ALLOWED UNTIL COPIES OF ALL APPROPRIATE NOI'S AND CERTIFICATIONS ARE RECEIVED BY THE CITY.

ALLOWABLE NON-STORM WATER DISCHARGES

- DISCHARGES FROM FIRE FIGHTING ACTIVITIES.
- FIRE HYDRANT FLUSHINGS. *
- WATER USED TO WASH VEHICLES OR CONTROL DUST.
- POTABLE WATER SOURCES (INCLUDING WATERLINE FLUSHINGS CONTAINING LESS THAN 1000 GALLONS). *
- UNCONTAMINATED GROUND WATER (INCLUDING DEWATERING GROUNDWATER INFILTRATION).
- FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS.
- SPRINGS, RIPARIAN HABITATS, WETLANDS AND UNCONTAMINATED GROUNDWATER.
- IRRIGATION WATER.
- EXTERIOR BUILDING WASH DOWN WITHOUT DETERGENTS.
- PAVEMENT WASH WATERS WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED (UNLESS ALL SPILL MATERIAL HAS BEEN REMOVED) AND WHERE DETERGENTS ARE NOT USED.
- AIR CONDITIONING CONDENSATE.

* HEAVILY CHLORINATED WATER (3.5 MG/L OR GREATER FREE CHLORINE) RESULTING FROM WATER LINE STERILIZATION SHALL BE DIRECTED UNDER PERMIT TO THE SANITARY SEWER UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL APPLY TO THE ENGINEERING DEPARTMENT FOR A SANITARY SEWER DISCHARGE PERMIT AFTER THE MANDATORY CHLORINE RETENTION TIME (USUALLY 24 HOURS). THE HEAVILY CHLORINATED WATER MAY BE DISCHARGED TO THE SANITARY SEWER, BEGINNING TWO WORKING DAYS AFTER PERMIT APPLICATION.

CORGAN
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ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS

1		

GLENN ENGINEERING
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IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
103059
REGISTERED
ENGINEER

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Date of issue:
02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

SWPPP DETAILS

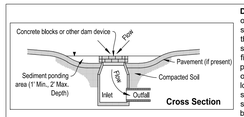
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3.4 Inlet Protection

Sediment Control



Cross Section

Description: Inlet protection consists of a variety of methods to intercept sediment at low point inlets through the use of depressed grading, filter stone, filter fabric, inlet inserts, organic filter tubes and other materials. The protection devices are placed around or across the inlet openings to provide localized detention or filtration of sediment and floatable materials in stormwater. Protection devices may be assembled onsite or purchased as manufactured assemblies.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Evaluate drainage patterns to ensure inlet protection will not cause flooding of roadway, property or structures
- Never block entire inlet opening
- Size according to drainage area and flow rates
- Include flow bypass for clogged controls and large storm events

ADVANTAGES / BENEFITS:

- May be the only feasible sediment control when all construction is located within rights-of-way

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness and reliability
- High maintenance requirements
- Has potential to flood roadways or adjacent properties

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and remove blockage of inlet after every storm event
- Remove sediment before it reaches half the design height or volume of the inlet protection, more frequently for curb inlets
- Repair or replace damaged materials
- Clean or replace filter stone and organic filter tubes is when clogged with sediment

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.35-0.65
(Depends on soil type)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *Traffic hazards*
- *Passage of larger storm events without causing flooding*
- *Flow diversion to other inlets or drainage points*

4.3 Concrete Waste Management

Waste Control

Description: Concrete waste at construction sites comes in two forms: 1) excess fresh concrete mix, including residual mix washed from trucks and equipment, and 2) concrete dust and concrete debris resulting from demolition. Both forms have the potential to impact water quality through stormwater runoff contact with the waste. The objective of concrete waste management is to dispose of these wastes in a manner that protects surface and ground water.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Prohibit the discharge of untreated concrete washout water
- Prohibit dumping waste concrete anywhere except at pre-determined, regulated, recycling or disposal sites
- Provide a washout containment with a minimum of 6 cubic feet of containment volume for every 10 cubic yards of concrete placed
- Minimum 1 foot freeboard on containment
- Minimum 10 mil plastic lining of containment
- Washout water evaporation and concrete recycling are the recommended disposal methods
- Educate drivers and operators on proper disposal and equipment cleaning procedures

LIMITATIONS:

- Does not address concrete sawcutting waste

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Check for and repair any damage to washout containment areas
- Clean up any overflow of washout pits
- Regularly remove and properly dispose of concrete waste

TARGETED POLLUTANTS

- ○ Sediment
- ● Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ● Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

IMPLEMENTATION CONSIDERATIONS

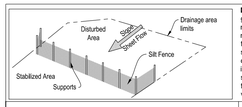
- ◒ Capital Costs
- ◒ Maintenance
- ● Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

3.10 Silt Fence

Sediment Control



Description: A silt fence consists of geotextile fabric supported by wire mesh netting or other backing stretched between metal posts with the lower edge of the fabric securely embedded six-inches in the soil. The fence is typically located downstream of disturbed areas to intercept runoff in the form of sheet flow. A silt fence provides both filtration and time for sediment setting by reducing the velocity of the runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Maximum drainage area of 0.25 acre per 100 linear feet of silt fence
- Maximum 200 feet distance of flow to silt fence; 50 feet if slope exceeds 10 percent
- Minimum fabric overlap of 3 feet at abutting ends; join fabric to prevent leakage
- Turn end of silt fence line upslope a minimum of 10 feet
- Install stone overflow structure at low points or spaced at approximately 300 feet if no apparent low point

ADVANTAGES / BENEFITS:

- Economical means to treat sheet flow
- Most effective with coarse to silty soil types

DISADVANTAGES / LIMITATIONS:

- Limited effectiveness with clay soils due to clogging
- Localized flooding due to minor ponding at the upslope side of the silt fence
- Not for use as check dams in swales or low areas subject to concentrated flow
- Not for use where soil conditions prevent a minimum toe-in depth of 6 inches or installation of support posts to a depth of 12 inches
- Can fail structurally under heavy storm flows, creating maintenance problems and reducing effectiveness

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair undercutting, sags and other fence failures
- Remove sediment before it reaches half the height of the fence
- Repair or replace damaged or clogged filter fabric

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.50-0.75
(Depends on soil type)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *Effects of ponding or the redirection of flow onto adjacent areas and property*

4.4 Debris and Trash Management

Waste Control

Description: Large volumes of debris and trash are often generated at construction sites, including packaging, pallets, wood waste, personal trash, scrap material, and a variety of other wastes. The objective of debris and trash management is to minimize the potential of stormwater contamination from solid waste through appropriate storage and disposal practices. Recycling of construction debris is encouraged to reduce the volume of material to be disposed of and associated costs of disposal.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Implement a job-site waste handling and disposal education and awareness program
- Provide sufficient and appropriate waste storage containers
- Provide timely removal of stored solid waste materials
- Train workers and monitor compliance

LIMITATIONS:

- Only addresses non-hazardous solid waste
- One part of a comprehensive construction site waste management program

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Empty waste containers regularly
- Clean up loose trash and debris daily
- Verify procedures are being followed
- Train new employees and regularly re-train all employees

TARGETED POLLUTANTS

- ○ Sediment
- ● Nutrients & Toxic Materials
- ○ Oil & Grease
- ● Floatable Materials
- ● Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

IMPLEMENTATION CONSIDERATIONS

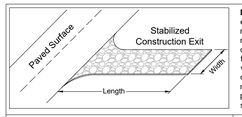
- ◒ Capital Costs
- ◒ Maintenance
- ● Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

3.11 Stabilized Construction Exit

Sediment Control



Description: A stabilized construction exit is a pad of crushed stone, recycled concrete or other rock material placed on geotextile filter cloth to dislodge soil and other debris from construction equipment and vehicle tires prior to exiting the construction site. The object is to minimize the tracking of soil onto public roadways where it will be suspended by stormwater runoff.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Slope exit away from offsite paved surface
- Minimum width and length dependent on size of disturbed area, which correlates to traffic volume
- 6 inches minimum thickness of stone layer
- Stone of 3 to 5 inches in size
- Add a wheel cleaning system when inspections reveal the stabilized exit does not prevent tracking

ADVANTAGES / BENEFITS:

- Reduces tracking of soil onto public streets
- Directs traffic to a controlled access point
- Protects other sediment controls by limiting the area disturbed

DISADVANTAGES / LIMITATIONS:

- Effectiveness dependent on limiting ingress and egress to the stabilized exit
- A wheel washing system may also be required to remove clay soil from tires, particularly in wet conditions

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Replace rock when sediment in the void area between the rocks is visible on the surface
- Periodically re-grade and top dress with additional stone to maintain efficiency

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=N/A

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ○ Suitability for Slopes > 5%

Other Considerations:

- *None*

EROSION CONTROL NOTES

THE CITY HAS ADOPTED THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) CONSTRUCTION BMP MANUAL. THESE OUTLINES WERE DEVELOPED AS AN AID FOR THOSE PREPARING STORM WATER POLLUTION PREVENTION PLANS (SW3P'S) FOR VARIOUS CONSTRUCTION ACTIVITIES IN THE CITY. THEIR USE DOES NOT RELIEVE THE DESIGN ENGINEER OR OPERATOR(S) FROM COMPLYING WITH THE NCTCOG BMP MANUAL OR THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGE FROM CONSTRUCTION SITES.

CONTRACTOR SHALL PREPARE A SW3P SEALED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER AND CERTIFIED BY THE OWNER THAT THE INFORMATION IS TRUE AND THAT THEY ASSUME RESPONSIBILITY FOR THE PLAN. ADDITIONALLY, THEY SHALL CERTIFY THAT THE PLAN MEETS STATE AND LOCAL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL AND STORM WATER QUALITY. IN ALL CASES, A DULY AUTHORIZED REPRESENTATIVE AS INDICATED IN THE GENERAL PERMIT MAY CERTIFY THIS PLAN.

PRIOR TO THE COMMENCEMENT OF WORK, THE OWNER AND GENERAL CONTRACTOR MUST SUBMIT NOTICES OF INTENT (NOI) AS CO-PERMITTEES TO DISCHARGE STORM WATER FROM A CONSTRUCTION SITE UNDER THE NPDES PERMIT. ADDITIONALLY, ALL CONTRACTORS AND SUBCONTRACTORS (INCLUDING FRANCHISE UTILITIES) WHOSE ACTIVITIES IMPACT THE SW3P MUST SIGN AN APPROVED CERTIFICATION THAT THEY UNDERSTAND THEIR RESPONSIBILITIES UNDER THE PLAN. NO WORK WILL BE ALLOWED UNTIL COPIES OF ALL APPROPRIATE NOI'S AND CERTIFICATIONS ARE RECEIVED BY THE CITY.

CONTRACTOR TO CHOOSE LOCATION OF CONSTRUCTION ENTRANCE. THIS ENTRANCE MUST BE USED BY ALL TRAFFIC ENTERING OR EXITING THE SITE.

SEDIMENT CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD. THE STONE FROM ROCK CHECK DAMS SHALL BE USED AS ENERGY DISSIPATERS FOR PROPOSED STORM SEWER AT CONSTRUCTION COMPLETION.

CURB INLET PROTECTION SHALL BE INSTALLED AS SOON AS STORM DRAINAGE HAS BEEN CONSTRUCTED.

PLYWOOD INLET PROTECTION TO BE PLACED AT UPSTREAM END OF ALL UNFINISHED PIPING AT DAYS END.

ALL SEDIMENT CONTROL MEASURES TO REMAIN IN PLACE UNTIL ENTIRE SITE IS STABILIZED.

THE EXTENT AND DURATION OF DISTURBANCE TO THE DRAINAGEWAYS SHALL BE MINIMIZED. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE FOLLOWED:

A. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
B. INSTALL SILT FENCE PRIOR TO DISTURBING SOIL. PERIMETER SILT FENCE TO BE INSTALLED OUTSIDE OF ANY POINT TO BE DISTURBED.
C. DURING CONSTRUCTION, INLET PROTECTION SHALL BE INSTALLED AS NEEDED. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED PER CONTRACT REQUIREMENTS. ALL DISTURBED AREAS WHICH ARE INACTIVE FOR LONG PERIODS OF TIME SHALL BE VEGETATED.
D. ONLY WHEN ENTIRE SITE IS STABILIZED AND CONSTRUCTION IS COMPLETE, SHALL SEDIMENT CONTROL MEASURES BE REMOVED.

CONTRACTOR SHALL CONTROL MUD ACCUMULATION ON ALL STREETS SURROUNDING THE PROJECT. NO MUD ACCUMULATION WILL BE ALLOW IN PUBLIC STREETS.

MAINTAIN ALL FILTERS DURING CONSTRUCTION TO PREVENT ANY BLOCKAGES FROM ACCUMULATED SEDIMENT. ADDITIONAL HAY BALES MAY BE REQUIRED DURING CONSTRUCTION AS SPECIFIED BY ENGINEER OR CITY INSPECTOR.

ALL PROPOSED PARKING AREAS TO BE PAVED AS SOON AS POSSIBLE AFTER SUBGRADE IS PREPARED.

CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROLS ONLY WHEN THERE IS A SUFFICIENT GROWTH OF GROUND COVER TO PREVENT FURTHER EROSION.

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ISSUES		
1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS		
1		

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HUB # 1752575195300
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IRVING, TEXAS 75038

MIKE GLENN 95059 REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Mike Glenn, P.E. 35059, on February 26, 2026

Date of issue:
02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

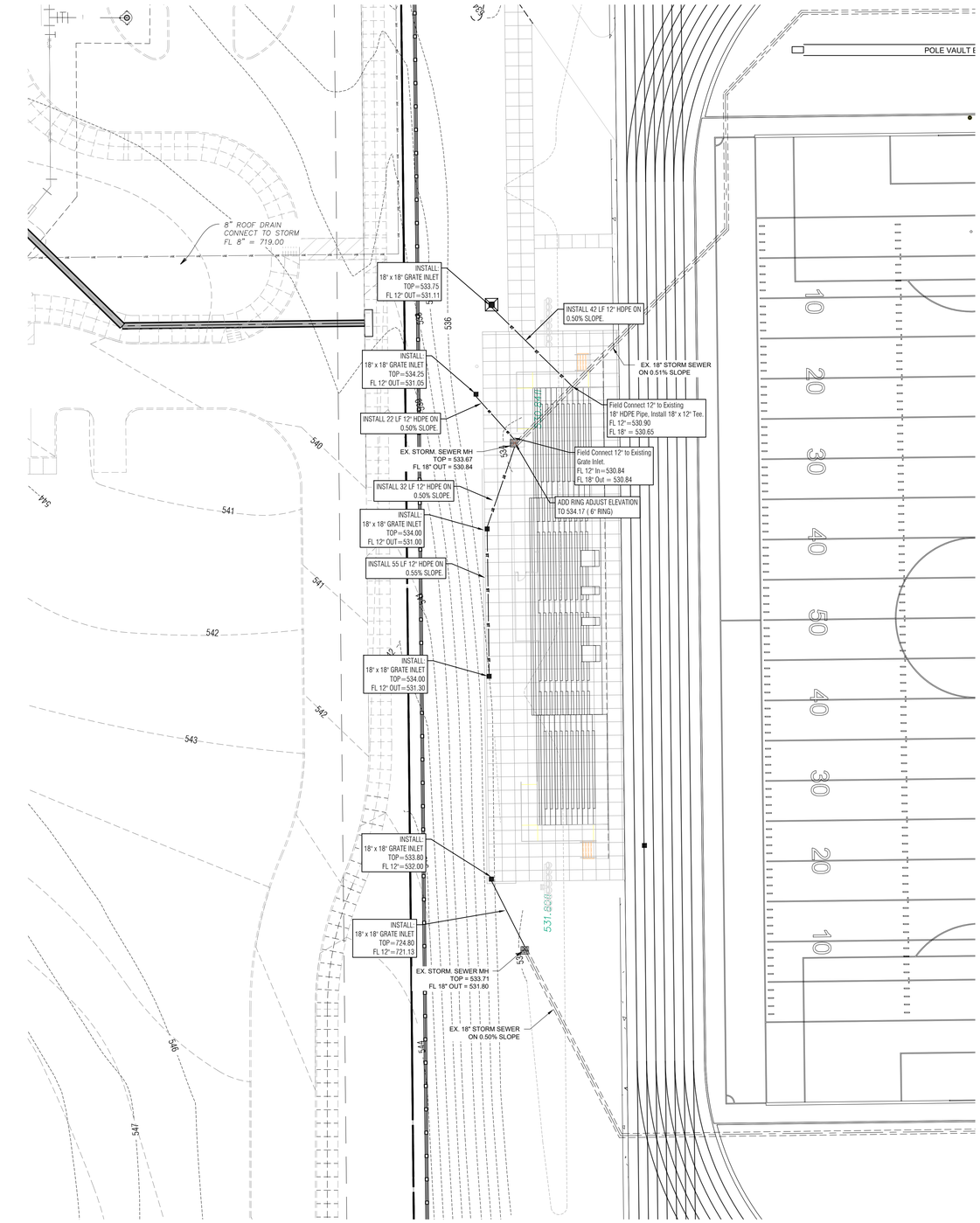
625 E FM 552, Rockwall, TX 75087

EROSION CONTROL DETAILS

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DATE 02/26/26
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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



GENERAL STORM SEWER NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THESE PLANS AND CITY OF ROCKWALL STANDARDS AND SPECIFICATIONS.
2. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL MAKE CERTAIN THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.
3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE REQUIREMENTS AND STANDARDS OF THE LOCAL GOVERNING AUTHORITY.
4. IN THE EVENT AN ITEM IS NOT COVERED IN THE CITY OF ROCKWALL SPECIFICATIONS, THE ENGINEER'S DECISION SHALL APPLY.
5. BARRICADING, TRAFFIC CONTROL, AND PROJECT SIGNS SHALL CONFORM TO "STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION BARRICADING AND CONSTRUCTION STANDARDS".
6. THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF ANY CONSTRUCTION. IN THE EVENT OF ANY CONFLICT AND PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION, IMMEDIATELY NOTIFY ENGINEER. MINOR ADJUSTMENTS OF FINISH GRADE TO ACCOMPLISH SPOT DRAINAGE ARE ACCEPTABLE, IF NECESSARY, UPON PRIOR APPROVAL OF ENGINEER. PAVING INSTALLED SHALL 'FLUSH OUT' AT ANY JUNCTURE WITH EXISTING PAVING.
7. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON FIELD SURVEYS AND LOCAL UTILITY COMPANY RECORDS. IT SHALL BE THE CONTRACTOR'S FULL RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES TO LOCATE THEIR UTILITIES PRIOR TO STARTING CONSTRUCTION.
8. CONTRACTOR SHALL VERIFY ALL EXISTING INVERTS, RIM ELEVATIONS AND SIZES PRIOR TO CONSTRUCTION.
9. ALL NON RCP DRAIN PIPE SHALL BE PVC SCH 40, ADS OR APPROVED EQUAL.
10. ALL RCP SHALL BE CLASS III.
11. W.E. AS INDICATED ON INLET CALLS INDICATES WATER ELEVATION AT INLET DURING 100 YEAR STORM EVENT.

NOTE:
ALL STORM SEWER IS
CONSIDERED PRIVATE

BENCHMARKS:

BENCHMARK #1:
SPK NAIL IN CENTER OF HUBBARD DRIVE .
N 6985121.0710 E 2586167.9530
ELEVATION=456.02

BENCHMARK #2:
3" ALUMINUM DISK SET IN CONCRETE
N.W. CORNER OF LIFT STATION FENCE.
N 6988281.3710 E 2587591.4680
ELEVATION=524.55

CORGAN
CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

REVISIONS

1		

GLENN ENGINEERING
TEXAS REGISTRATION # F-303 HUB # 1752575195300
PHONE (972) 717-5151 FAX (972) 717-2176
4500 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

STATE OF TEXAS
MIKE GLENN
103749
LICENSED PROFESSIONAL ENGINEER

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Date of issue:
02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

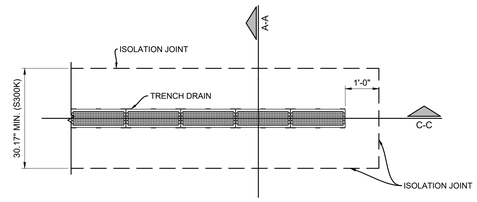
625 E FM 552, Rockwall, TX 75087

STORM SEWER PLAN

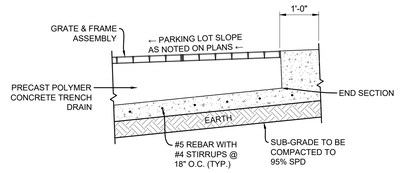
JOB 23162.000
DATE 02/26/26
SHEET C05.00

Feb 26, 2026 - 9:18am User: Robert
\\ROBERT-PC\Public\Bob's Projects\ROCKISD\Fm552MS\2026 TRACK REPLACEMENT\BIDSET\WILLIAMS MIDDLE SCH TRACK ENG.dwg

1. ALL ROOF DRAINS, DOWNSPOUTS AND CANOPY DRAINS ARE TO BE CONNECTED TO STORM SEWER SYSTEM.
2. EACH TRENCH DRAIN TO HAVE LOAD CLASS E-EN 1433 GRATES & MINIMUM OF 1 - SK3-903D CATCH BASIN FOR CONNECTION.

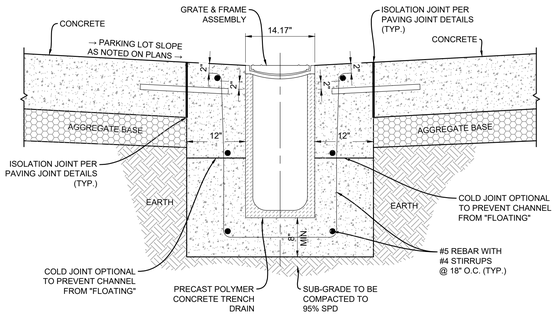


PLAN



SECTION C-C

A1	ACO POWER DRAIN INSTALLATION DETAIL
NTS	

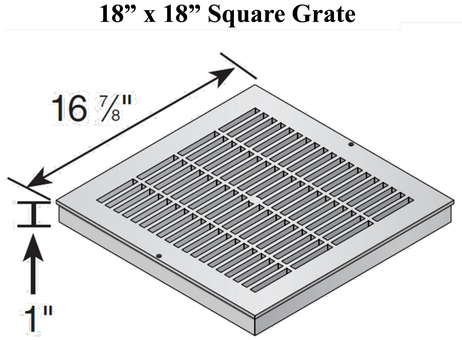


SECTION A-A

A3	S300K ACO POWER DRAIN INSTALLATION CROSS SECTION "A-A" (AT LOWPOINT)
NTS	

NDS™ WE PUT WATER IN ITS PLACE — TECHNICAL SPECIFICATIONS

18" x 18" Square Grate



Part #: 1810 ,
1811 and 1812
Material:
(HDPE) High Density Polypropylene
Color: #1810 (Gray), #1811 (Black) and #1812(Green)
Fits: Catch Basin #1882, #1884, #1800, #1804, #1816, #1830 and #1840.
Grate Opening: 7/16"
Open Surface Area: 86.31 Sq. Inches
Head Pressure / Flow Rate:
Head (inches) - Max Flow
1"= 373.40 GPM
1/2" = 264.03 GPM
UV inhibitor.
Weigh Per Each: 7.71 lbs.

Made in USA.

Load Recommendation Guide

Class B
- Loads of 61-175 psi.
- Recommended for medium-duty pneumatic tire traffic, autos and light trucks at speeds less than 20 m.p.h.

ADA Compliant

851 N. Harvard Avenue
Lindsay, CA 93247
800-726-1994

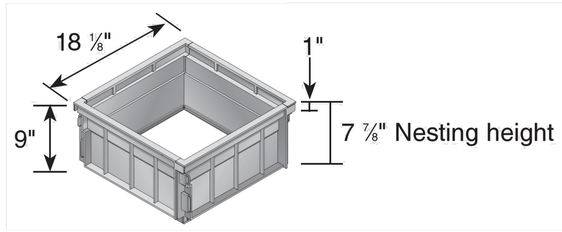
Visit ndspro.com for specs, detail drawings, and case studies

NDS™ WE PUT WATER IN ITS PLACE

C1	18"x18" SQUARE GRATE DETAIL	
NTS	https://www.ndspro.com/PDFs/Tech-Spec-Sheets/18-Inch-Square-Catch-Basin-1810-1811-1812.pdf	

NDS™ WE PUT WATER IN ITS PLACE — TECHNICAL SPECIFICATIONS

8" RISER FOR 18" CATCH BASIN



Material: Styrene
Part #1816
Weight: 5.92 lbs
Colors: Black
Fits: Use with #1800, #1804, #1882, or #1884
Connections are soil tight, requires water proof silicone to make connections water tight

851 N. Harvard Avenue
Lindsay, CA 93247
800-726-1994

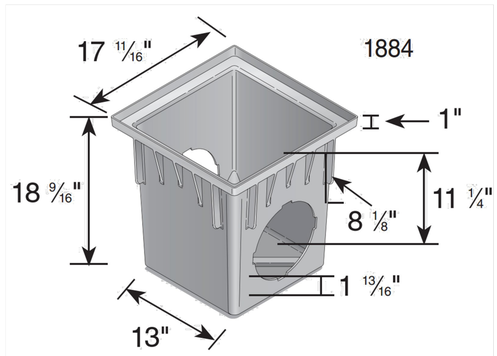
Visit ndspro.com for specs, detail drawings, and case studies

NDS™ WE PUT WATER IN ITS PLACE

C2	8" RISER FOR 18" CATCH BASIN	
NTS	https://www.ndspro.com/PDFs/Tech-Spec-Sheets/18-Inch-Square-Catch-Basin-1816.pdf	

NDS™ WE PUT WATER IN ITS PLACE — TECHNICAL SPECIFICATIONS

18" ONE PIECE CATCH BASIN



Material: UV Protected High Density Polyethylene (HDPE)
Weight: 9.65 lbs
Colors: Black
- 18" One Piece Catch Basin with 2 Openings (1882)
  Includes 2 #1890 Reducer Rings
- 18" One Piece Catch Basin with 4 Openings (1884)
  Includes 4 #1890 Reducer Rings

Requires either #1206, #1242, #1245, #1266, #1888, or #1889 universal outlet to connect pipe

851 N. Harvard Avenue
Lindsay, CA 93247
800-726-1994

Visit ndspro.com for specs, detail drawings, and case studies

NDS™ WE PUT WATER IN ITS PLACE

C3	18" ONE PIECE CATCH BASIN	
NTS	https://www.ndspro.com/PDFs/Tech-Spec-Sheets/18-Inch-Square-Catch-Basin-1882-1884.pdf	

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CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES

1	02/26/26	ISSUE FOR CONSTRUCTION

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GLENN ENGINEERING
TEXAS REGISTRATION # F-303
PHONE (972) 717-5151
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STATE OF TEXAS — MIKE GLENN — 135059 — REGISTERED PROFESSIONAL ENGINEER

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Date of issue: 02/26/26

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

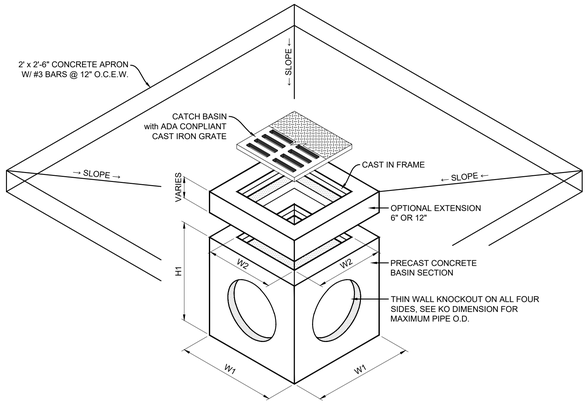
625 E FM 552, Rockwall, TX 75087

STORM SEWER DETAILS

JOB 23162.000
DATE 02/26/26
SHEET C05.50

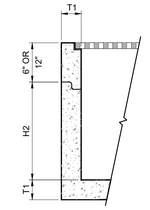
Feb 26, 2026 - 9:24am User: Robert
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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



MODEL NO.		DIMENSIONS							
CATCH BASIN	JUNCTION BOX	W1	W2	H1	H2	T1	KO	GRATE SIZE	WEIGHT LBS.
CB12	JB12	15"	10"	21"	18"	2"	10"	12"x12"x1"	180
CB18	JB18	24"	16"	34"	30"	4"	15"	18"x18"x1"	1,000
CB20	JB20	26"	18"	34"	30"	4"	17"	20"x20"x1"	1,335
CB24	JB24	32"	22"	41"	36"	5"	22"	24"x24"x2"	2,245
CB27	JB27	37"	25"	42"	36"	6"	24"	27"x27"x2"	2,875
CB30	JB30	42"	30"	42"	36"	6"	30"	32"x32"x2"	3,675
CB36	JB36	48"	36"	54"	48"	6"	32"	38"x38"x2"	4,585

1. CB12 CATCH BASIN IS RATED FOR PEDESTRIAN LOADING. ALL OTHERS ARE TRAFFIC DUTY.
2. ALL JUNCTION BOXES SHALL BE STANDARD TRAFFIC DUTY.



PARTIAL SECTION

SPECIFICATIONS

CONCRETE: Class 1 concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 30.

ALL AREA DRAINS
SHALL BE CB24 (24"x24")

A1	PRECAST CONCRETE CATCH BASIN/JUNCTION BOX 18" THRU 36"
NTS	

CORGAN
Dallas, TX 75202
T: 214.748.2000

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MIKE GLENN
103059
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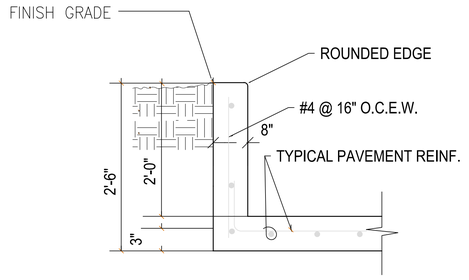
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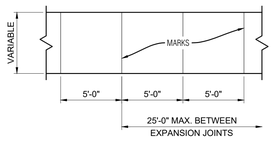
NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



A1 24" CURB / TURN-UP SIDEWALK DETAIL

NTS

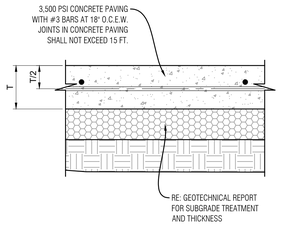
1. AT MARKINGS THE CONCRETE SHALL BE CUT ¼" DEEP, FOLLOWED BY GROOVING TOOL. STRENGTH SHALL BE 3,000 p.s.i. WITH #3 BARS @ 24" O.C.E.W.
2. SIDEWALKS ADJACENT TO BUILDING TO BE PLACED ON 6" SCARIFIED SUBGRADE THE SAME AS PAVING.



B1 SIDEWALK PLAN

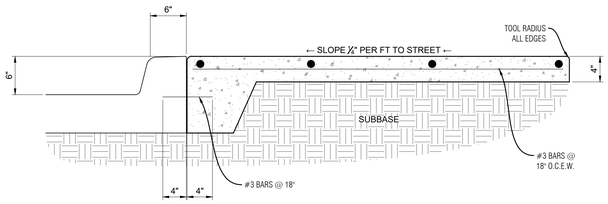
NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

RE: PAVING PLAN FOR PAVEMENT THICKNESS (T)



C1 PAVING SECTION

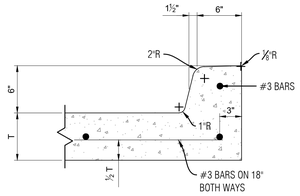
NTS (RE: C050 - PAVING PLAN)



A2 INTERIOR SIDEWALK TYPICAL SECTION

NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

RE: PAVING PLAN FOR PAVEMENT THICKNESS (T)



B2 INTEGRAL CURB & GUTTER

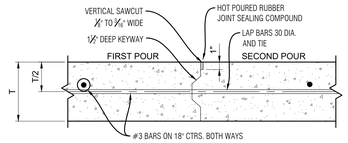
NTS (RE: C050 - PAVING PLAN)

ALL SIDEWALKS AND ACCESSIBLE ROUTES SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%

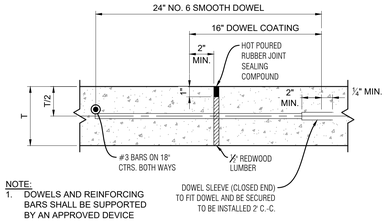


C2 WALK/BUILDING/CURB INTERFACE

NTS (RE: C020 - SITE PLAN & C050 - PAVING PLAN)

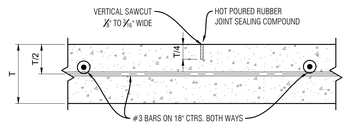


CONSTRUCTION JOINT DETAIL (L)



NOTE:
1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY AN APPROVED DEVICE

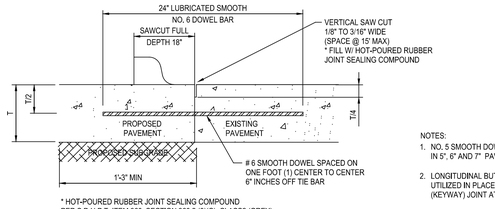
EXPANSION JOINT DETAIL
MAXIMUM SPACING = 60 FEET



SAWED DUMMY JOINT DETAIL (T)
MAXIMUM SPACING = 15 FEET

B3 JOINT DETAILS

NTS (RE: C050 - PAVING PLAN)



* HOT-POURED RUBBER JOINT SEALING COMPOUND PER S.D.H.P.T. ITEM 360, SECTION 360.2 (6)(C), CLASS2 (GREY)

TO BE USED WHERE PROPOSED CONCRETE PAVEMENT MEETS EXISTING CONCRETE PAVEMENT

NOTES:
1. NO. 5 SMOOTH DOWEL BAR MAY BE USED IN 5", 6" AND 7" PAVEMENT THICKNESS.
2. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTOR'S OPTION.
3. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG. DRILLING BY HAND IS NOT APPLICABLE. PUSHING DOWEL BARS INTO GREEN CONCRETE IS NOT ACCEPTABLE.

C3 LONGITUDINAL BUTT JOINT

NTS

CORGAN
Dallas, TX 75202
T: 214.748.2000

ISSUES

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TEXAS REGISTRATION # F-303 HUB # 1752575195300
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4000 FULLER DRIVE, SUITE 220 IRVING, TEXAS 75038

MIKE GLENN 106509 REGISTERED PROFESSIONAL ENGINEER

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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

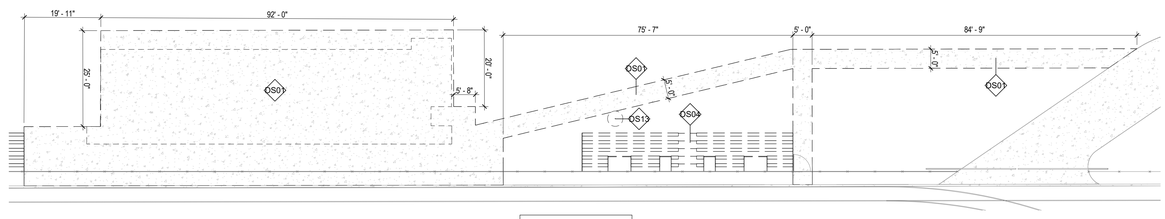
625 E FM 552, Rockwall, TX 75087

PAVING DETAILS

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DATE 02/26/26
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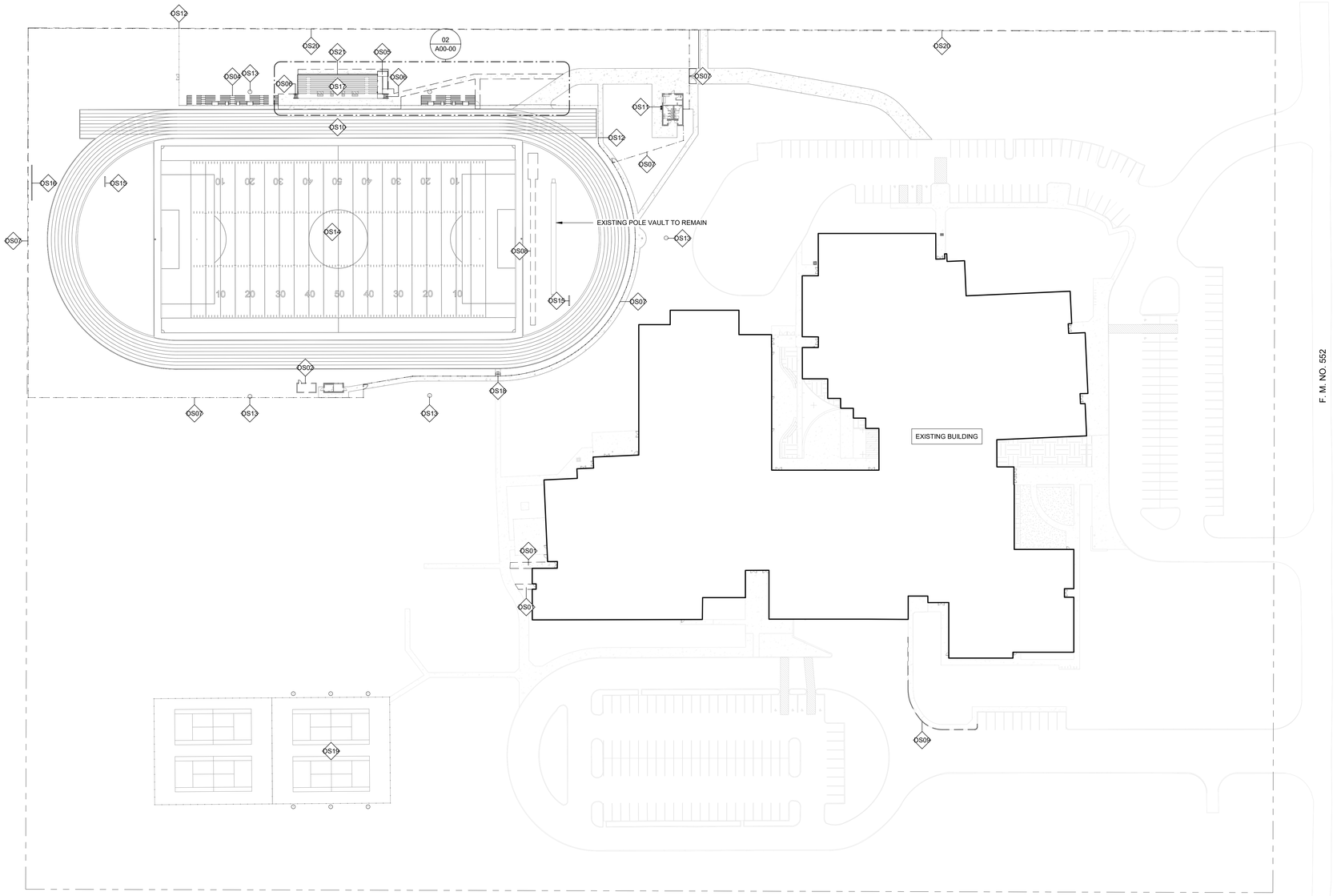
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NOTE: THE CITY OF ROCKWALL CONSTRUCTION STANDARDS APPLY, WHETHER INDICATED ON THESE PLANS OR NOT.



NOTE: GC TO FIELD VERIFY ALL DIMENSIONS

02 ENLARGED DEMO SITE PLAN
1/16" = 1'-0"



01 DEMO SITE PLAN
1" = 50'-0"

PLAN N

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
3. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL ITEMS TO REMAIN THROUGH THE ENTIRE COURSE OF DEMOLITION AND CONSTRUCTION (INCLUDING, BUT NOT LIMITED TO PARTITIONS, FINISHED, DOORS, FRAMES AND HARDWARE).
4. CONTRACTOR TO COORDINATE ALL PHASES OF DEMOLITION FOR PROJECT AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR CONFLICTING CONDITIONS, WHICH WOULD INTERFERE WITH THE SATISFACTORY COMPLETION OF THE WORK, PRIOR TO THE START OF DEMOLITION.
5. DO NOT REMOVE ANY FIRE PROTECTION SIGNALS OR EQUIPMENT, U.N.O PROTECT REQUIRED FOR THE DURATION OF THE JOB.
6. CONTRACTOR TO REMOVE BUILT-IN FURNITURE/ MILLWORK WHERE INDICATED (SHOWN DASHED). REFER TO NEW PLANS FOR RELOCATION ITEMS.
7. AT ALL LOCATIONS AT DEMOLITION AT EXTERIOR WALLS, INFILL TO MATCH EXISTING WALL CONSTRUCTION AND FINISH U.N.O.
8. REMOVE AND SALVAGE FIRE ALARM DEVICES, SPEAKERS AND SECURITY CAMERS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
9. REMOVE AND SALVAGE EXIT SIGNS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
10. STRIP EXISTING PAINT AND PREP FOR NEW ON ALL EXISTING HANDRAILS TO REMAIN.

KEYNOTE LEGEND

DS01	REMOVE EXISTING PAVING / SIDEWALK. REF CIVIL.
DS02	REMOVE EXISTING STORAGE SHED.
DS04	SALVGAE EXISTING BLEACHERS, RETURN TO DISTRICT.
DS05	REMOVE EXISTING BLEACHER RAMP.
DS06	REMOVE EXISTING BLEACHER STAIR.
DS07	REMOVE EXISTING CHAIN LINK FENCE.
DS08	ALT 04: REMOVE EXISTING TRIPLE JUMP AND LONG JUMP.
DS09	REMOVE EXISTING CURB, PREP FOR NEW. REF. CIVIL.
DS10	REMOVE EXISTING TRACK SURFACE AND STRIPING, PREP FOR RESURFACING.
DS11	REMOVE EXISTING DRINKING FOUNTAINS, PREP FOR NEW.
DS12	EXTENT OF EXISTING 4' TALL BLACK VINYL CHAIN LINK FENCE TO REMAIN.
DS13	REMOVE EXISTING LIGHT FIXTURES, PREP FOR NEW. EXISTING POLES TO REMAIN. REF. MEPT.
DS14	EXISTING SOUND SYSTEM TO BE REMOVED, PREP FOR NEW TO BE INSTALLED. REF, MEPT.
DS15	ALT 01: REMOVE EXISTING TIME CLOCK, PREP FOR NEW.
DS16	ALT 01: REMOVE EXISTING SCOREBOARD CABINET, PREP FOR NEW.
DS17	REMOVE AND REUSE ANGLE FRAME BLEACHERS AS REQUIRED FOR CONCRETE REPLACEMENT UNDERNEATH.
DS18	REMOVE EXISTING TURNSTILE.
DS19	ALT 02: REMOVE EXISTING LIGHT FIXTURES, PREP FOR NEW. EXISTING POLES TO REMAIN, REF. MEPT.
DS20	REMOVE AND SALVAGE EXISTING BLACK VINYL CHAIN LINK, RETURN TO THE DISTRICT.
DS21	REMOVE EXISTING GALVANIZED CHAIN LINK PERIMETER GUARDRAIL AROUND EXISTING BLEACHERS, PREP FOR NEW.

Deadline: March 31, 2026 - 2PM

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REGISTERED ARCHITECT HANSBERGER 16318 STATE OF TEXAS

Date of issue:
02/26/2026

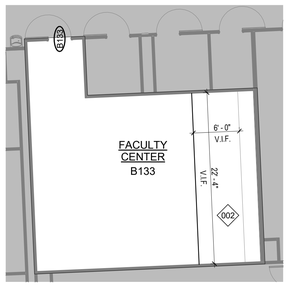
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

DEMO SITE PLAN

JOB 26028
DATE 02/26/2026
SHEET

A00-00



02 ENLARGED DEMO PLAN - FACULTY CENTER - B133
1/8" = 1'-0"



01 DEMO FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
3. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL ITEMS TO REMAIN THROUGH THE ENTIRE COURSE OF DEMOLITION AND CONSTRUCTION (INCLUDING, BUT NOT LIMITED TO PARTITIONS, FINISHED, DOORS, FRAMES AND HARDWARE).
4. CONTRACTOR TO COORDINATE ALL PHASES OF DEMOLITION FOR PROJECT AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR CONFLICTING CONDITIONS, WHICH WOULD INTERFERE WITH THE SATISFACTORY COMPLETION OF THE WORK, PRIOR TO THE START OF DEMOLITION.
5. DO NOT REMOVE ANY FIRE PROTECTION SIGNALS OR EQUIPMENT, U.N.O PROTECT REQUIRED FOR THE DURATION OF THE JOB.
6. CONTRACTOR TO REMOVE BUILT-IN FURNITURE/ MILLWORK WHERE INDICATED (SHOWN DASHED). REFER TO NEW PLANS FOR RELOCATION ITEMS.
7. AT ALL LOCATIONS AT DEMOLITION AT EXTERIOR WALLS, INFILL TO MATCH EXISTING WALL CONSTRUCTION AND FINISH U.N.O.
8. REMOVE AND SALVAGE FIRE ALARM DEVICES, SPEAKERS AND SECURITY CAMERS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
9. REMOVE AND SALVAGE EXIT SIGNS AS NEEDED. CM TO FIELD VERIFY REQUIRED LOCATIONS PRIOR TO BIDDING.
10. STRIP EXISTING PAINT AND PREP FOR NEW ON ALL EXISTING HANDRAILS TO REMAIN.

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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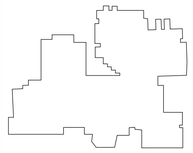
REGISTERED ARCHITECT
HANSBERGER
16318
STATE OF TEXAS

Date of issue:
02/26/2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

KEYPLAN



DEMO FLOOR PLAN - LEVEL ONE - OVERALL

JOB 26028
DATE 02/26/2026
SHEET

A00-01



01 DEMO FLOOR PLAN - LEVEL ONE - SEGMENT E
1/8" = 1'-0"

PLAN N

GENERAL DEMO NOTES

1. REFER CONSULTANT DRAWINGS FOR FURTHER DETAIL REGARDING THE REMOVAL OF THOSE SCOPES.
2. CONTRACTOR TO NOTIFY ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS IN INTENT TO ACCOMPLISHING ALL WORK AND COORDINATION PLAN AND COORDINATION OF THIS PLAN WITH ENGINEERING DRAWINGS OR IT WILL BE DEEMED THAT ALL NECESSARY WORK COST ARE INCLUDED.
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10. STRIP EXISTING PAINT AND PREP FOR NEW ON ALL EXISTING HANDRAILS TO REMAIN.

DEMO KEYNOTE LEGEND

001	REMOVE EXISTING DOOR & HARDWARE, EXISTING FRAME TO REMAIN. PREP FOR NEW DOOR AND HARDWARE. PREP FRAME FOR NEW PAINT.
003	REMOVE EXISTING FLOORING AND BASE, PREP FOR NEW.
004	SALVAGE EXISTING MIRRORS, PREP FOR RE-INSTALL.
006	PREP AND PRIME EXISTING EXPOSED CEILING STRUCTURE AND DUCTS FOR NEW PAINT.

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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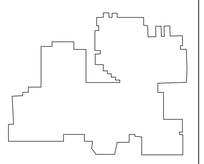
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HANSBERGER
ROBERT J. HUMM
16318
STATE OF TEXAS

Date of issue:
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

KEYPLAN

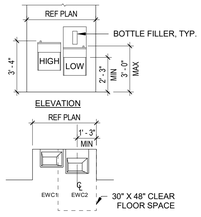


DEMO FLOOR PLAN - LEVEL ONE

JOB 26028
DATE 02/26/2026
SHEET A00-02

STANDARD LAYOUTS

SCALE: 1/4" = 1' - 0"



DRINKING FOUNTAIN

PLAN DESIGNATION: **EWC1**: SINGLE HIGH
EWC2: SINGLE LOW

SHEET SYMBOLS

- NEW PARTITION
- EXISTING PARTITION
- DEMOLISHED PARTITION
- TEMPORARY PARTITION
- PARTIAL HEIGHT PARTITION
- 001 — DEMOLITION KEYNOTE
- 1t — WINDOW TYPE IDENTIFICATION TAG
- 101 — DOOR IDENTIFICATION TAG
- Room name / 101 — ROOM NAME IDENTIFICATION TAG
- 01 — BATHROOM ACCESSORIES TAG
- Wall - N / Ceiling Finish / Wall - W / Floor Finish / Wall - E / Base Finish / Wall - S — FINISH TYPE IDENTIFICATION TAG
- A3-DA — PARTITION TYPE IDENTIFICATION TAG
- L-1 — LOUVER TAG
- 0 — GRID LINE IDENTIFICATION TAG
- 1 — REVISION CLOUD AND IDENTIFICATION TAG
- LEVEL 100'-0" — ELEVATION IDENTIFICATION TAG
- 1' - 0" — CEILING TAG
- BREAK LINE
- CENTER LINE
- MATCHLINE
- 1/ A101 — EXTERIOR ELEVATION IDENTIFICATION TAG
- 1/ A101 — INTERIOR ELEVATION IDENTIFICATION TAG
- Ref / 01 / A101 — BUILDING SECTION IDENTIFICATION TAG
- Ref / 01 / A101 — WALL SECTION IDENTIFICATION TAG
- 1 / A101 SIM — DETAIL REFERENCE TAG
- FIRE EXTINGUISHER CABINET

STANDARD ABBREVIATIONS

A.D.	AREA DRAIN
A.F.F. OR AFF	ABOVE FINISH FLOOR
A.P.	ACCESS PANEL
A/C.	AIR CONDITIONING
ABV.	ABOVE
ACOUS.	ACOUSTICAL
ACP	ACOUSTICAL CEILING PANEL
ADDTL.	ADDITIONAL
ADJ.	ADJUSTABLE OR ADJACENT
AL.	ALUMINUM
ANCH.	ANCHOR
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
ASS'Y.	ASSEMBLY
ATC	ACOUSTICAL CEILING TILE
AUTO.	AUTOMATIC
AWC	ACOUSTICAL WALL PANELS
B.L.	BUILDING LINE
B.O.	BOTTOM OF
BD.	BOARD
BLDG.	BUILDING
BLK.	BLOCK
BM.	BEAM
BOT.	BOTTOM
BRK.	BREAK
BRKT.	BRACKET
BSMT.	BASEMENT
BTWN.	BETWEEN
C.B.	CATCH BASIN
C.G.	CORNER GUARD
C.I.	CAST IRON
C.I.P	CAST IN PLACE
C.J.	CONTROL JOINT
C.O.	CLEAR OPENING
C.T.	CERAMIC TILE
CAB.	CABINET
CAT.	CATEGORY
CER.	CERAMIC
CFMF	COLD FORMED METAL FRAMING
CLG.	CEILING
CLO.	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
CORR.	CORRIDOR
CPT	CARPET
CPTT	CARPET TILE
CTR.	CENTER
CTRL.	CONTROL
D.F.	DRINKING FOUNTAIN
D.O.	DOOR OPENING
D.P.	DAMP PROOFING
D.S.	DOWNSPOUT
DBL.	DOUBLE
DEMO.	DEMOLITION
DEPT.	DEPARTMENT
DET. OR DTL.	DETAIL
DIA. OR DIAM.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DN.	DOWN
DR	DOOR
DRN	DRAIN
DWG.	DRAWING
DWGS.	DRAWINGS

DWR.	DRAWER
E.	EAST
E.J.	EXPANSION JOINT
E.S.	EXPOSED STRUCTURE
E.W.	EACH WAY
E.W.C.	ELECTRIC WATER COOLER
EA.	EACH
EL. OR ELEV.	ELEVATION
ELEC. OR ELECT.	ELECTRICAL
EMERG. OR EMER.	EMERGENCY
ENCL	ENCLOSURE
EQ	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EXP. OR EXPAN.	EXPANSION
EXT.	EXTERIOR
F.A.	FIRE ALARM
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
F.H.C.	FIRE HOSE CABINET
F.H.R.	FIRE HOSE REEL
F.HT.	FULL HEIGHT
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.S.	FACE OF STUD
F.S.	FULL SIZE
F.V.C.	FIRE VALVE CABINET
FDN.	FOUNDATION
FIN.	FINISH
FL. OR FLR.	FLOOR
FLASH	FLASHING
FLUOR.	FLUORESCENT
FRRF.	FIREPROOF(ING)
FR.	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FSTNR.	FASTENER
FT.	FOOT OR FEET
FTG.	FOOTING
FURR.	FURRING
FUT.	FUTURE
G.B.	GRAB BAR
G.C.	GENERAL CONTRACTOR
GA.	GAUGE
GALV.	GALVANIZED
GFRG	GLASS FIBER REINFORCED GYPSUM
GL.	GLASS
GND.	GROUND
GR.	GRADE
GRN	GRANITE
GSW	GYPSUM SHAFT WALL
GYP. BD.	GYPSUM BOARD
H.B	HOSE BIB
H.C.	HOLLOW CORE
H.K.	HOUSEKEEPING
H.M.	HOLLOW METAL
HCP.	HANDICAPPED
HD.	HAND
HDW. OR HDWR.	HARDWARE
HDWD.	HARDWOOD
HNDRL.	HANDRAIL
HORZ.	HORIZONTAL
HR.	HOUR
HT.	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
I.D.	INSIDE DIAMETER/DIMENSION
IN.	INCH
INCL.	INCLUDE(D)(ING)

INFO.	INFORMATION
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
JAN CLO.	JANITOR CLOSET
JAN.	JANITOR
JST.	JOIST
JT.	JOINT
L	LEG
LAB.	LABORATORY
LAM.	LAMINATE
LAV.	LAVATORY
LKR.	LOCKER
LT.	LIGHT
M.	METER
M.H.	MANHOLE
M.O.	MASONRY OPENING
MAS.	MASONRY
MATL.	MATERIAL
MAX	MAXIMUM
MBL.	MARBLE
MECH.	MECHANICAL
MEMB.	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MFG.	MANUFACTURER
MIN.	MINIMUM
MIR.	MIRROR
MISC.	MISCELLANEOUS
MTD.	MOUNTED
MTL.	METAL
MUL.	MULLION
N	NORTH
N.I.C.	NOT IN CONTRACT
N.T.S.	NO TO SCALE
NO.	NUMBER
NOM.	NOMINAL
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER/DIMENSION
OFF.	OFFICE
OPNG.	OPENING
OPP.	OPPOSITE
OPP.HD.	OPPOSITE HAND
OVHD.	OVERHEAD
OZ.	OUNCE
P.C.	PRECAST CONCRETE
P.LAM.	PLASTIC LAMINATE
PAV.	PAVING
PC.	PIECE
PL.	PLATE
PLAS.	PLASTIC
PLBG.	PLUMBING
PLYWD.	PLYWOOD
PMMP	PREMANUFACTURED METAL PANEL
PNT.	PAINT
POL.	POLISHED
PR.	PAIR
PRCST.	PRECAST
PREMANUF.	PREMANUFACTURED
PT.	POINT
PTD.	PAINTED
PTN.	PARTITION
R.	RADIUS
R.D.	ROOF DRAIN
R.O.	ROUGH OPENING
RCP	REFLECTED CEILING PLAN
REBAR	REINFORCING BAR

REF.	REFERENCE
REFG.	REFRIGERATOR
REINF.	REINFORCED
REQD.	REQUIRED
RESIL.	RESILIENT
REV.	REVISION
RFL.	REFLECTED
RM.	ROOM
S.	SOUTH
S.C.	SOLID CORE
S.H.	SPRINKLER HEAD
S.S.	STAINLESS STEEL
SAN.	SANITARY
SCHED. OR SCHD.	SCHEDULE
SEC.	SECURITY
SECT.	SECTION
SEW.	SEWER
SGL.	SINGLE
SHT.	SHEET
SHWR.	SHOWER
SIM.	SIMILAR
SPEC. OR SPECS.	SPECIFICATION(S)
SPKR.	SPEAKER
SQ.	SQUARE
SQ. FT. OR S.F.	SQUARE FOOT (FEET)
SQ. YD. OR S.Y.	SQUARE YARD(S)
STA.	STATION
STD.	STANDARD
STL.	STEEL
STOR.	STORAGE
STRUCT.	STRUCTURE OR STRUCTURAL
SUSP.	SUSPENDED
SYM.	SYMMETRICAL
T&G	TONGUE & GROOVE
T.	TREAD
T. OR TEMP.	TEMPERED
T.O.C.	TOP OF CONCRETE
T.O.CMU	TOP OF CMU
T.O.D.	TOP OF DECK
T.O.O.	TOP OF
T.O.P.	TOP OF PARAPET
T.O.S.	TOP OF STEEL
T.O.S.S.	TOP OF STRUCTURAL SLAB
T.V.	TELEVISION
TEL.	TELEPHONE
THK.	THICK
TLT.	TOILET
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
UNF.	UNFINISHED
UR.	URINAL
V.I.F.	VERIFY IN FIELD
VB.	VAPOR BARRIER
VERT.	VERTICAL
VEST.	VESTIBULE
W.	WEST OR WIDTH
W.B.	WEATHER BARRIER
W.C.	WATER CLOSET
W.P.	WATERPROOF
W/	WITH
W/O	WITHOUT
WD.	WOOD
WDW.	WINDOW
WR/GB	WATER RESISTANT GYP. BOARD
WSCT.	WAINSCOT
WT.	WEIGHT

ACCESSIBILITY NOTES

01 EXTERIOR ROUTE CONSTRUCTION

1. AN ACCESSIBLE ROUTE, IN THE DIRECTION OF TRAVEL, SHALL NOT HAVE A SLOPE EXCEEDING 1:20 (5/8" PER FOOT) EXCEPT AT A RAMP.
2. AN ACCESSIBLE ROUTE CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).
3. ALL NEW PAVING AND WALKS FOR AN ACCESSIBLE ROUTE, SHALL NOT HAVE AN ABRUPT CHANGE IN SURFACE LEVEL (VERTICALLY) GREATER THAN 1/4" WHEN ABUTTING EITHER EXISTING OR OTHER NEW SURFACES DESIGNATED FOR AN ACCESSIBLE ROUTE.
4. AN ACCESSIBLE ROUTE CROSSING OR PARALLELING A HAZARDOUS AREA, SHALL BE CLEARLY MARKED IN A CONTRASTING COLOR, WITH THE ROUTE LOCATION, MARKING MATERIALS AND COLOR SHOWN ON THE DRAWING.
5. ANY OPENINGS THAT ARE CONSTRUCTED IN THE SURFACE OF AN ACCESSIBLE ROUTE SHALL HAVE THE OPENINGS RUNNING PERPENDICULAR TO THE DIRECTION OF TRAVEL WITH THE OPENINGS DIMENSION NOT TO EXCEED 1/2" IN THE DIRECTION OF TRAVEL.

02 CURB RAMPS

1. THE TOP AND BOTTOM OF THE RAMP, AT THE TRANSITION TO EITHER EXISTING OR NEW SURFACES, SHALL BE FLUSH AND FREE OF ANY ABRUPT VERTICAL CHANGES.
2. THE SURFACE FINISH OF THE RAMP, EITHER RAISED OR RECESSED AS PERMITTED BY ACCESSIBILITY CODES AND GUIDELINES, SHALL BE INSTALLED TO PERMIT WATER DRAINAGE.
3. THE RAMP CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).

03 INTERIOR ROUTE CONSTRUCTION

1. AN ACCESSIBLE ROUTE, IN THE DIRECTION OF TRAVEL, SHALL NOT HAVE A SLOPE EXCEEDING 1:20 (5/8" PER FOOT), EXCEPT AT A RAMP.
2. AN ACCESSIBLE ROUTE CROSS SLOPE SHALL NOT EXCEED 1:48 (1/4" PER FOOT).
3. ALL NEW FLOOR CONSTRUCTION AND FLOORING MATERIALS SHALL NOT HAVE AN ABRUPT VERTICAL CHANGE IN FINISH SURFACE LEVEL GREATER THAN 1/4" WHEN ABUTTING EITHER EXISTING OR NEW SURFACES DESIGNATED FOR AN ACCESSIBLE ROUTE.

04 DOORS

1. ANY THRESHOLD SHALL NOT EXCEED 1/2" IN HEIGHT, NOR 1:2 SLOPE.
2. ALL ACCESSIBLE HARDWARE OPERABLE BY THE DISABLED, SHALL NOT EXCEED A HEIGHT OF 4'-0" AFF AND SHALL BE EASILY OPERATED WITH ONE HAND WITHOUT GRASPING, PINCHING OR TWISTING OF THE WRIST.
3. ALL ACCESSIBLE DOORS WITH CLOSERS SHALL HAVE THE CLOSER ADJUSTED SO THAT THE CLOSING TIME, FROM A 70 DEGREE OPEN ANGLE TO WITHIN 3" OF THE JAMB, IS NOT LESS THAN 3 SECONDS.
4. THE OPENING FORCE OF THE ALL ACCESSIBLE DOORS, EXCEPT FIRE EXIT DOORS, SHALL NOT EXCEED 5 POUNDS IN THE DIRECTION OF TRAVEL FOR EXITING.
5. THE OPERABLE HARDWARE ON A DOOR LEADING TO HAZARDOUS AREAS (E.G. BOILER ROOMS, MECHANICAL AND ELECTRICAL ROOMS, OTHER EQUIPMENT ROOMS, AND LOADING DOCK), SHALL HAVE A TEXTURED SURFACE ON THE TOUCHABLE AREA.

05 TOILET ROOMS

1. THE FLUSH CONTROL FOR ALL ACCESSIBLE TOILET/URINALS SHALL NOT EXCEED 3'-8" AFF, AND SHALL BE ON THE WIDE (APPROACH) SIDE OF THE TOILET.
2. ACCESSIBLE LAVATORIES SHALL HAVE ALL EXPOSED HOT WATER PIPING AND DRAIN PIPES EITHER INSULATED OR CONFIGURED TO PROTECT AGAINST SKIN CONTACT. THE UNDERSIDE OF THE LAVATORY SHALL NOT HAVE ANY SHARP OR ABRASIVE SURFACES.
3. ANY GRAB BAR INSTALLATION SHALL BE ABLE TO SUPPORT 250 POUNDS APPLIED IN ANY DIRECTION.

06 SIGNAGE

1. ALL ACCESSIBLE PERMANENT ROOMS AND SPACES, EXIT WAYS AND EXIT STAIRWAYS, SHALL HAVE SIGNAGE THAT MEETS ACCESSIBLE SIGNAGE REQUIREMENTS FOR LETTER SIZE, LETTER AND NUMBER TYPESTYLE, RAISED LETTERS, GRADE 2 BRAILLE, COLOR/CONTRAST, AND LOCATION.
2. ALL ACCESSIBLE TOILET ROOMS SHALL BE DESIGNATED WITH THE INTERNATIONAL SYMBOL OF ACCESSIBILITY AND ACCESSIBLE TEXT SIGNAGE FOR A PERMANENT ROOM, PLACED DIRECTLY BELOW THE PICTOGRAM SYMBOL. THE SIGNAGE SHALL MEET THE ACCESSIBLE SIGNAGE REQUIREMENTS FOR LETTER SIZE, LETTER AND NUMBER TYPESTYLE, RAISED LETTERS, GRADE 2 BRAILLE, COLOR/CONTRAST, AND LOCATION.
3. ALL ACCESSIBLE PARKING SPACES AND PUBLIC ENTRANCES SHALL BE DESIGNATED WITH THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGNAGE IN ADDITION TO ANY OTHER SIGNAGE REQUIRED FOR ACCESSIBILITY. THIS SIGNAGE SHALL MEET ACCESSIBILITY REQUIREMENTS FOR COLOR/CONTRAST AND LOCATION.

ACCESSIBLE MOUNTING HEIGHTS

	ADULT			SECTION
WATER CLOSET				
TOP OF SEAT	17"-19"			604.4
FLUSH CONTROLS	15" MIN-48" MAX			604.6/309.3/308
URINAL				
RIM OF BASIN	17" MAX.			605.2
FLUSH CONTROLS	15" MIN-48" MAX			604.6/309.3/308
LAVATORY/SINKS				
RIM OR COUNTER SURFACE	34" MAX.			606.3
APRON CLEARANCE	27" MIN.			306
KNEE CLEARANCE	27" MIN.			306.3
TOE CLEARANCE	9" MIN.			306.2
DRINKING FOUNTAIN				
SPOUT HEIGHT	36" MAX.			602.4
KNEE CLEARANCE	27" MIN.			306.3
TOE CLEARANCE	9" MIN			306.2
DRINKING FOUNTAIN (BENDING DISABLED)				
SPOUT HEIGHT	38"-43"			602.7
GRAB BARS				
TOP OF BAR	33" MIN-36" MAX			609.4
MIRROR				
BOTTOM OF REFLECTIVE SURFACE (above counters & lavs.)	40" MAX.			603.3
TOP OF REFLECTIVE SURFACE	74" MIN.			603.3
SHOWER STALL				
TOP OF SEAT	17" MIN-19" MAX			610.2
SHOWER SPRAY UNIT HEIGHT (FIXED)	48" MAX			608.6
SHOWER SPRAY UNIT HEIGHT (HAND HELD)	48" MAX			608.6
CONTROLS AND OPERATING MECHANISMS				
TOWEL DISPENSER	48" MAX.			308
SOAP DISPENSER	48" MAX.			308
HAND DRYER	48" MAX.			308
TOILET TISSUE DISPENSER	15"-48" MAX.			604.7
SANITARY NAPKIN DISPENSER/RECEPTACLE	48" MAX.			308
TOILET SEAT COVER DISPENSER	48" MAX.			308
ELECTRICAL DEVICES				
ELECTRICAL, PHONE AND DATA OUTLETS (TO CENTER)	17" MIN-46" MAX			308.2.1
ABOVE COUNTER OUTLETS (TO CENTER)	44" MAX.			308.2.2
LIGHT SWITCHES (HIGHEST OPERABLE PART)	48" MAX.			308
FIRE ALARM PULL (HIGHEST OPERABLE PART)	48" MAX.			308
THERMOSTATS (HIGHEST OPERABLE PART)	48" MAX.			308
FIRE EXTINGUISHER CAB. (T.O.HANDLE/OPER. DEVICE)	48" MAX.			308.3.1
PUBLIC TELEPHONE (TO HIGHEST OPERABLE PART)	48" MAX.			308
RAMPS AND STAIRS				
TOP OF HANDRAILS	34"-38"			505.4
ELEVATORS				
HALL CALL BUTTON	48" MAX			407.2.1.1/308
HALL LANTERNS	72" MIN			407.2.2.2
DRESSING AND FITTING ROOMS				
TOP OF BENCH	17" MIN-19" MAX			903.5
FOOD SERVICE LINES				
TOP OF TRAY SLIDE	28" MIN-34" MAX			904.5.2

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REGISTERED ARCHITECT — HANSBERGER — 16318 — STATE OF TEXAS

Date of issue: 02/26/2026

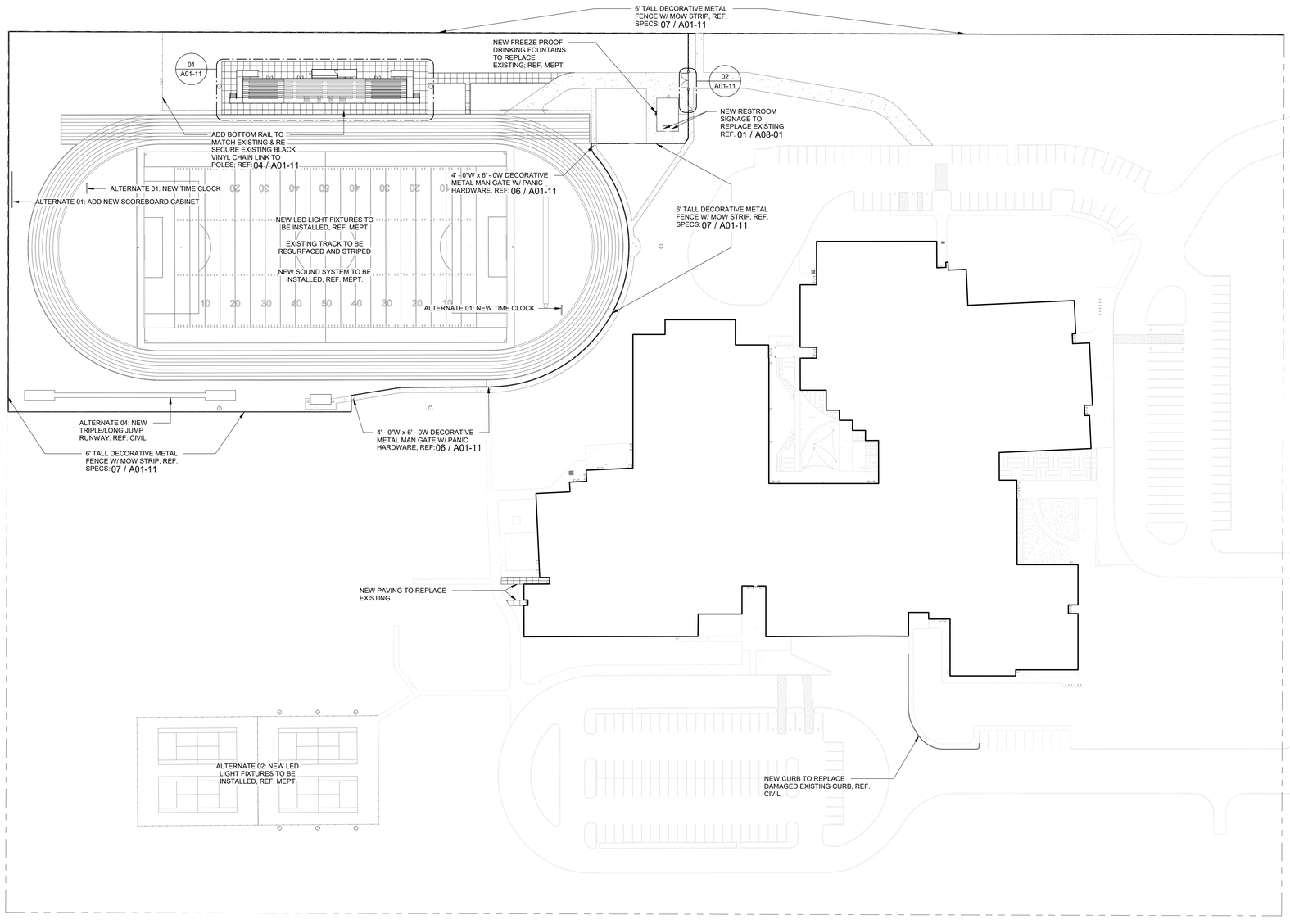
WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

STANDARDS AND SYMBOLS

JOB 26028
DATE 02/26/2026
SHEET A0G-01

2/26/2026 1:39:41 PM A0G-01 STANDARDS AND SYMBOLS



01 SITE PLAN
1" = 50'-0"

PLAN N

GENERAL SITE NOTES

1. FIELD VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE BEGINNING WORK.
2. OBTAIN AVAILABLE PLANS DEPICTING EXISTING & PROPOSED UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO SAID UTILITIES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. REFER TO CIVIL AND MEP DOCUMENTS FOR ADDITIONAL HARDSCAPE, SAW CUTTING, EARTH REMOVAL, TRENCHING, AND RELOCATION AND/OR DEMOLITION OF EXISTING UTILITIES UNDER AND ABOVE GROUND, TYP.
4. U.N.O. FURNISH & INSTALL 12"W x 4"D CONC. MOW STRIP BELOW ALL CHAIN LINK FENCING. COORDINATE TOP OF MOW STRIP HEIGHT W/ CIVIL GRADING PLANS & VERIFY W/ ARCHITECT.
5. REFER TO CIVIL DRAWINGS FOR COORDINATION WITH EXISTING ROADS AND ACCESSES.
6. REFER TO IRRIGATION DRAWINGS FOR SLEEVE LOCATIONS.
7. REFER TO CIVIL FOR PARKING DIMENSIONS & DETECTABLE WARNINGS. PROVIDE DETECTABLE WARNINGS AT CURB RAMP & OTHER LOCATIONS WHERE WALKING SURFACES CROSS OR ADJOIN A VEHICULAR WAY AS PER TAS REQUIREMENTS.
8. SUBMIT SIGNAGE LOCATIONS, MESSAGES, GRAPHICS, AND FACE DIRECTIONS TO ARCHITECT PRIOR TO FABRICATION, TYP.
9. ALL DRIVE STRIPING AND DIRECTIONAL ARROWS TO BE REVIEWED IN SUBMITTAL PRIOR TO INSTALL FOR COLORS & DIRECTION.
10. ALL SIDEWALKS & BUILDING ENTRY FLATWORK TO HAVE A MEDIUM BROOM FINISH, U.N.O.

SITE MATERIALS LEGEND

- 6'-0" DECORATIVE METAL FENCING W/ MOWSTRIP; REF. SPECS
- BLACK VINYL CHAIN LINK FENCING; SEE PLANS FOR FENCE TYPES. REF. SPECS
- EXISTING PAVING
- NEW PAVING; REF. CIVIL

Deadline: March 31, 2026 - 2PM

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	REVISIONS	

REGISTERED ARCHITECT
BRIAN HANSBERGER
16318
STATE OF TEXAS

Date of issue:
02/26/2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

SITE PLAN

JOB 26028
DATE 02/26/2026
SHEET
A01-01

FINISH KEY - EXTERIOR				
CODE	DESCRIPTION	MANUFACTURER	COLOR / FINISH	COMMENTS
BR-1	OPTION 01: ACCENT BRICK	KANSAS BRICK AND TILE	DARK WESTERN	RUNNING BOND, U.N.O.
BR-1	OPTION 02: ACCENT BRICK	ACME	VILLAGE	RUNNING BOND, U.N.O.

GENERAL GRANDSTAND NOTES

1. THE DESIGN, FABRICATION, & CONSTRUCTION DEPICTED IN THESE DRAWINGS AND SPECIFICATIONS IS BASED UPON GRANDSTANDS AS MANUFACTURED BY STURDISTEEL, WACO, TEXAS.

2. THE GRANDSTANDS TO BE PROVIDED AND INSTALLED ARE CONTINUOUS ANGLE FRAME GRANDSTANDS: THOSE BEARING UPON A LEVEL SLAB (PROVIDED BY OTHERS) AND CONSTRUCTED OF A STEEL ANGLE SUBSTRUCTURE AND ALUMINUM DECKING AND SEATING CONFIGURATIONS AS INDICATED ON THE PLANS AND SECTIONS.

3. (4) TYPES OF GRANDSTANDS ARE TO BE PROVIDED AS THE FOLLOWING INDICATES:
A. TRACK GRANDSTANDS (PERMANENT)
1. PROVIDE HANDICAP SEATING SPACES AS REQUIRED. DOUBLE HANDICAP SPACE, MIN. 66"x48" (SINGLE HANDICAP SPACE, MIN. 33"x48") FOR FRONT ACCESS. PROVIDE RAILS AT BACK OF SPACE, TYP.
2. PROVIDE CENTER AISLE HANDRAILS WHERE INDICATED ON PLAN. PROVIDE BREAKS IN CENTER AISLE HANDRAILS.
3. PROVIDE 4'-0" (MIN) WIDE AISLES WHERE THERE ARE ROWS ON ONLY ONE SIDE OF AN AISLE AT TRACK GRANDSTAND. PROVIDE HANDRAILS AT GRANDSTAND END WALLS.

4. PROVIDE VERTICAL AND HORIZONTAL MEMBERS AND 9 GA. GALV. CHAIN LINK FENCING FOR GUARDRAILS AT ENDS AND BACKS OF GRANDSTANDS AS INDICATED ON THE DRAWINGS.

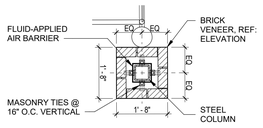
5. PROVIDE RAMPS FOR HANDICAP ACCESS/EGRESS AS INDICATED ON THE PLANS.

6. BENCH SEATING, 18" WIDE PER PERSON.

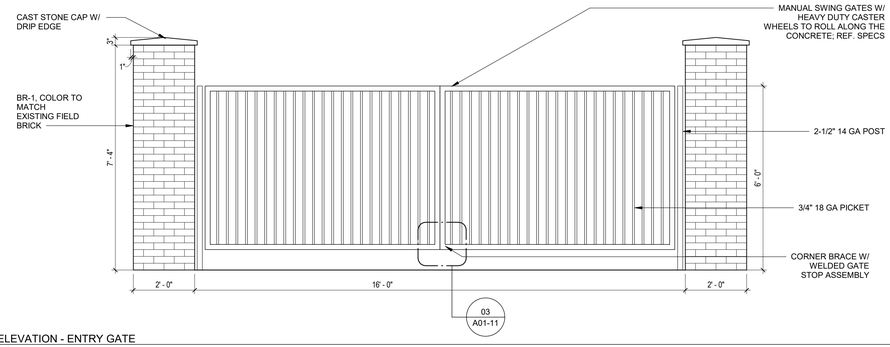
7. FURNISH AND INSTALL PRESSBOXES AS INDICATED WITH MANUFACTURER'S STANDARD PIECES, FINISHES, AND TRIM.

8. FURNISH AND INSTALL ALL STEPS, RAMPS, HANDRAILS, AND PERIMETER GUARDRAILS, AS REQUIRED BY CODES AND PROJECT CONDITIONS.

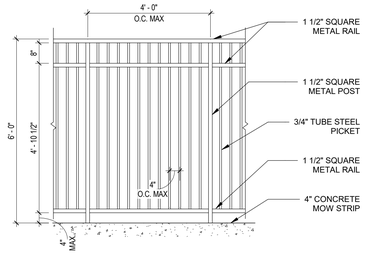
9. THE GRANDSTAND CONTRACTOR SHALL PROVIDE AL LSTEEL AND ALUMINUM COMPONENTS AND CONCRETE PIERS REQUIRED TO PROVIDE A TURN-KEY, READY FOR USE GRANDSTAND SYSTEM. THESE COMPONENTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: FOUNDATIONS FOR STEEL COMPONENTS, STEEL SUB-FRAME, ALUMINUM SEATS, ALUMINUM FLOOR DECK AND RISER CLOSURES, ALUMINUM STEPS, ALL HANDRAILS AND GUARDRAILS ATTACHED TO THE GRANDSTANDS, AND ALUMINUM PANEL SIDING PANELS AT TRACK/FIELD SIDE.



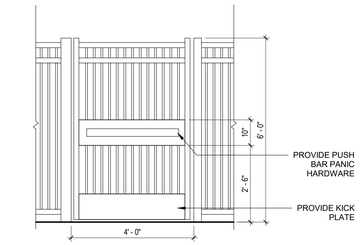
09 PLAN DETAIL - BRICK PILASTER
1/2" = 1'-0"



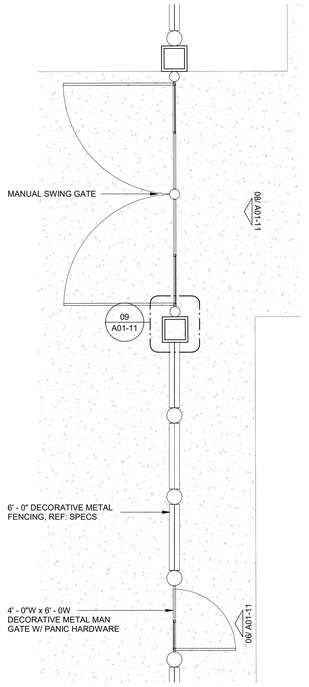
08 ELEVATION - ENTRY GATE
1/2" = 1'-0"



07 ELEVATION - DECORATIVE METAL FENCE
1/2" = 1'-0"



06 ELEVATION - MAN GATE
1/2" = 1'-0"



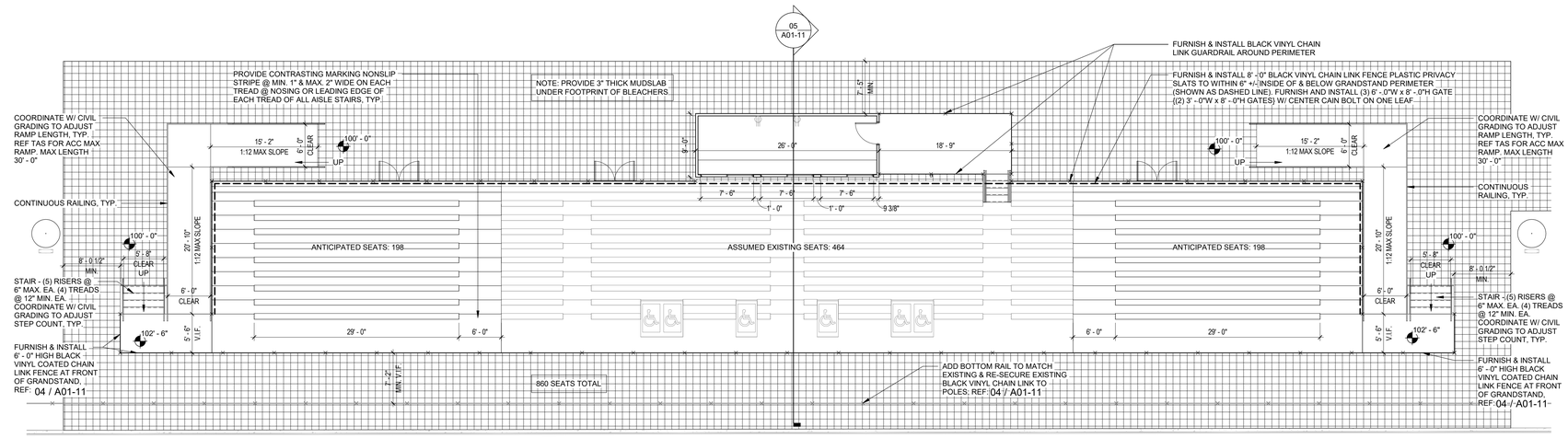
02 ENLARGED PLAN - GATE
1/4" = 1'-0"

05 SECTION - PRESS BOX
1/4" = 1'-0"

NOTE: STRUCTURE BY GRANDSTAND MANUFACTURER

04 SECTIONS - BLACK VINYL CHAIN LINK FENCE
1" = 1'-0"

03 DUMPSTER GATE STOP DETAIL
1 1/2" = 1'-0"



01 ENLARGED SITE PLAN - TRACK GRANDSTAND
1/8" = 1'-0"

GENERAL SITE NOTES

1. FIELD VERIFY EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE BEGINNING WORK.
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4. U.N.O. FURNISH & INSTALL 12"W x 4"D CONC. MOW STRIP BELOW ALL CHAIN LINK FENCING. COORDINATE TOP OF MOW STRIP HEIGHT W/ CIVIL GRADING PLANS & VERIFY W/ ARCHITECT.
5. REFER TO CIVIL DRAWINGS FOR COORDINATION WITH EXISTING ROADS AND ACCESSES.
6. REFER TO IRRIGATION DRAWINGS FOR SLEEVE LOCATIONS.
7. REFER TO CIVIL FOR PARKING DIMENSIONS & DETECTABLE WARNINGS. PROVIDE DETECTABLE WARNINGS AT CURB RAMP & OTHER LOCATIONS WHERE WALKING SURFACES CROSS OR ADJOIN A VEHICULAR WAY AS PER TAS REQUIREMENTS.
8. SUBMIT SIGNAGE LOCATIONS, MESSAGES, GRAPHICS, AND FACE DIRECTIONS TO ARCHITECT PRIOR TO FABRICATION, TYP.
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10. ALL SIDEWALKS & BUILDING ENTRY FLATWORK TO HAVE A MEDIUM BROOM FINISH, U.N.O.

EXT. MATERIALS LEGEND

BR-1

SITE MATERIALS LEGEND

- 6'-0" DECORATIVE METAL FENCING W/ MOWSTRIP; REF. SPECS
- BLACK VINYL CHAIN LINK FENCING, REF. PLANS FOR HEIGHT; REF. SPECS
- EXISTING BLACK VINYL CHAIN LINK FENCING
- EXISTING PAVING
- NEW PAVING; REF. CIVIL

Deadline: March 31, 2026 - 2PM

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16318
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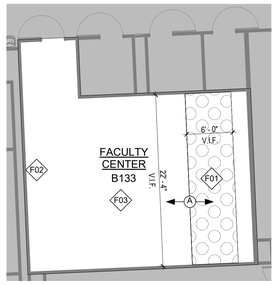
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

ENLARGED SITE PLANS AND DETAILS

JOB 26028
DATE 02/26/2026
SHEET A01-11



02 ENLARGED FINISH FLOOR PLAN - FACULTY CENTER - B133
1/8" = 1'-0"

PLAN N

FINISH KEY - FLOORS						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR/FINISH	SIZE	COMMENTS
MCT-1	MARMOLEUM COMPOSITION TILE	FORBO	MCT TILE	EIGER (MCT 3048)	13" x 13"	QUARTER-TURN INSTALLATION

FINISH KEY - BASE						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR / FINISH	SIZE	COMMENTS
RB-1	RUBBER BASE	TARKETT	STANDARD COVE BASE	BLACK	4" H	COILS

FINISH KEY - WALLS						
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR / FINISH	SIZE	COMMENTS
PNT-1	PAINT	SHERWIN WILLIAMS	REF SPECS	RESERVED WHITE (SW 7056) (258-C2)	--	FIELD PAINT
PNT-3	PAINT	SHERWIN WILLIAMS	REF SPECS	JAY BLUE (SW6797) (168-C7)	--	ACCENT PAINT
PNT-4	PAINT	SHERWIN WILLIAMS	REF SPECS	NAVAL (SW6244) (253-C6)	--	ACCENT PAINT
PNT-6	PAINT	SHERWIN WILLIAMS	REF SPECS	GAUNTLET GREY (SW 7019) (244-C6)	--	HM DOORS & FRAMES, EXPOSED STRUCTURE
PNT-9	PAINT	SHERWIN WILLIAMS	REF SPECS	TRICORN BLACK (SW 6258) (251-C1)	--	STAGE

TRANSITION SCHEDULE				
CODE	DESCRIPTION	MANUFACTURER	STYLE	COLOR / FINISH
A	CARPET TO MCT	JOHNSONITE	CT-20-A	CHARCOAL (20)



01 FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

PLAN N

GENERAL PLAN NOTES

1. ALL WALLS ARE TYPE A3-DA UNLESS NOTED OTHERWISE.
2. ALL INTERIOR FLOOR LEVELS ARE AT EL.100' - 0" UNLESS NOTED OTHERWISE.
3. PROVIDE CONTROL JOINTS IN GYPSUM BOARD WALLS ABOVE THE CORNER OF ALL INTERIOR DOOR AND WINDOW FRAMES IN THE CENTER OF STRAIGHT WALLS 30'-0" IN LENGTH OR GREATER OR AS INDICATED ON INTERIOR ELEVATIONS. PROVIDE HORIZONTAL CONTROL JOINTS AT 10'-0" A.F.F. THROUGHOUT BUILDING, TYP.
4. REFER TO AG-01 FOR STANDARD PLUMBING FIXTURE LAYOUTS (I.E. "S1", "S4", "U2", "L1", "EWC1").
5. ALL WALL-MOUNTED FIRE EXTINGUISHERS & AEDs TO BE MOUNTED AT 48" MAX. TO EXTINGUISHER HANDLE / OPERATING MECHANISM, U.N.O.
6. PROVIDE BLOCKING WITHIN PARTITION FOR ALL WALL MOUNTED ITEMS.
7. INSTALL CORNER GUARDS AT ALL EXPOSED OUTSIDE GYP. BOARD CORNERS ABOVE BASE.
8. MI - WALL MIRROR SIZE 3'-0" W X 6'-0" H MOUNTED ABOVE THE SCHEDULED WALL BASE
9. PROVIDE HORIZONTAL CFMF TO CONTAIN BATT INSULATION ON ALL E3-DA

GENERAL FINISH NOTES

1. ANY SURFACE MOUNTED PLUG MOLD AND CONDUIT TO BE PAINTED TO MATCH ADJACENT WALL.
2. ALL GENERAL WALL PAINT TO BE "PNT-1" AND BASE "RB-1" UNLESS OTHERWISE NOTED. ONE PRIME COAT AND TWO FINISH COATS.
3. CONTRACTOR SHALL INSPECT ALL SURFACES TO RECEIVE PAINTING AND CORRECT ALL DEFECTS BEFORE START OF WORK.
4. ALL CARPET INSTALLATIONS TO BE APPROVED BY THE ARCHITECT. ANY DOMING, CUPPING OR EXAGGERATED SEAMS ARE UNACCEPTABLE. GC TO SUBMIT SEAMING PLAN TO ARCHITECT FOR APPROVAL.
5. CONTRACTOR SHALL REMOVE ALL SPOTS AND ADHESIVE SMEARS FROM SURFACE WITH MANUFACTURER'S APPROVED CLEANING AGENT.
6. CONTRACTOR TO PROVIDE AND INSTALL VINYL OR METAL REDUCING STRIPS AS NOTED IN THE TRANSITION SCHEDULE SO THAT FLOORING IS ADA COMPLIANT. ARCHITECT TO APPROVE PRODUCT & COLOR.
7. ALL FLOORING MATERIAL TRANSITIONS OCCURING AT DOORS SHALL BE CENTERED UNDER THE DOOR IN A CLOSED POSITION.
8. UNDERSIDE OF CONCRETE SLAB, EXPOSED BEAMS AND COLUMNS EQUIPMENT, ELECTRIC CONDUIT AND ANY MISCELLANEOUS ITEMS ARE TO BE PROPERLY PREPARED AND PRIMED TO RECEIVE A PAINT FINISH.
9. THERE SHALL NOT BE PAINT CONDITIONS THAT OCCUR CAUSING FINISH OR COLOR TO TERMINATE ON AN OUTSIDE CORNER. ANY SUCH CONDITIONS TO BE BROUGHT TO ARCHITECT'S ATTENTION.
10. PROVIDE FULL-HEIGHT HIGH CORNER GUARDS AT ALL EXPOSED GYP BOARD CORNERS MOUNTED ABOVE BASE, U.N.O. REFERENCE FINISH PLANS FOR SPECIFIC LOCATIONS AND TYPES.
11. CONTINUE WT-3 WAINSCOT ONTO WALLS THAT TURN BACK, U.N.O.
12. PAINT ALL EXISTING DOOR/ WINDOW FRAMES, PNT-6.

KEYNOTE LEGEND

F01	INSTALL MCT-1 IN THE LOCATION OF EXISTING VCT, NEW RUBBER BASE TO MATCH EXISTING.
F02	PATCH ANY HOLES IN THE WALL.
F03	EXISTING CARPET & BASE TO REMAIN.

FINISH FLOOR LEGEND



FINISH TYPE IDENTIFICATION TAG



FLOOR TRANSITION SYMBOL

REF. TRANSITION SCHEDULE ON A02-01

SCOPE LEGEND

NOT IN SCOPE

Deadline: March 31, 2026 - 2PM

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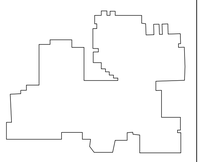
REGISTERED ARCHITECT
BRIAN HANSBERGER
16318
STATE OF TEXAS

Date of issue:
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

KEYPLAN



FLOOR PLAN - LEVEL ONE - OVERALL

JOB 26028
DATE 02/26/2026
SHEET

A02-01



01 FLOOR PLAN - LEVEL ONE - SEGMENT E
1/8" = 1'-0"

PLAN N

GENERAL PLAN NOTES

1. ALL WALLS ARE TYPE A3-DA UNLESS NOTED OTHERWISE.
2. ALL INTERIOR FLOOR LEVELS ARE AT EL.100' - 0" UNLESS NOTED OTHERWISE.
3. PROVIDE CONTROL JOINTS IN GYPSUM BOARD WALLS ABOVE THE CORNER OF ALL INTERIOR DOOR AND WINDOW FRAMES IN THE CENTER OF STRAIGHT WALLS 30'-0" IN LENGTH OR GREATER OR AS INDICATED ON INTERIOR ELEVATIONS. PROVIDE HORIZONTAL CONTROL JOINTS AT 10'-0" A.F.F. THROUGHOUT BUILDING, TYP.
4. REFER TO AG-01 FOR STANDARD PLUMBING FIXTURE LAYOUTS (I.E. "S1", "S4", "U2", "L1", "EWC1").
5. ALL WALL-MOUNTED FIRE EXTINGUISHERS & AEDs TO BE MOUNTED AT 48" MAX. TO EXTINGUISHER HANDLE / OPERATING MECHANISM, U.N.O.
6. PROVIDE BLOCKING WITHIN PARTITION FOR ALL WALL MOUNTED ITEMS.
7. INSTALL CORNER GUARDS AT ALL EXPOSED OUTSIDE GYP. BOARD CORNERS ABOVE BASE.
8. MI - WALL MIRROR SIZE 3'-0" W X 6'-0" H MOUNTED ABOVE THE SCHEDULED WALL BASE
9. PROVIDE HORIZONTAL CFMF TO CONTAIN BATT INSULATION ON ALL E3-DA

GENERAL RCP NOTES

1. CEILING HEIGHTS ARE 9'-0" A.F.F. UNLESS NOTED OTHERWISE.
2. THE CEILING FINISH SCHEDULE INDICATES CEILING MATERIALS AND FINISHES. MATERIALS OR FINISHES THAT VARY WITHIN A ROOM WILL BE INDICATED ON THE R.C.P.
3. RCP'S WILL TYPICALLY INDICATE:
   A. LOCATIONS, DIMENSIONS AND HEIGHTS A.F.F. OF FURRDOWNS.
   B. VARYING CEILING MATERIALS AND THEIR LOCATIONS.
   C. HEIGHTS OF WALLS A.F.F. (FULL EHIGHT AND PARTIAL HEIGHT).
   D. REQUIRED FIRE-RATINGS OF WALLS.
   E. FINAL LOCATIONS OF CEILING MOUNTED FIXTURES/ DEVICES.
4. CONTRACTOR COORDINATE MEP/ ETC. DRAWINGS FOR ALL FIXTURES / DEVICES MOUNTED IN, ABOVE, OR HUNG FROM THE CEILING. FINAL FIXTURE / DEVICE LOCATIONS ARE DETERMINED BY THE ARCHITECTURAL R.C.P. WHERE CONDITIONS DIFFER SIGNIFICANTLY BETWEEN THE PLANS, REQUEST CLARIFICATION FROM THE ARCHITECT BEFORE PROCEEDING. WHERE FIXTURES / DEVICES SHOWN OR SPECIFIED ON DRAWINGS OTHER THAN THE ARCHITECTURAL R.C.P.'S ARE VISIBLE AT THE CEILING PLANE, COORDINATE LOCATIONS WITH THE ARCHITECT.
5. LOCATE CEILING MOUNTED FIXTURES / DEVICES IN THE CENTERS OF FULL CEILING PLANELS / TILES U.N.O.
6. GYP. CEILINGS AND ALL SIDES OF GYP. BULKHEADS TO BE PNT-1, U.N.O. ON THE RCP'S.
7. ACCENT PAINT ON GYP. BOARD BULKHEADS TO BE PAINTED ON BOTTOM AND SIDES OF BULKHEAD.
8. ALL INTERIOR PARTITIONS ARE TO BE TO DECK, U.N.O.

SPECIALTY EQUIPMENT SCHEDULE

CODE	DESCRIPTION
IP-75	INTERACTIVE 75" PANEL, REF. MEP
MB-8	MARKERBOARD 4' X 8'

SCOPE LEGEND

NOT IN SCOPE

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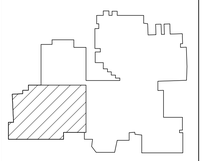
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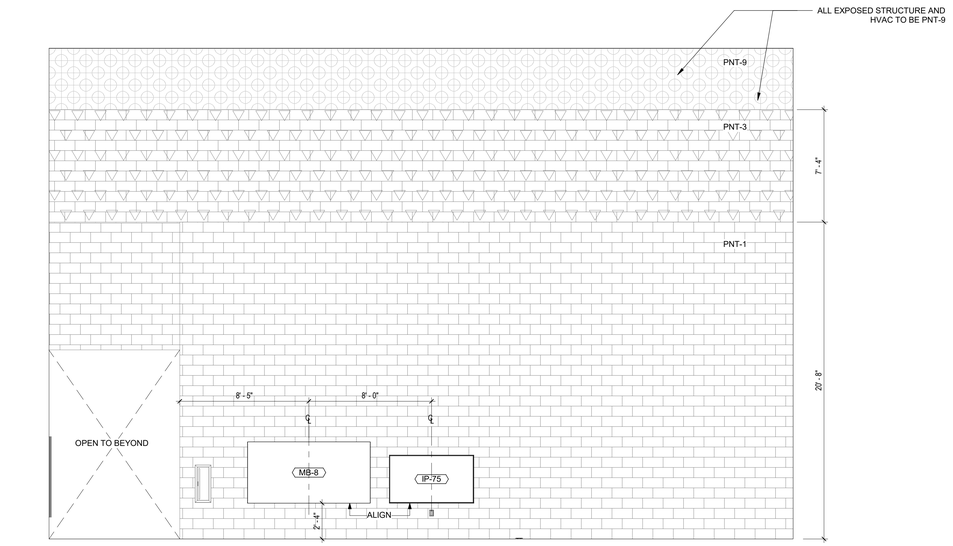
KEYPLAN



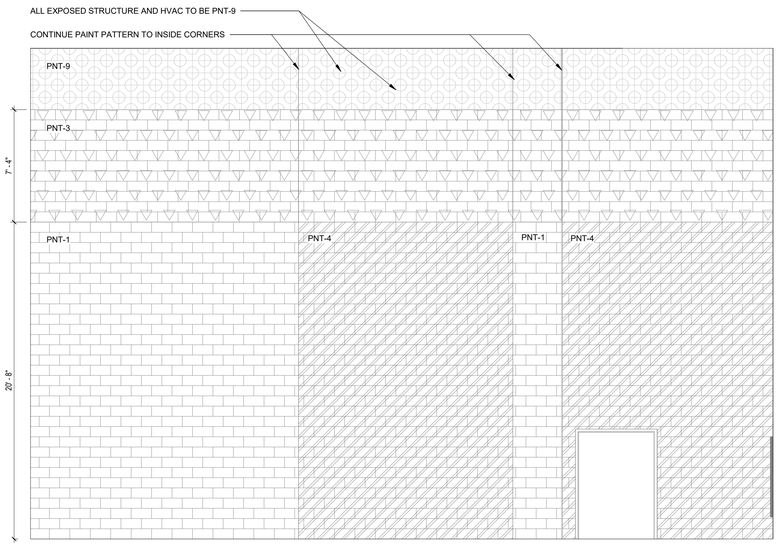
FLOOR PLAN - LEVEL ONE

JOB 26028
DATE 02/26/2026
SHEET

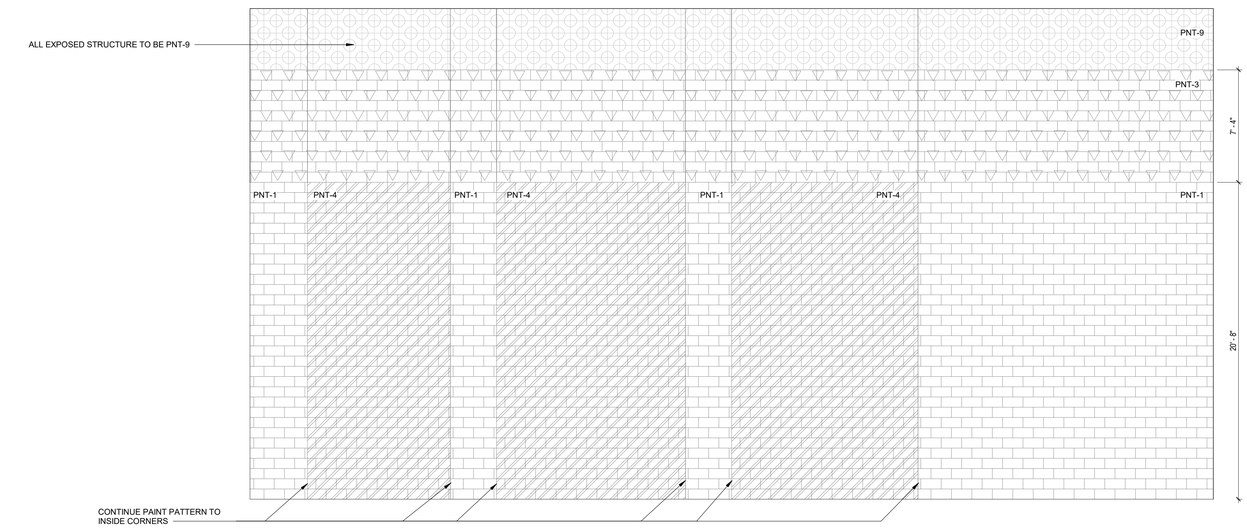
A02-02



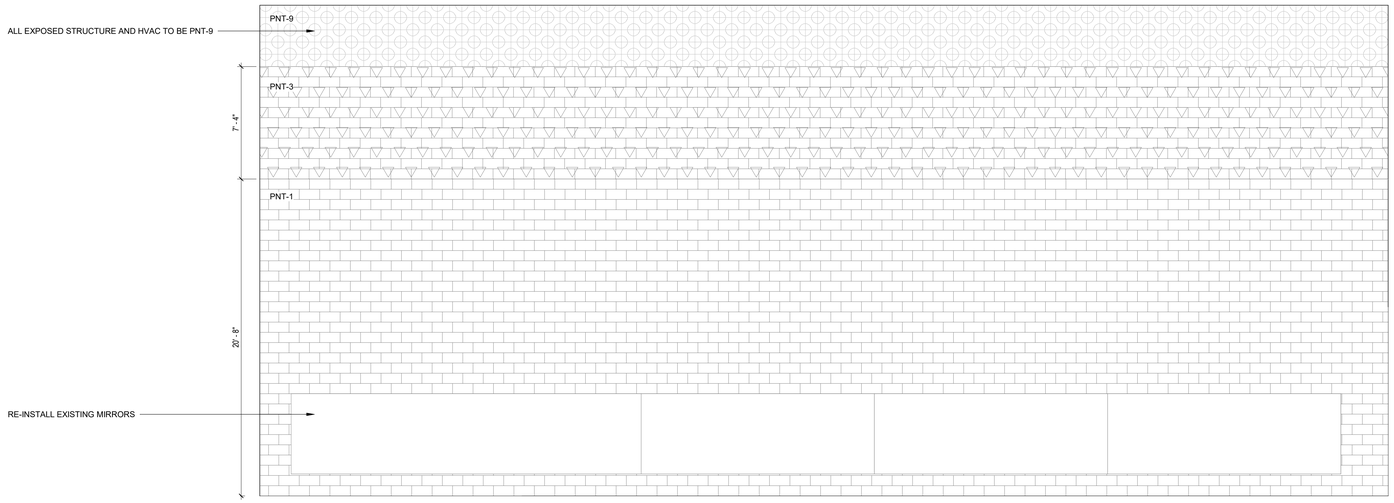
04 D119 - S GYMNASTICS
1/4" = 1'-0"



03 D119 - N GYMNASTICS
1/4" = 1'-0"



02 D119 - W GYMNASTICS
1/4" = 1'-0"



01 D119 - E GYMNASTICS
1/4" = 1'-0"

SPECIALTY EQUIPMENT SCHEDULE

CODE	DESCRIPTION
IP-75	INTERACTIVE 75" PANEL, REF. MEP
MB-8	MARKERBOARD 4' X 8'

INT. MATERIALS LEGEND

PNT-2 PNT-4 PNT-9

Deadline: March 31, 2026 - 2PM

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STATE OF TEXAS

Date of issue:
02/26/2026

WILLIAMS MS ATHLETIC SITE AND INTERIOR RENO

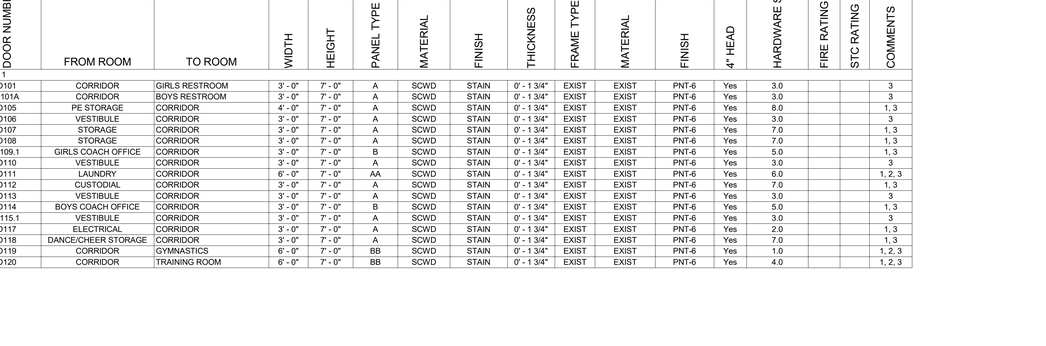
625 E FM 552, Rockwall, TX 75087

INTERIOR ELEVATIONS

JOB 26028
DATE 02/26/2026
SHEET A07-01

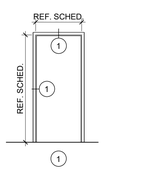
NEW DOOR SCHEDULE

DOOR NUMBER	ROOM		DOOR						FRAME			FRAME				
	FROM ROOM	TO ROOM	WIDTH	HEIGHT	PANEL TYPE	MATERIAL	FINISH	THICKNESS	FRAME TYPE	MATERIAL	FINISH	4" HEAD	HARDWARE SET	FIRE RATING	STC RATING	COMMENTS
LEVEL 1																
D101	CORRIDOR	GIRLS RESTROOM	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D101A	CORRIDOR	BOYS RESTROOM	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D105	PE STORAGE	CORRIDOR	4' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	8.0			1, 3
D106	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D107	STORAGE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	7.0			1, 3
D108	STORAGE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	7.0			1, 3
D109.1	GIRLS COACH OFFICE	CORRIDOR	3' - 0"	7' - 0"	B	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	5.0			1, 3
D110	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D111	LAUNDRY	CORRIDOR	6' - 0"	7' - 0"	AA	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	6.0			1, 2, 3
D112	CUSTODIAL	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	7.0			1, 3
D113	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D114	BOYS COACH OFFICE	CORRIDOR	3' - 0"	7' - 0"	B	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	5.0			1, 3
D115.1	VESTIBULE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	3.0			3
D117	ELECTRICAL	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	2.0			1, 3
D118	DANCE/CHEER STORAGE	CORRIDOR	3' - 0"	7' - 0"	A	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	7.0			1, 3
D119	CORRIDOR	GYMNASTICS	6' - 0"	7' - 0"	BB	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	1.0			1, 2, 3
D120	CORRIDOR	TRAINING ROOM	6' - 0"	7' - 0"	BB	SCWD	STAIN	0' - 1 3/4"	EXIST	EXIST	PNT-6	Yes	4.0			1, 2, 3

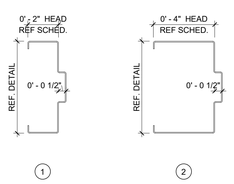


* NOTE: WHERE THE ADJACENT FACE OF WALL IS GREATER THAN 8" FROM FACE OF DOOR, A FORWARD APPROACH IS REQUIRED. THE REQUIRED LATCH SIDE CLEARANCE MUST MAINTAIN THE 8" MAX DEPTH FROM FACE OF WALL TO FACE OF DOOR.

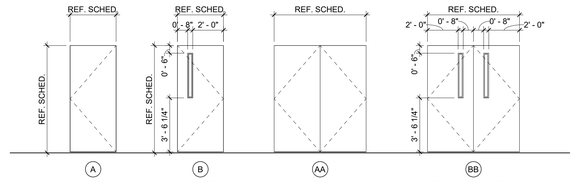
05 REQUIRED DOOR CLEARANCES FOR WALLS GREATER THAN 8" THICK
1/4" = 1'-0"



FRAME TYPES
1/4" = 1'-0"

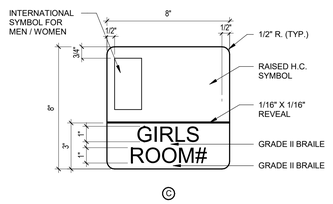


03 H. M. FRAME PROFILES
3" = 1'-0"



STANDARD PANEL TYPES
1/4" = 1'-0"

NOTES:
1. ALL COPY TO BE HELVETICA REGULAR
2. ALL COPY TO BE RAISED 1/32" MIN.
3. COPY STROKE WIDTH TO BE 1/4" WIDE MIN.



01 TYPE C
3" = 1'-0"

DOOR COMMENTS

SPECIFIC DOOR COMMENTS
1. DOOR SWING IS 180°.
2. DOOR TO RECEIVE KEYED REMOVABLE MULLION.
3. EXISTING DOOR FRAME TO REMAIN AND BE RE-PAINTED PNT-6.

GENERAL DOOR COMMENTS
4. ALL DOOR RIM EXIT DEVICE HARDWARE TO BE MOUNTED AT 39" A.F.F.
5. ALL HARDWARE TO BE DULL CHROME FINISH.
6. ALL DOOR EXIT DEVICES TO RECEIVE FLUSH END CAPS.
7. PROVIDE 3/4" UNDERCUT AT INTERIOR DOORS TO ALLOW FOR AIR FLOW. DOOR LOUVERS OR SIDE WALL TRANSFER GRILLES WILL NOT BE ACCEPTABLE.
8. PER AHJ REQUIREMENTS, ROOMS CONTAINING AIR-CONDITIONING SYSTEMS, ELECTRICAL EQUIPMENT OR FIRE PROTECTION SYSTEMS SHALL HAVE AHJ APPROVED SIGNAGE APPROVED BY THE FIRE CODE OFFICAL.

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	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
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	REVISIONS	



Date of issue:
02/26/2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

DOOR SCHEDULE

JOB 26028
DATE 02/26/2026
SHEET
A08-01

MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.



1 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

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	REVISIONS	

JAVIER GARCIA
118760
LICENSED
PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET MP02-01

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Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
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SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.



1 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - OVERALL
1" = 20'-0"

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JAVIER GARCIA
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PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

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MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET MP02-02

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MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

PLUMBING GENERAL NOTES

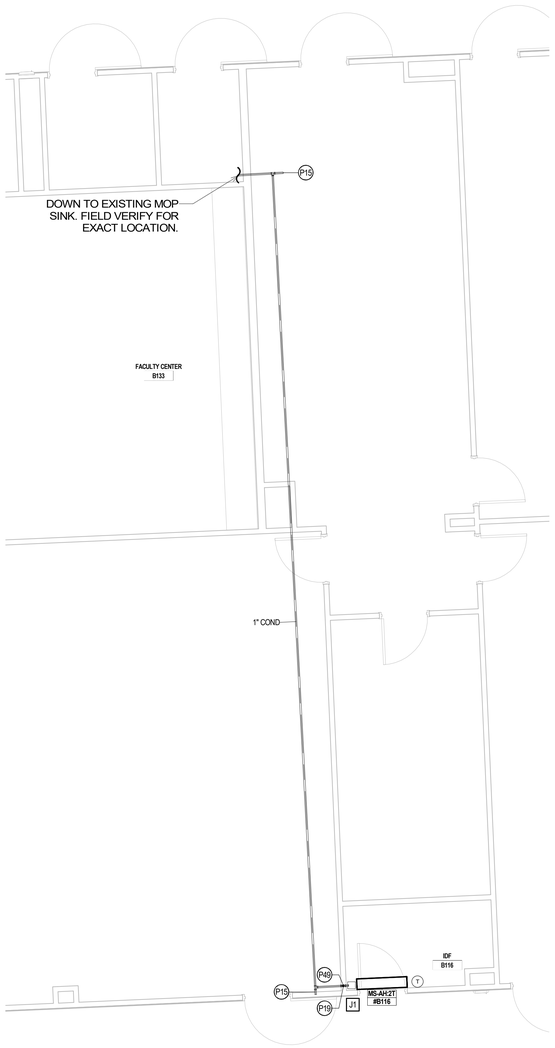
1. SEE SHEET MP07-01 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

MECHANICAL PLAN NOTES

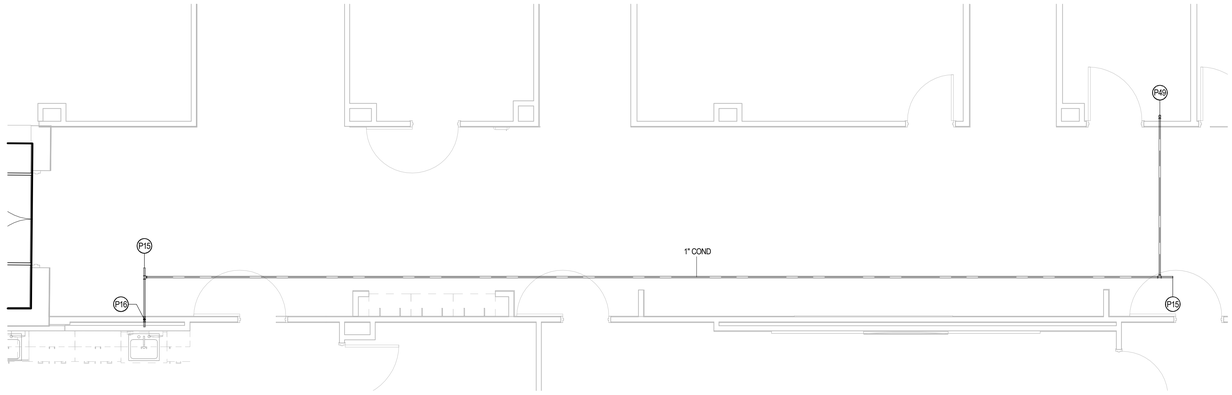
M1	REFRIGERANT LINES TO ROUTE DOWN CHASE PROVIDED BY ARCHITECT.
M2	ROUTE REFRIGERANT LINES NEATLY ON ROOF THROUGH HOODED ROOF PENETRATION.

PLUMBING PLAN NOTES

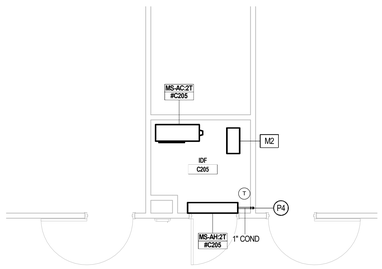
P4	DOWN IN WALL/CHASE
P15	CONDENSATE DRAIN CLEANOUT
P16	CONDENSATE DRAIN DOWN IN WALL, TIE-IN TO P-TRAP AT SINK WITH TAILPIECE
P19	PRESSURIZED CONDENSATE DRAIN LINE UP IN WALL. TIE-INTO NON-PRESSURIZED LINE.
P49	DOWN FROM LEVEL ABOVE



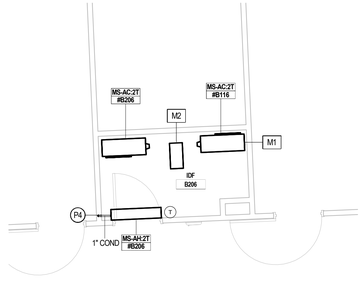
1 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - AREA B - B116 IDF
1/4" = 1'-0"



2 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL ONE - AREA A - C106B & C112
1/4" = 1'-0"



3 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - AREA A - C205 IDF
1/4" = 1'-0"



4 MECHANICAL & PLUMBING FLOOR PLAN - LEVEL TWO - AREA B - B206 IDF
1/4" = 1'-0"

ALL NEW MINI SPLITS TO BE ADDED TO EXISTING EMCS. REFER TO SPEC SECTIONS 23 09 23 AND 23 09 23A FOR FURTHER INFORMATION.

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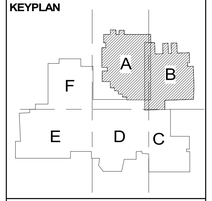
	REVISIONS	



WILLIAMS MS ATHLETIC SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

KEYPLAN



MECHANICAL & PLUMBING ENLARGED FLOOR PLANS

JOB 23162.000
DATE 02/26/2026
SHEET MP04-01

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MECHANICAL GENERAL NOTES

SEE SHEET MP07-01 FOR ALL GENERAL NOTES APPLICABLE TO ENTIRE DRAWING SET

MECHANICAL PLAN NOTES

M2	ROUTE REFRIGERANT LINES NEATLY ON ROOF THROUGH HOODED ROOF PENETRATION.



1 MECHANICAL & PLUMBING ROOF PLAN
1" = 20'-0"

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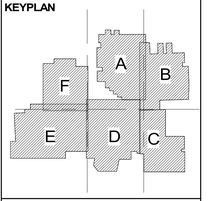
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JAVIER GARCIA
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PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

KEYPLAN

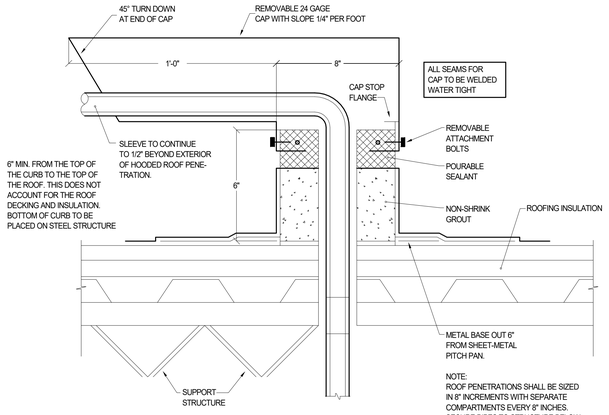


MECHANICAL & PLUMBING ROOF PLAN

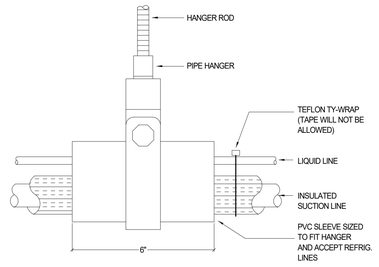
JOB 23162.000
DATE 02/26/2026
SHEET MP06-01

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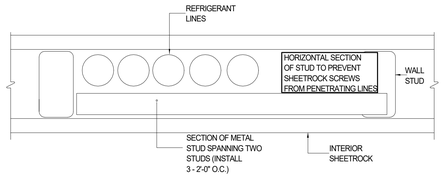
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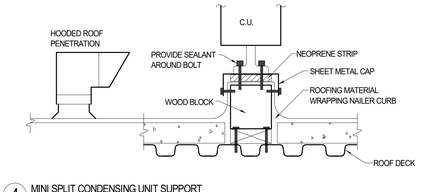
1 HOODED ROOF PENETRATION
N.T.S.



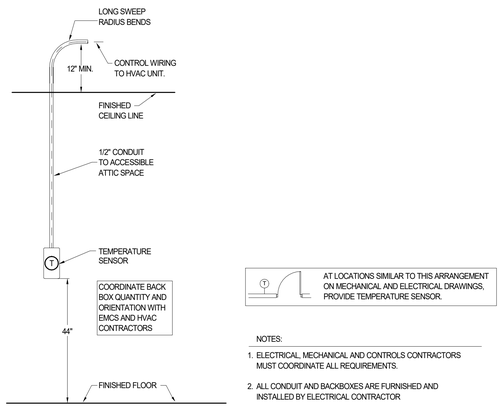
2 REFRIGERANT LINE ABOVE CEILING SUPPORT
N.T.S.



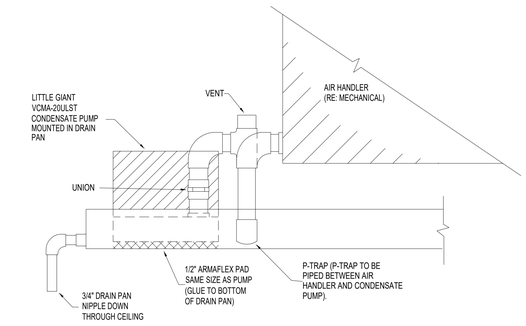
3 REFRIGERNAT LINE IN WALL
N.T.S.



4 MINI SPLIT CONDENSING UNIT SUPPORT
N.T.S.



5 SENSOR MOUNTING
N.T.S.



6 CONDENSATE PUMP DETAIL
N.T.S.

MECHANICAL SYMBOLS

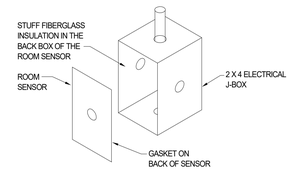
THERMOSTAT/SENSOR (PER SPEC.)		T
CO2 SENSOR		C2
HUMIDISTAT		H
THERMOSTAT/HUMIDISTAT		TH
DUCT DETECTOR WITH CONTROL RELAY		D
GRILLE TYPE		XX
CFM (CUBIC FT. PER MIN.)		###
DUCT TYPE TAG DENOTATION	RECTANGULAR	XX" x XX"
	FLAT OVAL	XX"/XX"
	ROUND	XX"Ø
RETURN AIR GRILLE		
SUPPLY GRILLE		
MANUAL VOLUME DAMPER		
MOTORIZED DAMPER		M
BACKDRAFT DAMPER WITH DIRECTIONAL ARROW		BDD
FIRE DAMPER/SMOKE FIRE DAMPER	RECTANGULAR	FD SFD
	ROUND	FD SFD
CAP		
SPIRAL DUCT		
FLEX DUCT		
MEDIUM PRESSURE DUCT		
EXTERIOR DUCT		
INTERNALLY LINED - PAINT GRIP DUCT		

NOTE: SOME SYMBOLS MAY NOT BE USED.

PLUMBING SYMBOLS

A	ACID LINE
CA	COMPRESSED AIR LINE
COND	CONDENSATE LINE
CRAWL	CRAWLSPACE DRAIN LINE
CW	DOMESTIC COLD WATER LINE
FW	DOMESTIC FILTERED WATER LINE
HW	DOMESTIC HOT WATER LINE
FP	FIRE PROTECTION LINE
FP-D	FIRE PROTECTION DRY LINE
FP-O	FIRE PROTECTION OTHER LINE
FP-PA	FIRE PROTECTION PRE-ACTION LINE
G	GAS LINE
GL	GREASE LINE
SP	PUMP DISCHARGE LINE
ORD	ROOF DRAIN - OVERFLOW LINE
RD	ROOF DRAIN - PRIMARY LINE
S/O	SAND/OIL WASTE LINE
SS	SANITARY SEWER LINE
SW	SOLIDS WASTE LINE
F	SPRINKLER LINE
SD	STORM DRAINAGE LINE
SSD	SUB-SOIL DRAIN LINE
V	VENT LINE
	CUT-OFF VALVE
	CUT-OFF VALVE
	HOSE BIBB
	CAP
	DRAIN
	GAS METER
	FLOOR SINK/O.S.D.
P	PLUMBING RISER
	WATER METER
	GAS COCK (VALVE)
	PRIMARY/OVERFLOW ROOF DRAIN
V.T.R.	VENT THROUGH ROOF
	INDICATES SAWCUT SLAB AND PATCH TO MATCH AFTERWARDS

NOTE: "E-(ABBREVIATION)" = EXISTING PIPING
NOTE: NOT ALL SYMBOLS ARE USED



7 ROOM SENSOR INSULATION
N.T.S.

MECHANICAL GENERAL NOTES

1. MECHANICAL CONTRACTOR TO PROVIDE TO THE PLUMBING CONTRACTOR THE RECOMMENDED AC MANUFACTURER'S DATA FOR CONDENSATE TRAPS PER EACH TYPE OF UNIT.
2. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OR ADJUSTMENT OF ALL HOLD DOWN BOLTS ON COMPRESSORS AT HVAC EQUIPMENT TO ALLOW FOR PROPER VIBRATION ISOLATION.
3. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL ABANDONED SCREWS, PIPING, TAPE, PAPERS, PACKING PRODUCTS, ETC.
4. ALL EQUIPMENT SHALL BE PROPERLY LABELED PER SPECIFICATIONS.
5. CLOSE ALL OUTSIDE AIR DAMPERS UPON INSTALLATION AND KEEP ALL OUTSIDE AIR DAMPERS CLOSED UNTIL THE "TEST AND BALANCE" IS PERFORMED.
6. PROVIDE AND INSTALL MANUAL VOLUME CONTROL DAMPERS ON SUPPLY AND RETURN BRANCH DUCT SERVING A DIFFUSER OR REGISTER. ALL MANUAL DAMPERS INSTALLED ABOVE HARD CEILINGS OR AT OTHER INACCESSIBLE AREAS SHALL BE SUPPLIED WITH A CABLE OPERATED DAMPER EQUAL TO "YOUNG REGULATOR MODEL 830A-CC".
7. DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY THE FIRE ALARM CONTRACTOR, INSTALLED BY THE MECHANICAL CONTRACTOR, AND FINAL TIE-IN BY THE FIRE ALARM CONTRACTOR.
8. SEAL WITH FIRE RETARDING SEALANT AROUND PIPE THROUGH ANY PENETRATION OF FIRE WALLS. REFER TO ARCHITECTURAL SHEETS FOR FIRE WALLS.
9. ALL GRILLES ARE SHOWN IN APPROXIMATE LOCATION. FIELD VERIFY PLACEMENT WITH CEILING GRID.
10. ALL DIFFUSERS/FLEX CONNECTIONS SHALL HAVE A RIGID METAL ELBOW UNLESS COMING DIRECTLY DOWN FROM A UNIT OR HEIGHT OF CEILING IS EXTREME. ALL FLEX DUCT TO HAVE AT LEAST ONE SUPPORT STRAP.
11. THE SPACE AROUND DUCTS AND PENETRATING ITEMS OF SMOKE PARTITION WALLS SHALL BE FILLED WITH AN IBC APPROVED MATERIAL LIMITING THE FREE PASSAGE OF SMOKE.
12. COORDINATE WITH THE PLUMBING CONTRACTOR LOCATION OF ALL SUPPLY FANS WITH PLUMBING VENTS. MAINTAIN 10'-0" MINIMUM SEPARATION.
13. NO MECHANICAL EQUIPMENT THAT REQUIRES SERVICE (i.e. FANS, ROOFTOP UNITS, CONDENSERS, ETC.) ON ROOF SHALL BE CLOSER THAN 10'-6" TO EDGE OF BUILDING.
14. THE MECHANICAL CONTRACTOR SHALL NOT INSTALL ANY ROOF EQUIPMENT CLOSER THAN 5'-0" TO ANY ADJACENT WALLS, EXPANSION JOINTS, AND/OR PARAPETS.
15. COORDINATE WITH THE PLUMBING CONTRACTOR LOCATION OF ALL ROOFTOP UNITS WITH ALL PLUMBING VENTS. MAINTAIN 10'-0" MINIMUM SEPARATION.
16. COORDINATE ALL UNITS, DUCTWORK, GRILLES, REFRIGERANT LINES WITH ALL TRADES BEFORE INSTALLING.
17. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE ROOFING CONTRACTOR ALL COUNTER FLASHING REQUIRED AT ROOF CURBS.
18. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE STEEL ERECTOR AND ROOFING CONTRACTOR THE INSTALLATION OF ALL ROOF MOUNTED EQUIPMENT.
19. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING SLOPE OF STRUCTURAL STEEL TO ALLOW ROOF CURBS TO BE INSTALLED LEVEL.
20. ALL ROOFTOP UNITS AND CURBS TO BE INSTALLED LEVEL. ROOFTOP UNIT MFG. TO PROVIDE SEAL BETWEEN UNIT AND CURB.
21. INSTALL CONDENSERS PER MANUFACTURER CLEARANCES.
22. MECHANICAL CONTRACTOR SHALL SUBMIT TO ARCHITECT / ENGINEER REFRIGERANT LINE SET DESIGN AND ROUTING PER MANUFACTURER FOR REVIEW BEFORE INSTALLATION BEGINS.
23. THE MECHANICAL CONTRACTOR SHALL APPLY ULTRA-VIOLET PROTECTIVE COATING OVER REFRIGERANT INSULATION PER MANUFACTURER.
24. ALL AIR HANDLERS: NO PIPING, CONDUITS, DUCTS, WIRING, DISCONNECTS, ETC. WILL BE ALLOWED TO BE INSTALLED CLOSER THAN 3'-0" (THREE FEET) IN FRONT OF THE SERVICE ACCESS PANEL.

PLUMBING GENERAL NOTES

1. PLUMBING CONTRACTOR TO COORDINATE ALL PIPING ROUTING ABOVE CEILING WITH MECHANICAL AND ELECTRICAL CONTRACTORS BEFORE INSTALLING.
2. PLUMBING CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR MOUNTING HEIGHTS OF ALL AIR HANDLERS TO GUARANTEE POSITIVE DRAINAGE OF ALL CONDENSATE DRAINS (1/8" PER FT. SLOPE - MINIMUM).
3. MECHANICAL CONTRACTOR TO PROVIDE TO THE PLUMBING CONTRACTOR THE RECOMMENDED AC MANUFACTURERS' DATA FOR CONDENSATE TRAPS PER EACH TYPE OF UNIT.

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JAVIER GARCIA 118760 LICENSED PROFESSIONAL ENGINEER
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WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

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MECHANICAL & PLUMBING GENERAL NOTES, SYMBOLS & DETAILS

JOB 23162.000
DATE 02/26/2026
SHEET

MP07-01

COMcheck Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code: 2021 IECC
Project Title: Williams MS
Location: Rockwall, Texas
Climate Zone: 3a
Project Type: Alteration

Construction Site:
Rockwall, Texas

Owner/Agent:
Rockwall ISD
Texas

Designer/Contractor:
Chelsea Casady
EMA Engineering
328 S Broadway Ave
Tyler, Texas 75702
903-581-2677
ccasady@emaengineer.com

Mechanical Systems List

Quantity System Type & Description

3 2T Mini-split (Single Zone):
Heating: 1 each - Central Furnace, Electric, Capacity = 25 kBtuh
No minimum efficiency requirement applies
Cooling: 1 each - Split System, Capacity = 25 kBtuh, Air-Cooled Condenser, Unknown Economizer
Proposed Efficiency = 20.00 SEER2, Required Efficiency = 13.40 SEER2
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Chelsea Casady — Name - Title
Chelsea Casady — Signature
2/23/26 — Date

Project Title: Williams MS
Data filename:
Report date: 02/23/26

SMALL CAPACITY SPLIT SYSTEM SCHEDULE

MS MARKS	DESIGN MANUFACTURER	MODEL	TONS	SEER2 | IEER	EER2	HSPF2	FAN CFM HIGH SPEED	FAN CFM LOW SPEED	COOLING CAPACITY (MBTUH)	HEATING CAPACITY (MBTUH)	ELECTRICAL VOLT.	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	MAXIMUM PIPE (FT) ELEV.	MAXIMUM PIPE (FT) LENGTH	UNIT WEIGHT (LBS)	REMARKS | PROVIDE	MS TAGS
MS-AH:2T	LG	KNSAC241A	2T				650	370			208 V	1	0 A	0 A			30	POWERED FROM AC UNIT, CONDENSATE PUMP, WIRED SENSOR	B116, B206, C205
MS-AC:2T	LG	KUSAC241A	2T	20	12.3	8.8			25	25	208 V	1	15 A	20 A	33	65 1/2	100	A2L REFRIGERANT, HAIL COIL GUARD	B116, B206, C205

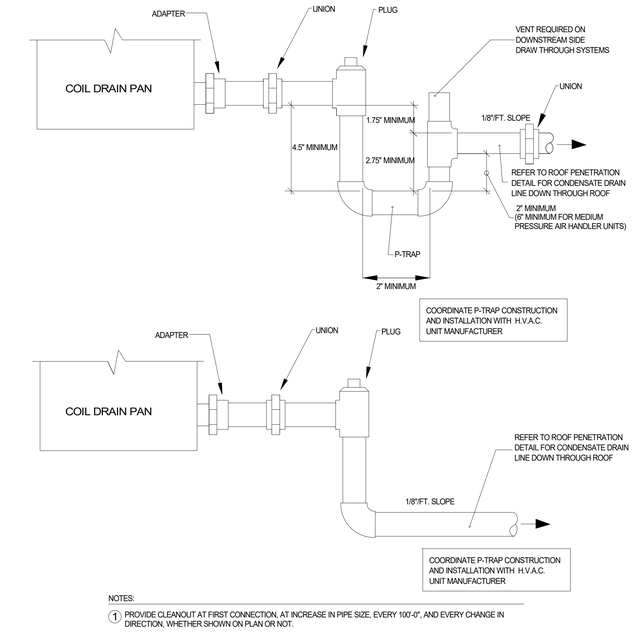
MARK	DESCRIPTION	MANUFACTURER & NO	SUPPLY	ELEC. DATA	ACCESSORIES	PAIRING ACCESSORY
WATER COOLERS - FOUNTAINS						
E1	ON-WALL ELECTRIC DRINKING FOUNTAIN - FREEZE RESISTANT	ELKAY EDFP217FPK	COLD	120 V.	ARCHITECT TO SELECT FINISH, NO CFC REFRIGERANTS, WADE 403 CARRIER, CANE TOUCH APRON, VANDAL RESISTANT, REFER TO ARCHITECTURAL PLANS FOR MOUNTING HEIGHT	
PUMPS						
J1	CONDENSATE PUMP	LITTLE GIANT VCMA-20ULST		120 V. 1.5 AMPS	20 G.P.M. AT 15 FEET TOTAL HEAD, 6' POWER CORD, PROVIDE CHECK VALVE ON DISCHARGE LINE	

*PLUMBING CONTRACTOR SHALL PROVIDE AN OFFSET VACUUM BREAKER TUBE WHERE THE HEIGHT OF THE GRAB BAR CREATES A CONFLICT WITH THE FLUSH VALVE.

MINIMUM FIXTURE CONNECTION SCHEDULE

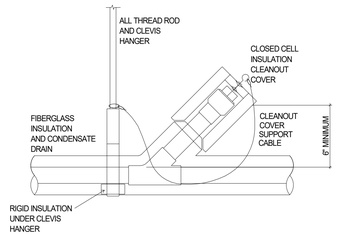
NAME OF FIXTURE	C.W.	H.W.	TRAP SIZE	WASTE	VENT	REMARKS
WATER CLOSET	1"	-	-	4"	2"	FLUSH VALVE WITH MAX. 1.28 GALLON FLUSH
URINAL	3/4"	-	3"	3"	2"	SIPHON JET TYPE W/MAX. 0.5 GALLON FLUSH
LAVATORY	1/2"	1/2"	1-1/4"	1-1/2"	1-1/4"	
COUNTER SINK	1/2"	1/2"	1-1/2"	2"	1-1/2"	
JANITOR SINK	1/2"	1/2"	3"	3"	2"	WALL HUNG OF FLOOR TYPE
ELEC. WATER COOLER	1/2"	-	1-1/4"	1-1/2"	1-1/4"	
FLOOR DRAIN	1/2"	-	3"	3"	2"	ALL FLOOR DRAINS TO HAVE TRAP PRIMERS

NOTE: ALL THE ABOVE FIXTURES ARE NOT NECESSARILY USED.

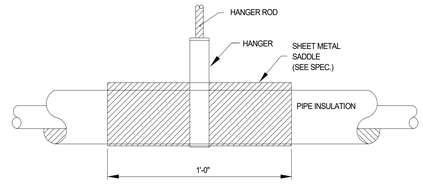


NOTES:
1. PROVIDE CLEANOUT AT FIRST CONNECTION, AT INCREASE IN PIPE SIZE, EVERY 100'-0", AND EVERY CHANGE IN DIRECTION, WHETHER SHOWN ON PLAN OR NOT.

1 CONDENSATE DRAIN DETAIL
N.T.S.



2 IN-LINE CONDENSATE CLEANOUT DETAIL
N.T.S.



3 PIPE SUPPORT DETAIL
N.T.S.

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MECHANICAL & PLUMBING SCHEDULES, DETAILS & COMCHECK

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2/25/2026 12:55:41 PM MP08-01 MECHANICAL & PLUMBING SCHEDULES, DETAILS & COMCHECK

LUMINAIRE SCHEDULE: WILLIAMS MIDDLE SCHOOL ADDITIONS AND RENOVATIONS

Nada F - (903) 581-2677
nfierro@emaengineer.com
EMA Project #26 0017

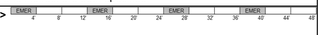
General Requirements:

(1) All luminaires to have .125 lens thickness, 4000K color temp, 10% THD drivers, 80 CRI or better and be dimmable down to 10% unless otherwise stated. All exterior luminaires to be 70 CRI or better. (2) See Lighting Control Chart and details for more information regarding controls. (3) Any luminaire that ends in "E" in the drawing set is to be treated as an emergency version of the listed luminaire. Any luminaire that ends in "G" in the drawing set is to be treated as an emergency version of the listed luminaire connected to a generator and/or UPS. (4) All LED luminaires are to have lumen output tolerance of +/- 8% and VA tolerance of +5% / -10%. (5) All submitted luminaires shall have an L70 rating of at least 50k hrs and shall have a 5 year system warranty with both listed on the manufacturer cut sheet. (6) For linear luminaires (Lx, LHx, Px, PLx, Wx, etc.), the number in the Type Mark indicates the linear length in whole feet. For linear luminaires (Lx-x, LHx-x, Px-x, PLx-x, Wx-x, etc.), the numbers in the Type Mark indicates the linear length in feet and inches, unless otherwise noted. (7) For round luminaires (Rx, RHx, etc.), the number in the Type Mark indicates the diameter in whole feet.

*Lumen output and VA listed are per luminaire or per head or per linear foot and include both up and down component if direct and indirect are both specified.

Emergency Lighting Requirements:

Linear Emergency Section Layout >>



Project Specific Comments and Requirements:
See Specifications, Lighting Controls Chart and COMcheck for additional luminaire and controls information.

Comments Key:
D1%- Dimmable to 1%, FS- Fused, MS- Integral Motion Sensor, MS/PC- Integral Motion Sensor / Photocell,

Type	Description	Luminaire Equivalents	Delivered Lumens	Comments	Volts	Watts Max
M	LED High Mast Luminaire, Yoke Mounted, with Type V Square Distribution, Glare Shield, Color: By Architect	Wisconsin Lighting Lab WS HSX 330,	56375	FS, MS/PC	480V	328
ZZZ	END OF SCHEDULE, , with , Color:					

Exterior Lighting Controls

Provide and install mechanically-held contactors as required in electrical rooms throughout the building to control the exterior lighting in groups as indicated in plan notes and on drawings, to satisfy the requirements of IECC 2021. Provide and install control wiring as required to all contactors throughout the building so that each group of luminaires operates together. On/off control of all exterior luminaires shall be by photocell and existing Energy Management Control System (EMCS), as specified. See information to the right for dimming control and additional requirements.

Parking Lot and Walkway Lighting	Motion Sensor - 15 minutes	Control - Dim to 50%	Photocell - Req'd.	Schedule - Not Req'd
All Other Lighting	Motion Sensor - N/A	Control - On / Off	Photocell - Req'd.	Schedule - Automatically shut off from midnight to 6:00AM

Exterior Lighting Control System Diagram

NOTES:
1. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF THE FOLLOWING:
   - WALL PACKS
   - SOFFIT LUMINAIRES
   - FLAG POLE LUMINAIRES
   - WALKWAY LUMINAIRES
   - PARKING LOT LUMINAIRES DESIGNATED AS SECURITY LIGHTING
   - EACH INDIVIDUAL PARKING LOT
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL WIRING, CONDUIT, CONTROLS ETC. AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM. CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL LOW VOLTAGE CONTROLS WIRING AS CONTROL RELAY.

1. PHOTOCELL - 24V, RAINTIGHT, ROOF-MOUNTED, FACING NORTH
2. CONTROL RELAY WITH OVERRIDE SWITCH - 120 V WITH 24V COIL, SPDT, 20A OR AS REQUIRED BY CONTROLS CONTRACTOR (FUNCTIONAL DEVICES INC. #RIB2101SBC OR APPROVED EQUAL)
3. MECHANICALLY-HELD LIGHTING CONTACTOR - 480V WITH 120V COILS, 30A, POLE AS REQUIRED

1 EXTERIOR LIGHTING CONTROL BY EMCS
N.T.S.

LIGHTING GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

1. VERIFY ALL CEILING HEIGHTS AND TYPES WITH ARCHITECTURAL DRAWINGS BEFORE PROVIDING LUMINAIRES AND WIRING.
2. REFER TO SPECIFICATIONS, LUMINAIRE SCHEDULE AND LIGHTING CONTROL CHART FOR ADDITIONAL REQUIREMENTS AND MORE INFORMATION.
3. ROUTE CONDUIT IN EXPOSED AREAS PERPENDICULAR OR PARALLEL TO WALLS. ROUTE CONDUIT AS HIGH AS POSSIBLE AND ROUTE CONDUIT RUNS ADJACENT TO EACH OTHER. CONDUIT SHALL BE ORDERLY AND NEAT.
4. EXISTING LUMINAIRES REMOVED AND NOT REUSED SHALL REMAIN PROPERTY OF THE OWNER.

ELECTRICAL LEGEND - LIGHTING SYMBOLS

SYMBOL	DESCRIPTION
———	BRANCH CIRCUIT - CONDUIT IN WALL or ABOVE CEILING, INDICATES DEVICES AND EQUIPMENT ON A CIRCUIT. NOT INTENDED TO SHOW ROUTING
— — — —	BRANCH CIRCUIT OR FEEDER CONDUIT UNDER FLOOR or UNDERGROUND
- - - - - - - -	SWITCH WIRE / SWITCH CIRCUIT, TYPICAL CONTROL PER SPACE
-S1- -S2- -S3- -S1G- -S2G- -S3G- -S1D- -S2D- -S3D-	DAYLIGHT ZONE - REFER TO LIGHTING CONTROL CHART FOR MORE INFORMATION (P-DZ = PRIMARY DAYLIGHT ZONE, S-DZ = SECONDARY DAYLIGHT ZONE)
CL-1,3,5	ARROW INDICATES HOMERUN, TEXT INDICATES PANEL AND CIRCUIT
$: $_3$: $_4$	SWITCH LOCATION MOUNTED AT 44" A.F.F. UNLESS NOTED - STANDARD / PROGRAMMABLE ; 3-WAY ; 4-WAY
$K : $3K: $4K	KEYED SWITCH LOCATION - (SAME AS ABOVE) - KEY OPERATED, PROVIDE 12 EXTRA KEYS FOR OWNER
: $_{HV}$: $_{WM}$: $_{CM}$	MOTION SENSOR CONTROLS, SEE SPECS FOR LOCATION, QUANTITY, COMMISSIONING ETC. (HV = HIGH VOLUME, WM = WALL MOUNT, CM = CORNER MOUNT)
: $_{HV}$	PHOTOCELL SENSOR CONTROLS, SEE SPECS FOR LOCATION, QUANTITY, COMMISSIONING ETC. (HV = HIGH VOLUME)
: :	LUMINAIRE, SEE LUMINAIRE SCHEDULE & SPECS FOR MORE INFO, LETTER INDICATES TYPE RECESSED ; SURFACE ; PENDANT
: :	EMERGENCY LUMINAIRE - (SAME AS ABOVE) - SWITCHED, WITH BATTERY, GENERATOR OR UPS BACKUP MOUNTED AT 7'-6" A.F.F. UNLESS NOTED
: :	CRITICAL BRANCH LUMINAIRE - (SAME AS ABOVE) - SWITCHED, WITH GENERATOR BACKUP MOUNTED AT 7'-6" A.F.F. UNLESS NOTED
	EMERGENCY LUMINAIRE - (SAME AS ABOVE) - NOT SWITCHED, WITH BATTERY, GENERATOR OR UPS BACKUP
:	EXIT SIGN - NOT SWITCHED, CONTINUOUSLY LIT, BATTERY OPERATED - CEILING MOUNT ; WALL MOUNT
	EXTERIOR LUMINAIRE - SEE LUMINAIRE SCHEDULE FOR MORE INFORMATION

NOTES:
1. SOME SYMBOLS MAY NOT BE USED.
2. ALL DASHED SYMBOLS ARE SAME AS ABOVE BUT EXISTING.
3. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 48" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ELECTRICAL DETAILS AND ARCHITECTURAL DRAWINGS.
4. SEE LIGHTING CONTROL CHART FOR SWITCH, MOTION SENSOR AND PHOTOCELL INFORMATION AND CONTROL.

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LIGHTING DETAILS, SYMBOLS, & GENERAL NOTES

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ELECTRICAL GENERAL NOTES

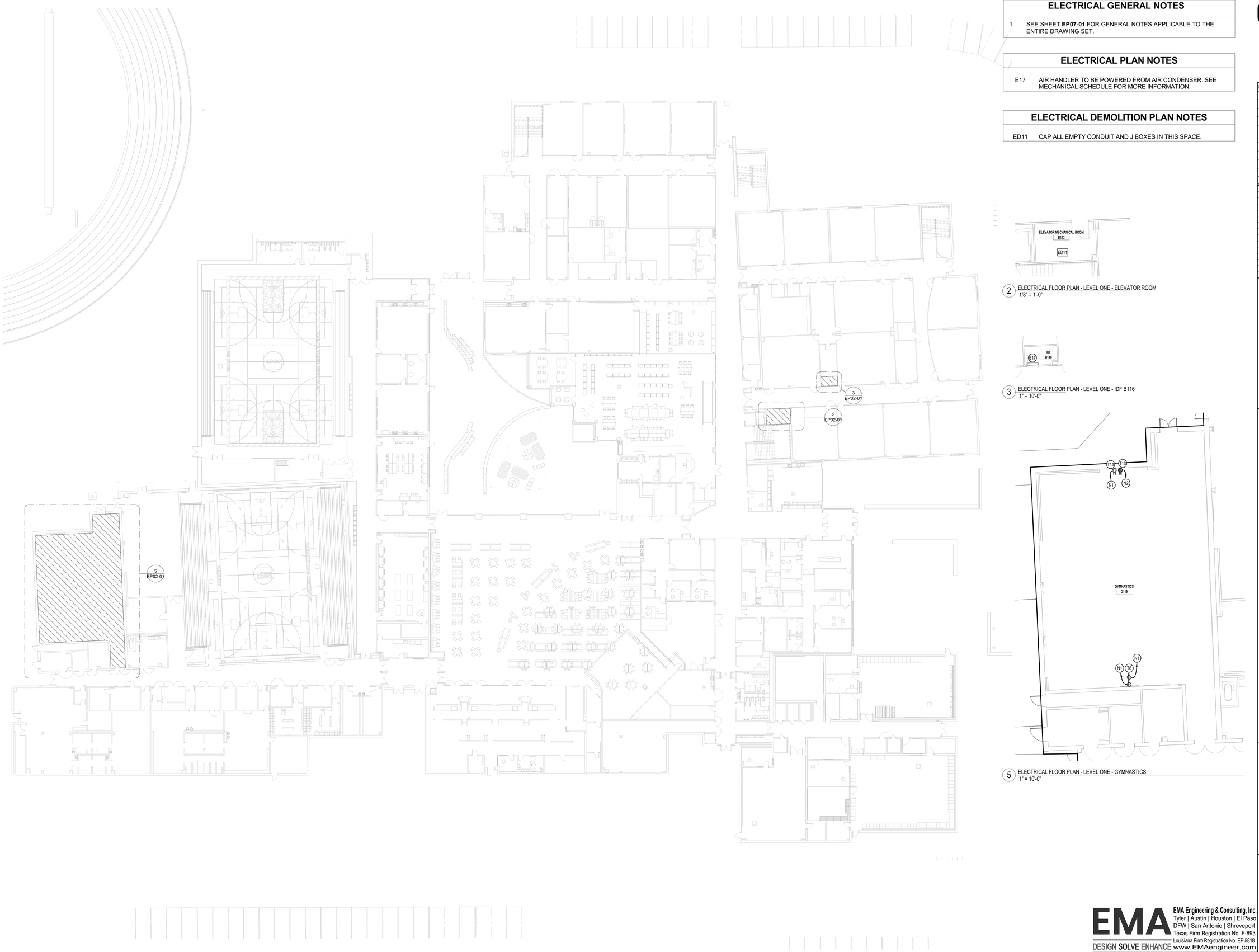
1. SEE SHEET **EP07-01** FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

ELECTRICAL PLAN NOTES

E17 AIR HANDLER TO BE POWERED FROM AIR CONDENSER. SEE MECHANICAL SCHEDULE FOR MORE INFORMATION.

ELECTRICAL DEMOLITION PLAN NOTES

ED11 CAP ALL EMPTY CONDUIT AND J BOXES IN THIS SPACE.



1 ELECTRICAL FLOOR PLAN - LEVEL ONE
1" = 20'-0"

2 ELECTRICAL FLOOR PLAN - LEVEL ONE - ELEVATOR ROOM
1/8" = 1'-0"

3 ELECTRICAL FLOOR PLAN - LEVEL ONE - IDF B116
1" = 10'-0"

5 ELECTRICAL FLOOR PLAN - LEVEL ONE - GYMNASTICS
1" = 10'-0"

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102427
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ELECTRICAL FLOOR PLAN - LEVEL ONE- OVERALL

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1 ELECTRICAL FLOOR PLAN - LEVEL TWO
1" = 20'-0"

ELECTRICAL GENERAL NOTES

1. SEE SHEET **EP07-01** FOR GENERAL NOTES APPLICABLE TO THE ENTIRE DRAWING SET.

ELECTRICAL PLAN NOTES

E1 WEATHERPROOF GFCI MAINTENANCE RECEPTACLE INSTALLED BELOW DISCONNECT.

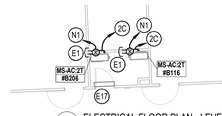
E17 AIR HANDLER TO BE POWERED FROM AIR CONDENSER. SEE MECHANICAL SCHEDULE FOR MORE INFORMATION.

ELECTRICAL AC RENOVATION PLAN NOTES

2C PROVIDE POWER TO 2-TON AIR CONDENSER USING EXISTING BREAKER SPACE IN EXISTING 208V PANEL. PROVIDE A NEW 2P 20A BREAKER, #10 WIRE, 30A DISCONNECT AND 20A FUSES.

ELECTRICAL RENOVATION PLAN NOTES

N1 PROVIDE POWER TO RECEPTACLES USING EXISTING AVAILABLE BREAKER SPACE OR EXISTING AVAILABLE SPARE BREAKER IN NEAREST ACCEPTABLE 120/208V PANEL. A MAXIMUM OF 8 RECEPTACLES MAY BE ON 1 CIRCUIT. PROVIDE A NEW 1P 20A BREAKER AND #12 WIRE.



2 ELECTRICAL FLOOR PLAN - LEVEL TWO - IDF B206
1" = 10'-0"

3 ELECTRICAL FLOOR PLAN - LEVEL TWO - IDF C205
1" = 10'-0"

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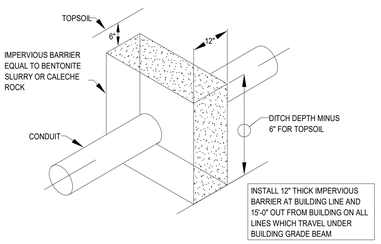
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ELECTRICAL FLOOR PLAN - LEVEL TWO- OVERALL

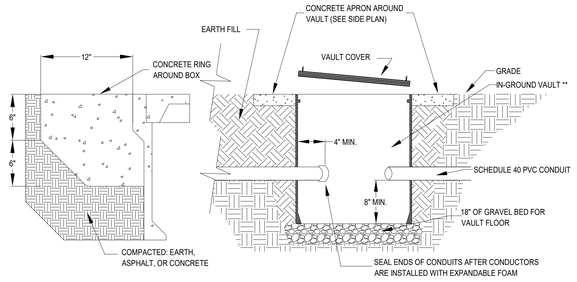
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1 IMPERVIOUS BARRIER
N.T.S.



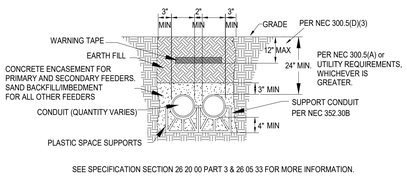
** IN-GROUND VAULT. CONSTRUCTION SHALL BE FIBERGLASS OR POLYMER-CONCRETE WITH A LOAD RATING APPROPRIATE FOR THE INSTALLED LOCATION. EACH ENCLOSURE SHALL BE AN IN-GROUND VAULT WITH A SURFACE-LEVEL COVER AND GRAVEL FLOOR. THE ENCLOSURE SHOULD BE SIZED FOR THE NUMBER OF CONDUITS AND CONFIGURATION REQUIRED. HATCH COVER SHALL BE SECURED WITH AT LEAST TWO PENTAGONAL-HEAD BOLTS.

2 PULL BOX
N.T.S.

ELECTRICAL LEGEND - POWER SYMBOLS

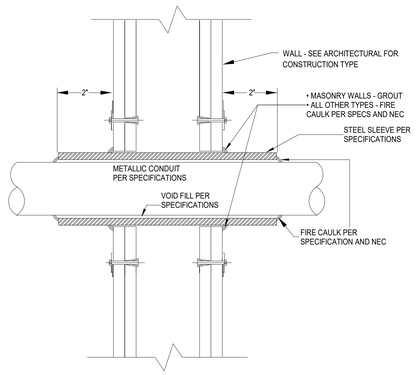
	BRANCH CIRCUIT - CONDUIT IN WALL or ABOVE CEILING. INDICATES DEVICES AND EQUIPMENT ON A CIRCUIT. NOT INTENDED TO SHOW ROUTING.
	BRANCH CIRCUIT OR FEEDER CONDUIT UNDER FLOOR or UNDERGROUND.
	SWITCH WIRE - SWITCH CIRCUIT
CL-1, 3, 5	HOME RUN WITH CIRCUIT DESIGNATION(S) - LETTER DENOTES PANEL
	PANELBOARD or SWITCHGEAR (SEE PANEL SCHEDULES AND RISER DIAGRAM)
	SPECIAL PANEL, EQUIPMENT RACK, CABINET, ETC. - SURFACE MOUNT; FLUSH MOUNT
TX	POWER TRANSFORMER - SEE PANEL SCHEDULE, RISER, AND SPECIFICATIONS.
	DISCONNECT / SAFETY SWITCH - SEE SCHEDULES FOR MORE INFORMATION.
	GROUND ; WEATHERHEAD
	CONCRETE IN-GRADE PULL BOX / HAND HOLE - PROVIDE AS SHOWN OR AS REQUIRED.
	JUNCTION BOX - @ 18" AFF OR AS NOTED , FLUSH WALLS / FLUSH CEILING or FLOOR or ELSE.
	RECEPTACLE @ 18" AFF OR AS NOTED - DUPLEX ; QUAD; SIMPLEX.
	MULTI-POLE RECEPTACLE @ 18" AFF or AS NOTED ; NON-LINEAR TWISTLOCK MULTIPOLE @ 18" AFF or AS NOTED.
	GFCI DUPLEX RECEPTACLE @ 6" ABOVE BACKSPLASH IF SHOWN AT MILLWORK or 18" AFF ; WEATHERPROOF GFCI.
	DUPLEX RECEPTACLE W/ DUAL USB @ 6" ABOVE BACKSPLASH IF SHOWN AT MILLWORK or 18" AFF. SEE SPECIFICATIONS FOR MORE INFORMATION.
	NON-LINEAR RECEPTACLE @ 18" AFF or AS NOTED - DUPLEX ; QUAD.
	DUPLEX FLOOR W/ BRASS COVER PLATE & 3/4" C TO ACCESSIBLE ATTIC SPACE or AS NOTED.
	FLOOR BOX - 2 GANG (RFB2/CFB2) W/1X DUPLEX; 4 GANG (RFB4/CFB4) W/2X DUPLEX. SEE SPECS FOR MORE INFO.
	FLOOR BOX - 6 GANG ; 8 GANG. SEE SPECS FOR MORE INFO.
	FLOOR BOX - 10 GANG; CUSTOM FLOORBOX AS NOTED. SEE SPECS FOR MORE INFO.
	POKE-THRU FLOOR BOX - 3X RECEPTACLES & COMM. SEE SPECS FOR MORE INFO. WALKERBOX EVOLUTION 8AT or APPROVED EQUAL, OR AS NOTED.
	POWER POLE - POWER & DATA
	PLUGMOLD WITH RECEPTACLES AT 12" OC
SR	SURFACE - MOUNT RACEWAY - SEE SPECIFICATIONS FOR MORE INFORMATION.
M M M M	MOTOR - W / MOTOR-RATED SWITCH PER SPECIFICATIONS FOR ALL MOTORS THAT DO NOT REQUIRE OVERLOAD PROTECTION. FINAL CONNECTION BY ELECTRICAL CONTRACTOR - MOTOR (GENERAL) ; EXHAUST FAN ; SUPPLY FAN ; PUMP.
S	MOTOR TOGGLE SWITCH.
	DOOR HOLD BACK - PROVIDE POWER SHOWN TO LOW VOLTAGE TX TO SERVE DEVICE(S).
	EMERGENCY POWER OFF (EPO) - SEE SPECIFICATIONS FOR MORE INFORMATION.
	PHOTOVOLTAIC ARRAY BOUNDARY
	PHOTOVOLTAIC MODULE ; BALLASTED MODULE
	BUZZER - EDWARDS #15IG-6G1 OR APPROVED EQUAL AT 80" AFF.
	PUSH BUTTON - EDWARDS #695 OR APPROVED EQUAL AT 44" AFF ; SIGNAL TX ABOVE CEILING.
WH	WATER HEATER - SEE PLUMBING SCHEDULE FOR MORE INFORMATION.
PS	PLUMBING SENSORS - PROVIDE POWER SHOWN TO LOW VOLTAGE TX TO SERVE DEVICE(S).
	DUPLEX RAISED FLOOR RECEPTACLE.

NOTES:
1. SOME SYMBOLS MAY NOT BE USED.
2. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 46" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ARCHITECTURAL DRAWINGS.
3. DIMENSIONS GIVEN A.F.F. ARE TO BOTTOM OF BOX.

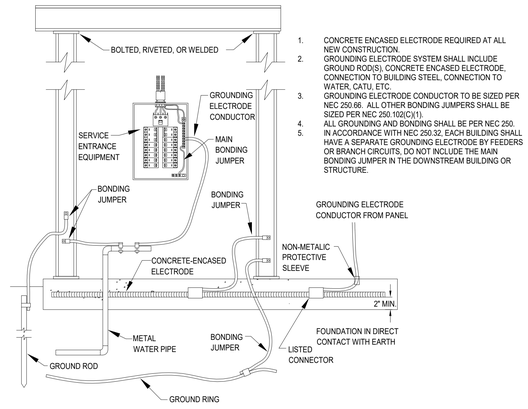


SEE SPECIFICATION SECTION 26 20 00 PART 3 & 26 05 33 FOR MORE INFORMATION.

3 UNDERGROUND CONDUITS
N.T.S.



4 WALL PENETRATION
N.T.S.



1. CONCRETE ENCASED ELECTRODE REQUIRED AT ALL NEW CONSTRUCTION.
2. GROUNDING ELECTRODE SYSTEM SHALL INCLUDE GROUND ROD(S), CONCRETE ENCASED ELECTRODE, CONNECTION TO BUILDING STEEL, CONNECTION TO WATER, CATV, ETC.
3. GROUNDING ELECTRODE CONDUCTOR TO BE SIZED PER NEC 250.66. ALL OTHER BONDING JUMPERS SHALL BE SIZED PER NEC 250.102(C)(1).
4. ALL GROUNDING AND BONDING SHALL BE PER NEC 250.
5. IN ACCORDANCE WITH NEC 250.32, EACH BUILDING SHALL HAVE A SEPARATE GROUNDING ELECTRODE BY FEEDERS OR BRANCH CIRCUITS. DO NOT INCLUDE THE MAIN BONDING JUMPER IN THE DOWNSTREAM BUILDING OR STRUCTURE.

5 GROUNDING ELECTRODE SYSTEM
N.T.S.

ELECTRICAL GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

BRANCH CIRCUITS
1. PROVIDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT. MULTIPLE CIRCUITS SHALL NOT SHARE A COMMON NEUTRAL. NEUTRAL CONDUCTORS SHALL BE SIZED AS LARGE AS THE PHASE CONDUCTORS. NEUTRAL CONDUCTORS SHALL NOT BE SHARED OR BE OF A REDUCED SIZE.
2. UNLESS OTHERWISE NOTED, ALL COMPUTER POWER RECEPTACLES TO HAVE A NORMAL EQUIPMENT GROUND AND AN ISOLATED GROUND WITH #10 AWG NEUTRAL. DIFFERENT CIRCUITS SHALL NOT SHARE A COMMON NEUTRAL.
3. WHERE GFCI PROTECTION IS SHOWN ON PLANS OR SCHEDULE OR OTHERWISE REQUIRED BY NEC (210.8 AND 230.95), PROVIDE A GFCI PERMANENT MOUNTED IN-LINE DEVICE BY NORTH SHORE SAFETY OR HUBBELL OR LITTELFUSE SHOCK BLOCK IN LIEU OF GFCI PROTECTION AT THE RECEPTACLE OR GFCI PROTECTION AT THE OCPD. THESE PRODUCTS OR SIMILAR WILL TYPICALLY WORK FOR 20A, 30A, 40A, 50A AND 60A AT 120/208V 1PH AND 3PH. PRODUCT MUST BE LISTED FOR THE USE. NOTE: GFCI PROTECTION MUST BE PROVIDED WHERE REQUIRED SO COORDINATE GFCI LIMITATIONS WITH PANEL MANUFACTURER CAREFULLY BEFORE BIDDING.

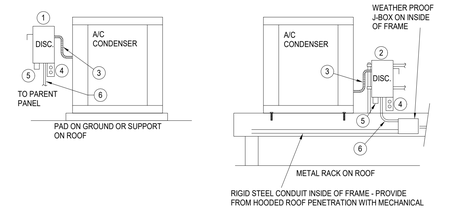
CONDUITS
1. WHERE POSSIBLE, ALL CONDUIT AND / OR CABLING SHALL BE INSTALLED BETWEEN THE BOTTOM AND TOP CHORD OF JOIST. WHERE NO CEILINGS ARE SCHEDULED, ALL CONDUIT SHALL BE UP AGAINST BOTTOM OF THE TOP CHORD. DO NOT SUPPORT OR REST CONDUITS ON BOTTOM CHORD OF JOISTS.
2. ROUTE EACH CONDUIT IN EXPOSED AREAS PERPENDICULAR OR PARALLEL TO WALLS. ROUTE CONDUIT AS HIGH AS POSSIBLE AND ROUTE CONDUIT RUNS ADJACENT TO EACH OTHER. CONDUITS SHALL BE ORDERLY AND NEAT.
3. PROVIDE TWO (2) SPARE ON INCH (1") CONDUITS STUBBED UP INTO ATTIC SPACE AT ALL FLUSH MOUNTED ELECTRICAL CABINETS.
4. COORDINATE CONDUIT ROOF PENETRATIONS WITH MECHANICAL ROOF TOP UNITS AND / OR THRU HOODED PLUMBING PENETRATIONS TO CONDENSING UNITS.

DEVICES
1. AT CASEWORK, VERIFY ALL INSTALLATION HEIGHTS OF RECEPTACLES WITH ARCHITECTURAL DETAILS BEFORE ROUGH-IN.
2. TAMPER RESISTANT RECEPTACLES SHALL BE PROVIDED IN ACCORDANCE WITH NEC ARTICLE 406.12.
3. DO NOT INSTALL DEVICES IN AREAS ON WALLS WHERE MIRRORS, WHITEBOARDS OR OTHER PERMANENT WALL FURNISHINGS WILL BE INSTALLED. DO NOT INSTALL DEVICES IN THESE AREAS UNLESS REVIEWED AND APPROVED BY THE OWNER REPRESENTATIVE.
4. EXACT LOCATION OF ALL RECEPTACLES, DEVICES, & ETC. INSTALLED IN MOVEABLE FURNITURE SHALL BE COORDINATED WITH OWNER REPRESENTATIVE.
5. REFER TO TECHNOLOGY / COMMUNICATION DRAWINGS FOR GENERAL LOCATION OF CONDUITS AND BACK BOXES SUPPLIED BY THIS CONTRACTOR IN BASE BID.
6. UNLESS OTHERWISE NOTED ALL DEVICES THAT PROVIDE POWER TO COMMERICAL AND RESIDENTIAL STYLE LAUNDRY EQUIPMENT TO BE INSTALLED 42" A.F.F. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT AND OWNER REPRESENTATIVE FOR EXACT MOUNTING HEIGHT AND LOCATION PRIOR TO INSTALLATION.

EQUIPMENT
1. DURING SUBMITTAL PHASE, THIS CONTRACTOR SHALL SUBMIT LAYOUT OF ALL PANELS, SWITCHGEAR, TRANSFORMERS, CONTRACTORS, ETC. IN EACH EQUIPMENT ROOM WHERE THIS EQUIPMENT IS LOCATED. ALL LAYOUTS MUST BE DRAWN TO SCALE AND DIMENSIONED.

UTILITY
1. THE CONTRACTOR AND SUBCONTRACTORS SHALL COORDINATE WITH ALL UTILITY COMPANIES AND THE OWNER'S REPRESENTATIVE TO DETERMINE THE LOCATION OF ALL EXISTING LINES AND UTILITIES BEFORE DITCHING IS PERFORMED. THE CONTRACTOR AND SUB CONTRACTORS SHALL BE RESPONSIBLE FOR REPAIR OF ANY CUT OR DAMAGED LINES OR UTILITIES THAT ARE NOT SHOWN ON ANY PLANS.

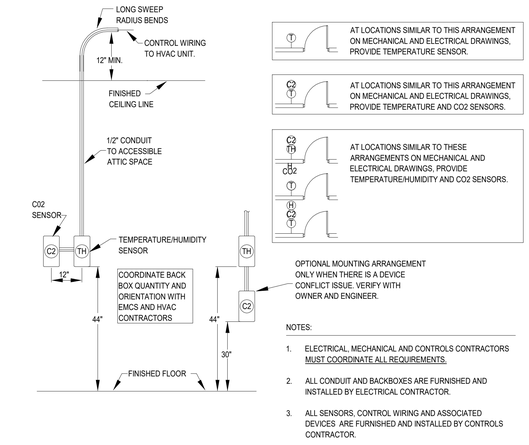
COORDINATION
1. MECHANICAL - EXACT MECHANICAL EQUIPMENT LOCATIONS AND TYPE SHALL BE COORDINATED WITH MECHANICAL PLANS AND MECHANICAL CONTRACTOR. DO NOT INSTALL CONDUIT / CABLING WITHIN 3'-0" OF ANY HVAC UNIT UNLESS THE CONDUIT AND / OR CABLING SERVES THAT UNIT.
2. MECHANICAL - SEE EXHAUST FAN SCHEDULE ON MECHANICAL SHEET FOR EXHAUST FAN SWITCHING, UNLESS CONTROLS ARE SPECIFICALLY NOTED ON THE DRAWINGS. WHERE "EMCS" IS MENTIONED, PROVIDE MECHANICALLY-HELD CONTACTORS AS NECESSARY FOR FAN CONTROL. COORDINATE CONTACTOR COIL ELECTRICAL REQUIREMENTS WITH MECHANICAL CONTROLS CONTRACTOR. WHERE "24/7" IS MENTIONED, PROVIDE A MOTOR-RATED SWITCH AT THE MOTOR ONLY. WHERE "SWITCH" IS MENTIONED, DO ONE OF THE FOLLOWING:
   - IN KITCHEN, TIE ALL HOOD SUPPLY AND EXHAUST FANS TO HOOD CONTROLS. PROVIDE SWITCHES AS NECESSARY AT HOOD. FOR MORE INFORMATION, SEE KITCHEN HOOD DETAIL.
   - IN SCIENCE LABS, TIE EXHAUST FANS TO UTILITY CONTROLLER PER LABORATORY UTILITY SHUT OFF SYSTEM DETAIL.
   - IN ART, PROVIDE CONTROLS FOR KILN EXHAUST PER KILN EXHAUST FAN CONTROL DETAIL.
   - IN BATHROOMS AND JANITORIAL, EXHAUST FAN TO BE SWITCHED WITH THE LUMINAIRES IN THE SPACE PER THE EXHAUST FAN SWITCHING DETAIL.
   - ELSEWHERE, SWITCH THE FAN WITH A MOTOR-RATED SWITCH ON THE WALL IN THE SPACE THE EXHAUST FAN SERVES.
3. MECHANICAL - REFER TO THE MECHANICAL SHEETS FOR ALL SENSOR LOCATIONS (THERMOSTAT, HUMIDISTAT, CO2, ETC.), DUCT DETECTORS, CONTROL RELAYS, MOTORIZED DAMPERS, SFDs, ETC. THIS CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONDUIT, BACK BOXES AND LINE VOLTAGE WIRING TO SENSORS, DEVICES, ETC. AS REQUIRED TO ENSURE A COMPLETE AND OPERATIONAL SYSTEM. FOR MORE INFORMATION, REFER TO SPECIFICATIONS AND SENSOR INSTALLATION DETAIL.
4. MECHANICAL - ALL VARIABLE FREQUENCY DRIVES (VFD's) ARE TO BE PROVIDED BY THE MECHANICAL CONTRACTOR, INSTALLED AND POWERED BY THE ELECTRICAL CONTRACTOR, AND CONTROLLED BY THE CONTROLS CONTRACTOR. THIS CONTRACTOR TO PROVIDE ALL NECESSARY LINE-VOLTAGE WIRING FROM PANEL TO VFD's AND FROM VFD's TO EACH MOTOR.
5. PLUMBING - PROVIDE POWER TO ALL ELECTRIC TRAP PRIMER BY TYING INTO NEAREST 120V GENERAL PURPOSE RECEPTACLE CIRCUIT IN ROOM USING #12 WIRE.



NEVER MOUNT DISCONNECTING MEANS TO ACCESS PANEL OR OVER ANY DATA LABELS OR COVER PLATES. IF ADEQUATE SPACE DOES NOT EXIST ON THE SIDE OF THE UNIT, MOUNT DISCONNECT TO UNISTRUT ASSEMBLY, NOT THE UNIT. SEE PANEL ROOF SUPPORT OR RTU POWER SUPPLY FOR SUITABLE DISCONNECT MOUNTING OPTIONS.

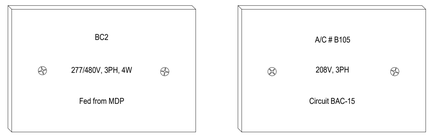
1. NEMA 3R HEAVY DUTY DISCONNECT. AT ANY UNIT WHERE MOUNTING THE DISCONNECT WOULD COVER AN ACCESS PANEL OR THE LABEL AND THERE IS NO SUITABLE DISCONNECT MOUNTING LOCATION NEAR THE UNIT, MOUNT TO UNISTRUT SUPPORTS PER PANEL ROOF SUPPORT.
2. NEMA 3R HEAVY DUTY DISCONNECT ON UNISTRUT SUPPORTS ATTACH UNISTRUT TO STEEL FRAME NOT CONDENSING UNIT
3. SEALTIGHT FLEXIBLE CONDUIT FROM DISCONNECT TO UNIT.
4. GFCI WEATHERPROOF RECEPTACLE AS REQUIRED.
5. LIGHTNING SURGE ARRESTOR. SEE SPECIFICATION 264300.
6. ALL PENETRATIONS THROUGH THE ROOF TO BE IN RIGID CONDUIT. NO FLEXIBLE CONDUIT OR SEALTIGHT.

6 A/C DISCONNECT MOUNTING
N.T.S.



NOTES:
1. ELECTRICAL, MECHANICAL AND CONTROLS CONTRACTORS MUST COORDINATE ALL REQUIREMENTS.
2. ALL CONDUIT AND BACKBOXES ARE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
3. ALL SENSORS, CONTROL WIRING AND ASSOCIATED DEVICES ARE FURNISHED AND INSTALLED BY CONTROLS CONTRACTOR.

7 SENSOR MOUNTING DETAIL
N.T.S.



PANELBOARD LABEL (TYPICAL) HVAC DISCONNECT SWITCH LABEL (TYPICAL)

NOTES:
1. ATTACH SECURELY WITH NON-CORRODING STAINLESS STEEL SCREWS, NON-CORRODING POP RIVETS ARE ACCEPTABLE, ADHESIVE ATTACHMENT IS NOT ACCEPTABLE.
2. LABEL ALL PANELBOARDS, SWITCHBOARDS, TRANSFORMERS, HVAC DISCONNECT SWITCHES, AND MOTOR CONTROL CENTERS AS REQUIRED, REFERENCE SPECIFICATION SECTION 260553.

8 ELECTRICAL EQUIPMENT IDENTIFICATION
N.T.S.

CORGAN
www.corgan.com
T: 214.748.2000

	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
2		
3		
4		
5		
6		
7		
8		
9		
10		

	REVISIONS	

JAMES M. TATE III
102427
LICENSED PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

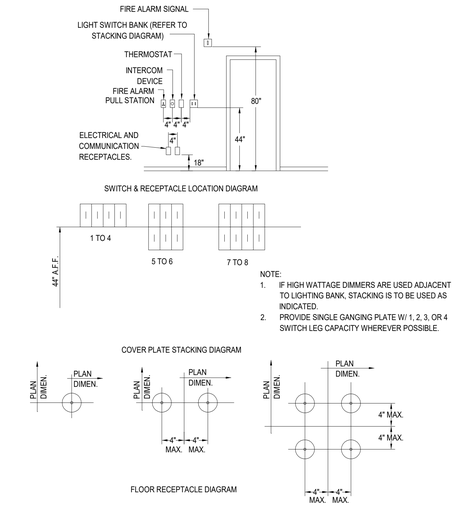
625 E FM 552, Rockwall, TX 75087

ELECTRICAL DETAILS, SYMBOLS, & GENERAL NOTES

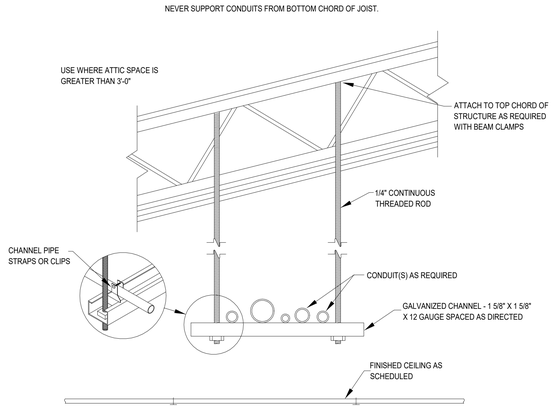
JOB 23162.000
DATE 02/26/2026
SHEET EP07-01

EMA Engineering & Consulting, Inc.
Tyler | Austin | Houston | El Paso
DFW | San Antonio | Shreveport
Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
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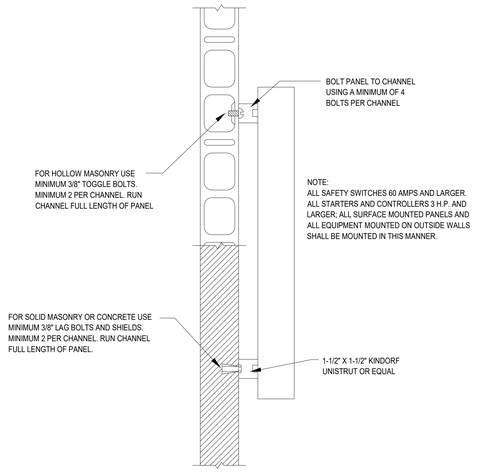
SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.



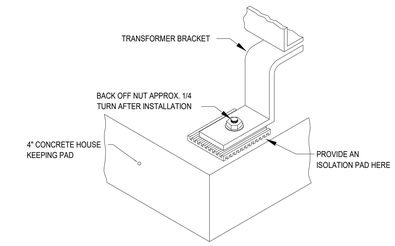
1 OUTLET DIAGRAM
N.T.S.



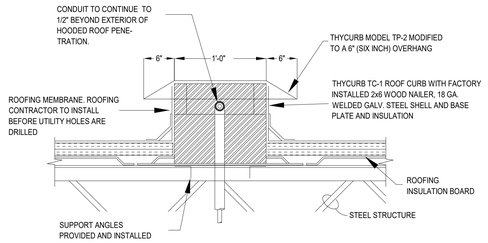
2 CONDUIT SUPPORT
N.T.S.



3 EQUIPMENT MOUNTED ON SURFACE/WALL
N.T.S.



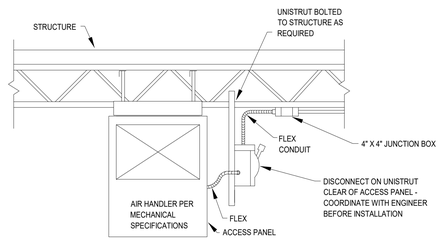
4 ISOLATION PAD
N.T.S.



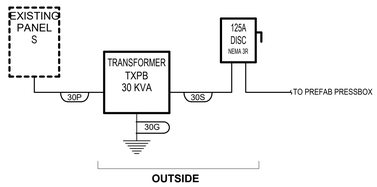
GENERAL NOTES:

1. DO NOT INSTALL IN ROOF VALLEYS.
2. DO NOT INSTALL CLOSER THAN 3'-0" FROM ANY OTHER EQUIPMENT OR ROOF COMPONENT REQUIRING ROOF FLASHING.

6 HOODED ROOF PEN THYCURB
N.T.S.



7 AH DISCONNECT FOR ABOVE CEILING
N.T.S.



PRIMARY SIDE OF XFMR [480v 3ph]

- 15P 3-#10, 1-#10 GRN, 3/4"C.
- 30P 3-#6, 1-#10 GRN, 1"C.
- 45P 3-#4, 1-#8 GRN, 1"C.
- 75P 3-#1/0, 1-#6 GRN, 1 1/2"C.
- 112P 3-#2/0, 1-#6 GRN, 1 1/2"C.
- 150P 3-#4/0, 1-#4 GRN, 2"C.
- 225P 3-#500 MCM, 1-#3 GRN, 3"C.
- 300P 2-2 1/2"C. WITH 3-#250 MCM, 1-#2 GRN IN EACH.

SECONDARY SIDE OF XFMR [208v 3ph]

- 15S 4-#4, 1-#8 GRN, 1 1/2"C.
- 30S 4-#1/0, 1-#6 GRN, 2"C.
- 45S 4-#2/0, 1-#4 GRN, 2 1/2"C.
- 75S 4-#250 MCM, 1-#2 GRN, 2 1/2"C.
- 112S 2-2"C. WITH 4-#3/0, 1-#4 GRN IN EACH.
- 150S 2-2 1/2"C. WITH 4-#250 MCM, 1-#2 GRN IN EACH.
- 225S 3-3"C. WITH 4-#300 MCM, 1-#2 GRN IN EACH.
- 300S 3-3"C. WITH 4-#400 MCM, 1-#1/0 GRN IN EACH.

TRANSFORMER GROUNDS

- 15G #8 GRN
- 30G #6 GRN
- 45G #4 GRN
- 75G #2 GRN
- 112G #2 GRN
- 150G #1/0 GRN
- 225G #2/0 GRN
- 300G #2/0 GRN



SAMPLE REDUCING PIN TERMINAL

AT ALL TERMINATIONS USE ANTIOXIDANT PER MANUFACTURE'S RECOMMENDATION.

ELECTRICAL RISER GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

GENERAL

1. COORDINATE EXACT LOCATION OF ALL EXTERIOR SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, METERS, ETC. WITH OWNER AND ARCHITECT BEFORE FINAL INSTALLATION. AVOID INSTALLING AL SUCH ITEMS NEAR THE FRONT ENTRANCE.
2. FEEDERS AND BRANCH CIRCUITS CAN EXIT THE BOTTOM OR TOP OF EACH PANELBOARD OR SWITCHBOARD AS REQUIRED. FEEDERS CAN EXIT THE SIDES OF TRANSFORMERS IF ACCEPTABLE PER MANUFACTURER.

UTILITIES

1. THE UTILITY WORK SHOWN HERE IS PROPOSED AND MAY NOT INCLUDE ALL UTILITY COMPANY REQUIREMENTS AND CLEARANCES. COORDINATE FINAL UTILITY EQUIPMENT LOCATIONS, ROUTING, EASEMENTS, PAD INFORMATION, ETC. WITH UTILITY COMPANY BEFORE BIDDING.

SERVICE ENTRANCE

1. EXCEPT FOR OVERHEAD AND UNDERGROUND SERVICE ENTRANCE, PROVIDE GROUNDING CONDUCTOR PER RISER NOTES (NEC 250.119, SIZED PER 250.122).
2. GROUNDING ELECTRODE CONDUCTOR (NEC 250.24) SHALL BE INSTALLED AT MAIN SERVICE DISCONNECT UNLESS REQUIRED ELSEWHERE BY CITY ORDINANCE.
3. LABEL ALL SERVICE ENTRANCE EQUIPMENT WITH THE CALCULATED FAULT CURRENT AND DATE OF CALCULATIONS (NEC 110.24(A) THE DATE OF CALCULATIONS SHALL BE THE DATE ON THE SEAL. SEE SPECIFICATIONS FOR MORE INFORMATION.
4. PROVIDE A METER AND AN SPD PER SPECIFICATIONS AT EACH MAIN SWITCHBOARD.
5. WHEN A MAIN SERVICE DISCONNECT IS INSTALLED OUTSIDE, THE MAIN DISTRIBUTION PANEL INSIDE THE BUILDING MUST NOT HAVE THE GROUNDED CONDUCTOR TIED TO THE GROUNDING ELECTRODE SYSTEM.

DRY TYPE TRANSFORMERS (480V-208/240)

1. ALL TRANSFORMERS TO BE 115°C RISE.
2. ALL TRANSFORMERS SERVING PANELS WITH ISOLATED GROUND OR DOUBLE-SIZED NEUTRAL SHALL HAVE A MINIMUM RATING OF K-13. ALL OTHERS MAY BE RATED K-1.
3. WHEREVER THE LENGTH OF THE SECONDARY CONDUCTORS FROM A TRANSFORMER EXCEED TEEN FEET (10'), PROVIDE AN OCPD (CIRCUIT BREAKER OR FUSED DISCONNECT) WITHIN 10' (TEN FEET) OF THE TRANSFORMER SECONDARY TERMINALS PER NEC 240-21(C)(2). UNLESS OTHERWISE NOTED, SIZE THE OCPD TO MATCH THE PANELBOARD THAT THE TRANSFORMER SERVES.

OVERCURRENT PROTECTION / DISCONNECTING MEANS

1. PROVIDE ARC ENERGY REDUCTION PER SPECIFICATIONS AND SHALL MEET NEC 240.67 AND 240.87.
2. ALL SERVICE DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 230.95). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
3. ALL FEEDER DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 215.10). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
4. ALL FEEDER DISCONNECTING MEANS 1000A OR MORE SHALL HAVE GFPE PROTECTION (NEC 210.13). SEE SPECIFICATIONS FOR MORE INFORMATION. (DOES NOT APPLY TO 120/208/240V ELECTRICAL SYSTEMS).
5. PROVIDE GFPE PROTECTION AT GENERATOR PER SPECIFICATIONS AND NEC (NEC 215.10, 230.95, 702).

TERMINATIONS

1. THE USE OF BURNDY OR NSI (OR APPROVED EQUIVALENT) UL RATED COMPRESSION REDUCING PIN TERMINALS ON COPPER AND ALUMINUM CONDUCTORS IS ACCEPTABLE WHERE INSTALLED PER NEC AND PER MANUFACTURERS INSTRUCTIONS. SEE IMAGE ON THIS SHEET.

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JAMES M. TATE III
102427
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02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

ELECTRICAL DETAILS AND RISER DIAGRAM

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Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
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SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

JOB 23162.000
DATE 02/26/2026
SHEET EP07-02

PLUMBING DEMOLITION PLAN NOTES

PDS1 DRINKING FOUNTAINS TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

ELECTRICAL DEMOLITION PLAN NOTES

EDS10 ALL EXISTING SPORTS LIGHTING CONTROL CABINETS, CONTACTORS, SWITCHES, ETC IN ELECTRICAL ROOM IN THIS BUILDING TO BE REMOVED AND REPLACED WITH NEW SPORTS LIGHTING CONTROL CABINET WITH INTEGRAL CONTACTORS. EXISTING CONDUIT AND WIRING FROM ELECTRICAL ROOM TO SPORTS LIGHTING POLES TO REMAIN IN PLACE. EXISTING CONDUIT AND WIRING WITHIN ELECTRICAL ROOM TO BE INTERCEPTED AND REMOVED AS REQUIRED TO ACCOMMODATE ROUTING THROUGH NEW SPORTS LIGHTING CONTROL CABINET WITH INTEGRAL CONTACTORS. CAP AND MARK ALL EXISTING CONDUIT AND WIRING REMOVED DURING DEMOLITION TO BE EXTENDED TO NEW TO NEW SPORTS LIGHTING CONTROL CABINET.

EDS12 PLAY CLOCK DISCONNECT IN EXISTING STORAGE BUILDING TO BE RELOCATED INTO NEW PREFAB PRESSBOX. EXISTING CONDUIT TO BE INTERCEPTED AND EXTENDED AS NEEDED TO NEW LOCATION.

EDS13 SCOREBOARD DISCONNECT IN EXISTING STORAGE BUILDING TO BE RELOCATED INTO NEW PREFAB PRESSBOX. EXISTING CONDUIT TO BE INTERCEPTED AND EXTENDED AS NEEDED TO NEW LOCATION.

ELECTRICAL DEMOLITION PLAN NOTES

EDS1 EXISTING SPORTS LIGHTING PANEL MOUNTED ON LIGHT POLE TO BE REMOVED. REMOVE EXISTING CONDUIT AND WIRING DOWN TO GROUND LEVEL TO BE EXTENDED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. CAP AND MARK CONDUIT. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION.

EDS9 EXISTING POLE MOUNTED SECURITY LIGHTING TO BE REPLACED. CONDUIT AND WIRING FEEDING EXISTING POLE MOUNTED SPORTS LIGHTING TO BE REUSED FOR NEW POLE MOUNTED SPORTS LIGHTING.

LIGHTING DEMOLITION PLAN NOTES

LD1 EXISTING HIGH MAST LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LUMINAIRE HEADS. EXISTING LIGHT POLE AND BASE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING. NEW LED LUMINAIRES TO BE CONTROLLED BY EXISTING EMCS.

LD2 EXISTING FOOTBALL FIELD LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LIGHTING. EXISTING FOOTBALL FIELD LIGHT POLE TO BE REMOVED AND RELOCATED. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING AT NEW POLE LOCATION.

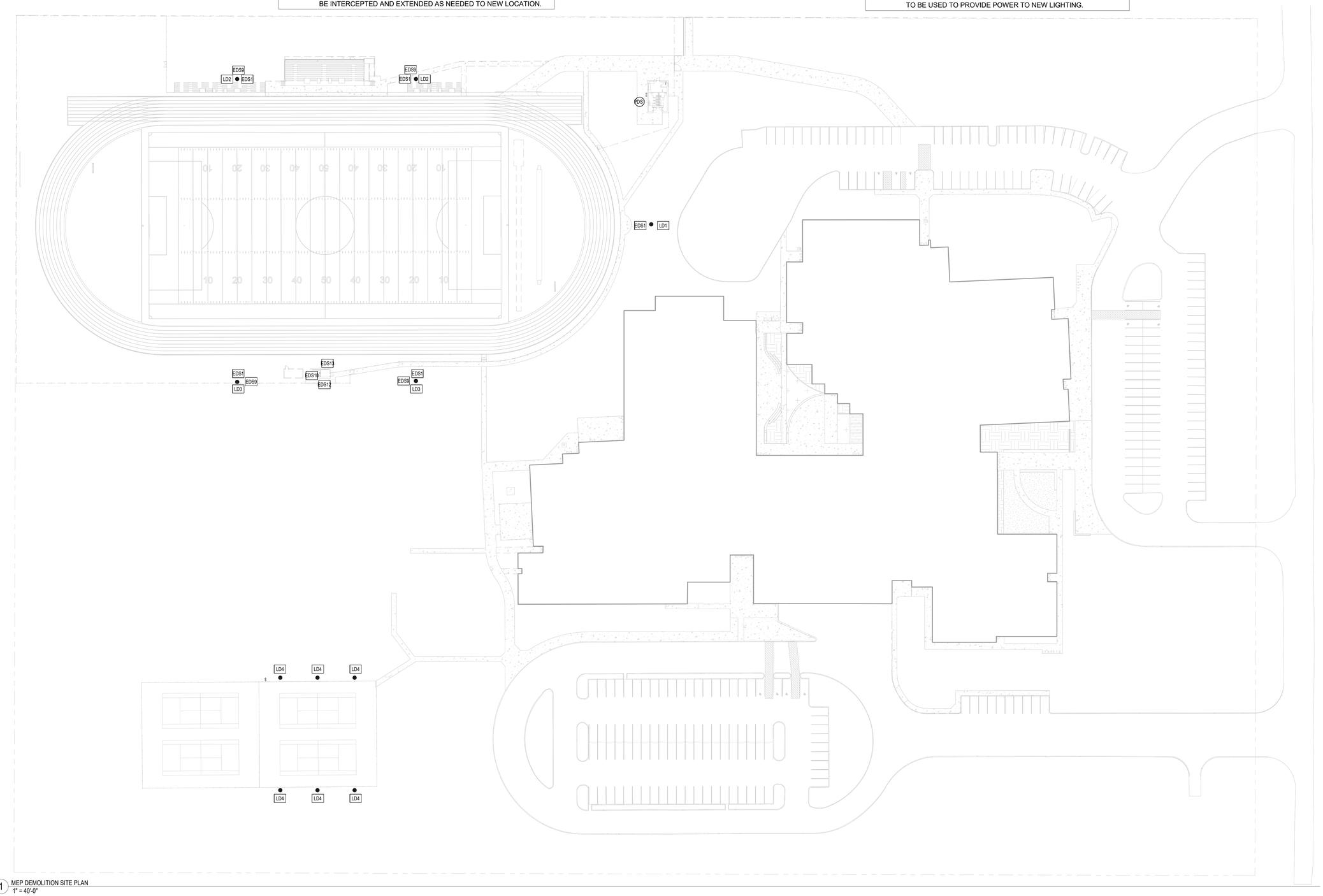
LD3 EXISTING FOOTBALL FIELD LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LIGHTING. EXISTING LIGHT POLE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING.

LD4 ALTERNATE 02 - EXISTING TENNIS COURT LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LIGHTING. EXISTING LIGHT POLE AND BASE TO REMAIN IN PLACE. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING.

ELECTRICAL DEMOLITION GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

1. UNLESS NOTED ON DRAWINGS, ALL LIGHTING, SWITCHES, RECEPTACLES AND OTHER ELECTRICAL DEVICES ARE TO REMAIN.
2. REFER TO SPECIFICATION SECTION 26 05 05, ELECTRICAL DEMOLITION REMODELING, FOR GENERAL DEMOLITION REQUIREMENTS.
3. ALL MATERIAL REMOVED AND NOT RETAINED BY THE OWNER SHALL BE DISPOSED OF OFF SITE IN A LAWFUL MANNER.
4. BEFORE DEMOLISHING PANELS, TRACE ALL BRANCH CIRCUITS TO CONFIRM THAT EXISTING LOADS HAVE BEEN RELOCATED TO NEW PANELS. IF A LOAD EXISTS THAT HAS NOT BEEN RELOCATED TO NEW PANELS, CONTACT THE ENGINEER FOR INSTRUCTIONS.



1 MEP DEMOLITION SITE PLAN
1" = 40'-0"

Deadline: March 31, 2026 - 2PM

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MEP DEMOLITION SITE PLAN

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JOB 23162.000
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ES01-01

LIGHTING PLAN NOTES

L5 ALTERNATE 02 - CIRCUIT NEW TENNIS COURT LIGHTING TO THE EXISTING CIRCUIT AT THIS POLE. EXISTING CIRCUIT TO BE ROUTED THROUGH THE NEW MUSCO SPORTS LIGHTING CONTROL CABINET. PROVIDE A NEW 2 POLE 30A BREAKER TO FEED NEW TENNIS COURT LIGHTING USING EXISTING WIRE.

L6 ALTERNATE 02 - NEW SPORTS LIGHTING CONTROL CABINET. EXISTING TENNIS COURT LIGHTING CIRCUITS SHALL BE ROUTED THROUGH THE NEW CONTROL CABINET. EXTEND CONDUIT AND WIRING AS NECESSARY TO THE CONTROL CABINET. PROVIDE LOCAL OVERRIDE PUSH BUTTON ON CONTROL CABINET.

L8 LOCATION OF SPORTS LIGHTING CONTROL CABINET. COORDINATE EXACT ELECTRICAL REQUIREMENTS WITH MANUFACTURER BEFORE INSTALLATION. PROVIDE POWER FROM EXISTING 120/208V PANEL "PBL" LOCATED IN THIS ELECTRICAL ROOM. PROVIDE A NEW 20A 1POLE BREAKER WITH #12 WIRE. FIELD VERIFY FOR EXACT LOCATION OF CABINET

L9 SPORTS LIGHTING CONTROL CABINET TO BE FED FROM EXISTING 120/208V PANEL "PBL". PROVIDE A NEW 20A 1 POLE BREAKER WITH #6 WIRE. FIELD VERIFY FOR EXACT LOCATION OF CABINET.

LIGHTING PLAN NOTES

L1 NEW LED HIGH-MAST LUMINAIRE HEADS TO BE CIRCUITED TO EXISTING 2 POLE 20A BREAKER FROM EXISTING PANEL "S". EXTEND CONDUIT AND WIRING AS NECESSARY. NEW LED LUMINAIRES TO BE CONTROLLED BY EXISTING EMCS.

L2 PROVIDE POLE MOUNTED SPORTS LIGHTING REMOTE DRIVER ENCLOSURE AT 10'-0" A.F.G. COORDINATE WITH SPORTS LIGHTING MANUFACTURER BEFORE INSTALLATION. EXTEND EXISTING CONDUIT AND WIRING TO REMOTE DRIVER ENCLOSURE LOCATION AS REQUIRED.

L3 PROVIDE POWER TO NEW FOOTBALL FIELD LUMINAIRE HEADS FROM EXISTING PANEL "S" THROUGH SPORTS LIGHTING CONTROL CABINET LOCATED IN EXISTING PRESS BOX ELECTRICAL ROOM. PROVIDE A NEW 3 POLE 60A BREAKER TO FEED NEW FIELD, TRACK AND BLEACHER LIGHTING USING EXISTING WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

L4 PROVIDE POWER TO NEW FOOTBALL FIELD SECURITY LUMINAIRE HEADS FROM EXISTING PANEL "S" THROUGH SPORTS LIGHTING CONTROL CABINET LOCATED IN EXISTING PRESS BOX ELECTRICAL ROOM. PROVIDE A NEW 1 POLE 30A BREAKER TO FEED NEW SECURITY LIGHTING USING EXISTING WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

ELECTRICAL SITE PLAN NOTES

ES17 NEW LOCATION OF SCOREBOARD DISCONNECT FROM EXISTING STORAGE BUILDING TO NEW PREFABRICATED PRESSBOX. INTERCEPT EXISTING CONDUIT AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED TO REACH NEW DISCONNECT LOCATION.

ELECTRICAL SITE PLAN NOTES

ES12 PROVIDE AND ROUTE UNDERGROUND FEEDERS FROM PANEL "S" TO NEMA 3R TRANSFORMER "TXPB" TO FEED NEMA 3R DISCONNECT FOR PRE-FABRICATED PRESSBOX. REFER TO RISER DIAGRAM FOR MORE INFORMATION.

ES13 TIME CLOCK TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

ES14 SCOREBOARD TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

ES15 DRINKING FOUNTAINS TO BE REPLACED BY ALTERNATE. DISCONNECT AND RECONNECT ELECTRICAL AS NEEDED.

PLUMBING SITE PLAN NOTES

PS1 TIE NEW DRINKING FOUNTAIN INTO EXISTING UTILITY LINES. FIELD VERIFY EXACT LOCATION. Re: MP07-01 FOR PLUMBING SCHEDULE

ELECTRICAL SITE PLAN GENERAL NOTES

1. CONTRACTORS AND SUBCONTRACTORS SHALL VERIFY LOCATION, CONDUCT TEST AND INSPECTIONS, COORDINATE WITH UTILITIES, OWNER'S REPRESENTATIVES, AND CHECK FOR ALL UNDERGROUND UTILITIES AND LINES BEFORE DITCHING TAKES PLACE. CONTRACTOR AND SUBCONTRACTORS PERFORMING THESE DUTIES SHALL BE RESPONSIBLE FOR ANY REPAIRS OF CUT OR DAMAGED LINES AND UTILITIES NOT SHOWN ON PLANS.
2. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF EXTERIOR LIGHTING GROUPS PER LIGHTING CONTROL DETAIL.

ELECTRICAL SITE PLAN NOTES

ES18 EXISTING CONDUIT AND WIRING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. PROVIDE NEW CONDUIT AND WIRING FROM REMOTE DRIVER ENCLOSURE MOUNTED ON POLE TO NEW LUMINAIRE HEADS AS REQUIRED. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING AND MOUNTING OF REMOTE DRIVER ENCLOSURE WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

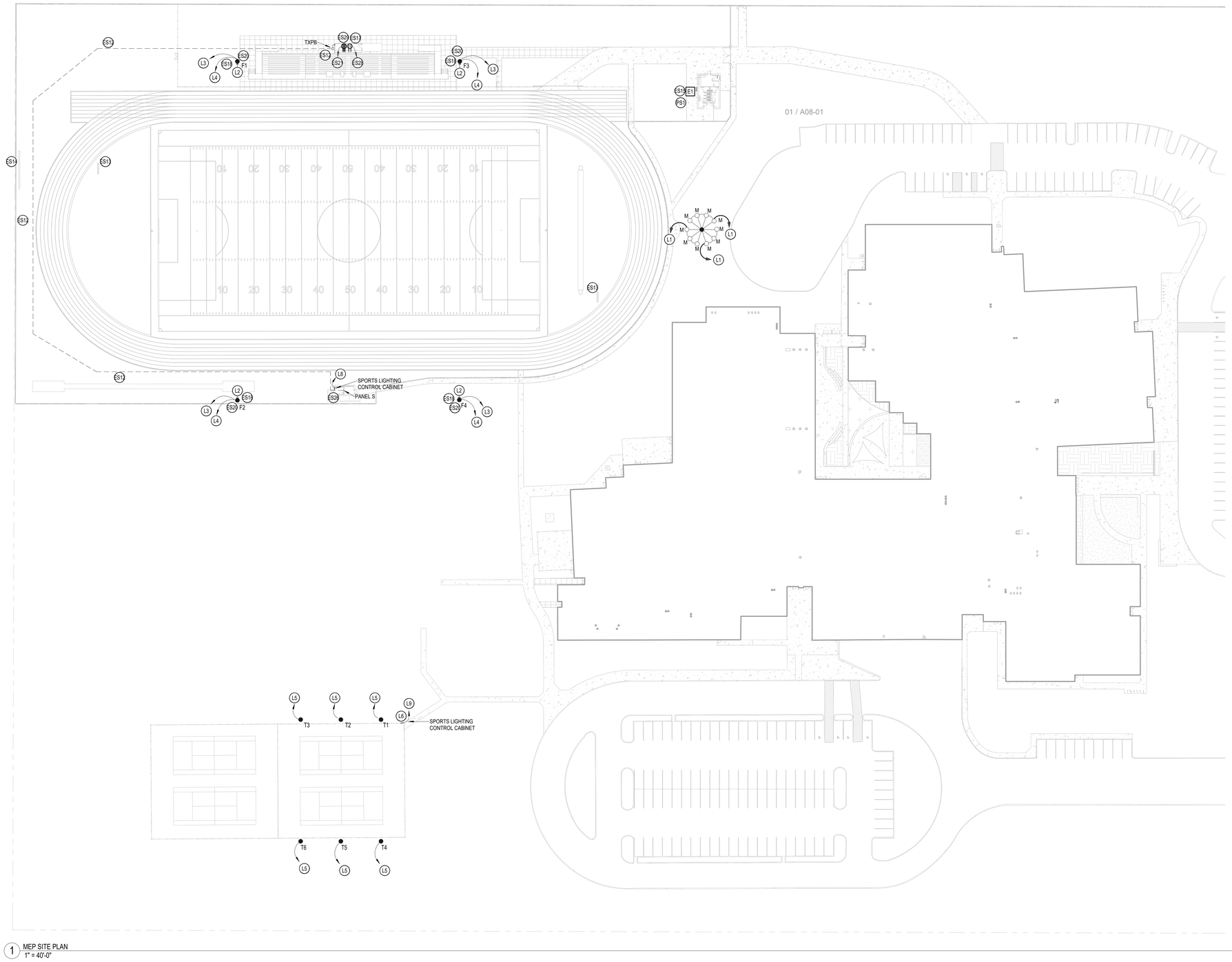
ES20 EXISTING CIRCUIT PROVIDING POWER TO EXISTING POLE MOUNTED SECURITY LIGHTING TO BE REUSED AND PROVIDE POWER FOR NEW POLE MOUNTED SECURITY LIGHTING. CONDUIT AND WIRING TO BE REROUTED THROUGH SPORTS LIGHTING CONTROL CABINET. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

ES21 L6-30 TO BE CIRCUITED FROM LOAD CENTER LOCATED INSIDE PREFAB PRESSBOX. PROVIDE 30A 2P BREAKER AND #10 WIRE. COORDINATE WITH PREFAB PRESSBOX MANUFACTURER PRIOR TO INSTALLATION.

ES26 EXISTING CONDUIT AND WIRING FOR SPORTS LIGHTING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED IN ELECTRICAL ROOM IN THIS BUILDING TO NEW SPORTS LIGHTING CONTROL CABINET AND TO EXISTING BREAKER SPACE IN EXISTING PANEL THAT POWERED THE EXISTING SPORTS LIGHTING BEING REPLACED. PROVIDE NEW BREAKER(S) AS CALLED OUT FOR EACH POLE. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION ON CONTROL CABINET.

ES28 TECH RACK TO BE CIRCUITED FROM LOAD CENTER LOCATED INSIDE PREFAB PRESSBOX. PROVIDE 20A 1P BREAKER AND #12 WIRE. COORDINATE WITH PREFAB PRESSBOX MANUFACTURER PRIOR TO INSTALLATION.

ES29 NEW LOCATION OF PLAY CLOCK DISCONNECT FROM EXISTING STORAGE BUILDING TO NEW PREFABRICATED PRESSBOX. INTERCEPT EXISTING CONDUIT AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED TO REACH NEW DISCONNECT LOCATION.



1 MEP SITE PLAN
1" = 40'-0"

Deadline: March 31, 2026 - 2PM

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JAMES M. TATE III
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WILLIAMS MS ATHLETIC SITE AND INTERIOR RENO

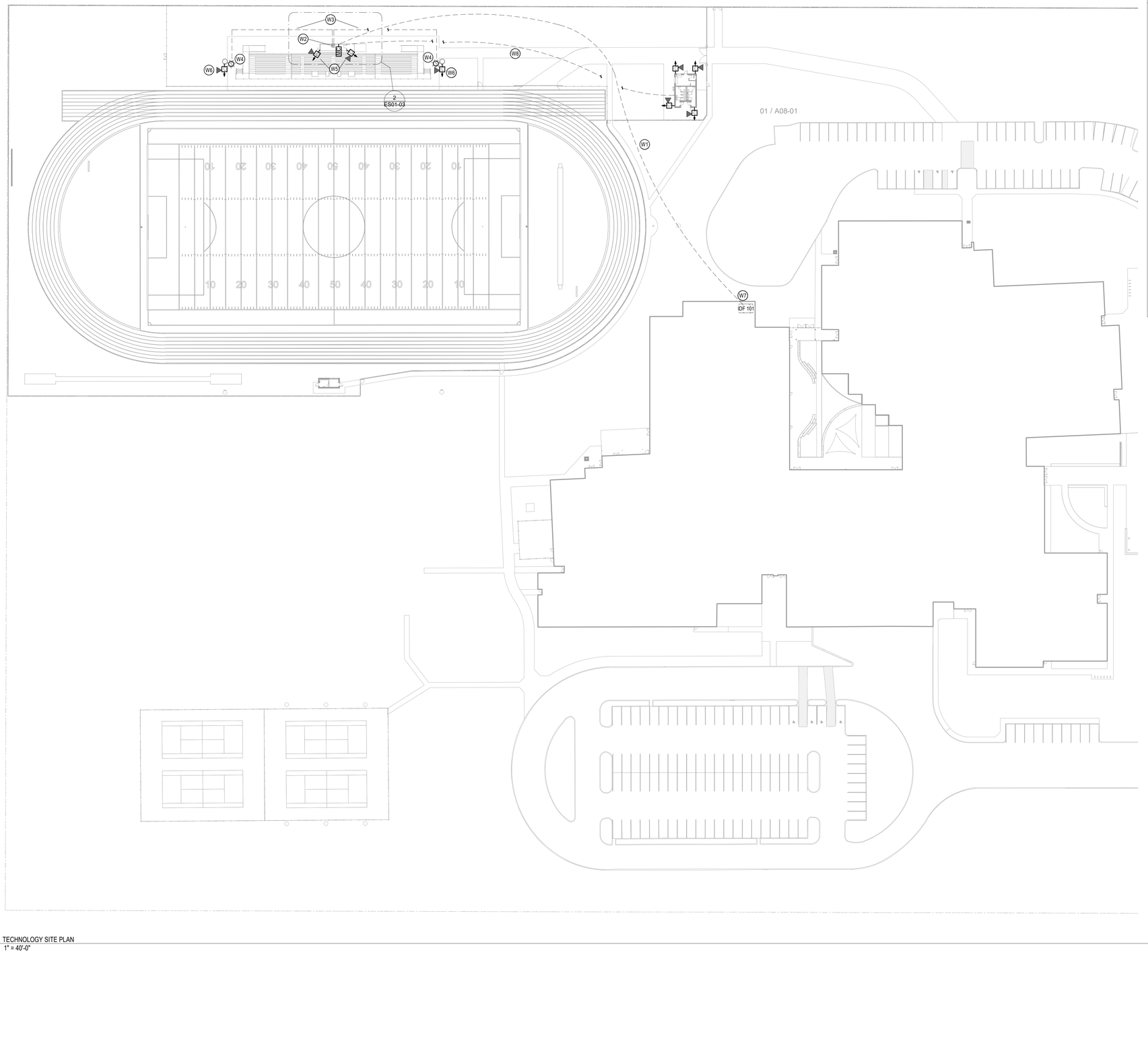
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MEP SITE PLAN

JOB 23162.000
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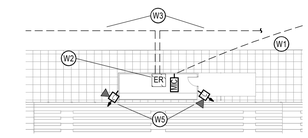
1 TECHNOLOGY SITE PLAN
1" = 40'-0"

TECHNOLOGY SITE PLAN GENERAL NOTES

1. SEE ET700 SERIES SHEETS FOR GENERAL NOTES, DETAILS AND SCHEDULES APPLICABLE TO THE ENTIRE DRAWING SET.
2. ALL PRESS BOX A/V DEVICE LOCATIONS TO BE COORDINATED WITH OWNER/ARCHITECT PRIOR TO INSTALLATION.

TECHNOLOGY SITE PLAN NOTES

- (W1) PROVIDE AND RUN UNDERGROUND TWO 2" CONDUITS BETWEEN EXISTING WILLIAMS MS AND NEW PRESS BOX, ONE FOR FIBER AND ONE FOR SPARE. STUB UP INTO FLOOR OF PRESS BOX, CAP AND MARK. PROPOSED ROUTING SHOWN, COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION.
- (W2) EQUIPMENT RACK FOR NEW TRACK SOUND SYSTEM TO BE COMBINED WITH NETWORK EQUIPMENT. TOP 6RU TO BE RESERVED FOR NETWORK EQUIPMENT. COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO INSTALLATION.
- (W3) PROVIDE AND RUN UNDERGROUND ONE 1.25" CONDUIT FOR COMMUNICATIONS CABLING TO THE LIGHT POLE MOUNTED SPEAKERS. PROPOSED ROUTING SHOWN, COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION. FIELD VERIFY EXACT LIGHT POLE LOCATION.
- (W4) MOUNT SPEAKER ON POLE AT 20'-0" A.F.G. AIMED TOWARDS BLEACHERS. FIELD VERIFY EXACT LIGHT POLE LOCATION FOR SOUND REINFORCEMENT SPEAKERS.
- (W5) MOUNT CAMERAS ON FACE OF PRESS BOX AIMED TOWARDS THE FIELD. COORDINATE EXACT HEIGHT AND REQUIREMENTS PRIOR TO INSTALLATION.
- (W6) MOUNT CAMERA ON POLE AT 12'-0" A.F.G. AIMED TOWARDS BLEACHERS. COORDINATE EXACT HEIGHT AND REQUIREMENTS PRIOR TO INSTALLATION.
- (W7) CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING NEEDED PRECAUTIONS FOR CORE DRILLING THROUGH STORM SHELTER.
- (W8) PROVIDE AND RUN UNDERGROUND ONE 2" CONDUIT FOR COMMUNICATIONS CABLING FOR CAMERAS. CONTINUE CONDUITS, STUB UP WALL INTO ACCESSIBLE ATTIC SPACE AND CONTINUE OSP CABLING TO NETWORKED DEVICES. SAW-CUT OR BORE UNDER AS REQUIRED. PROPOSED ROUTING SHOWN. COORDINATE EXACT PATH AND REQUIREMENTS PRIOR TO INSTALLATION.



2 TECHNOLOGY SITE PLAN - PRESS BOX
1" = 20'-0"

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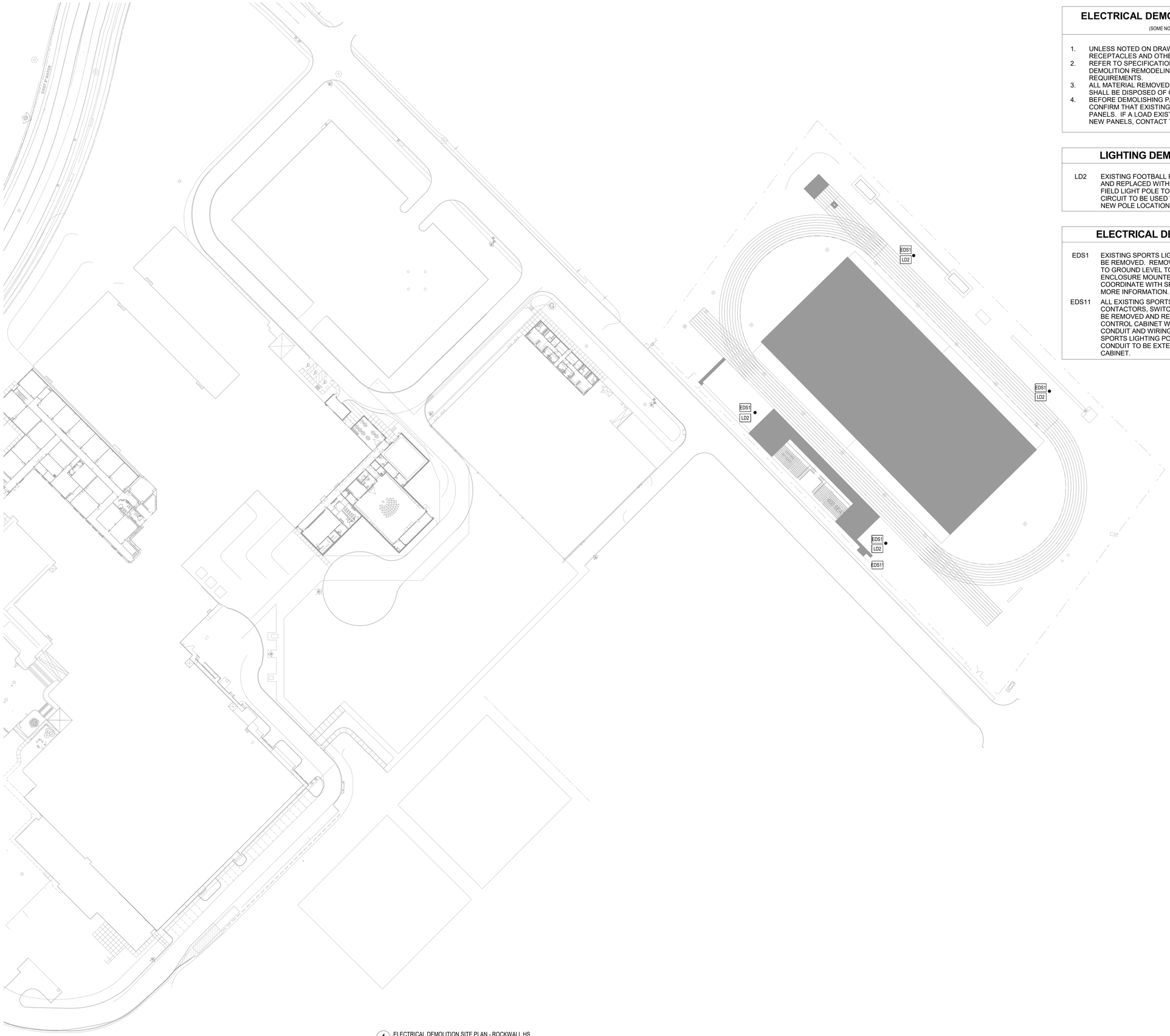
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TECHNOLOGY SITE PLAN - WILLIAMS MS

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1 ELECTRICAL DEMOLITION SITE PLAN - ROCKWALL HS
1" = 50'-0"

ELECTRICAL DEMOLITION GENERAL NOTES

(SOME NOTES MAY NOT BE USED)

1. UNLESS NOTED ON DRAWINGS, ALL LIGHTING, SWITCHES, RECEPTACLES AND OTHER ELECTRICAL DEVICES ARE TO REMAIN.
2. REFER TO SPECIFICATION SECTION 26 05 05, ELECTRICAL DEMOLITION REMODELING, FOR GENERAL DEMOLITION REQUIREMENTS.
3. ALL MATERIAL REMOVED AND NOT RETAINED BY THE OWNER SHALL BE DISPOSED OF OFF SITE IN A LAWFUL MANNER.
4. BEFORE DEMOLISHING PANELS, TRACE ALL BRANCH CIRCUITS TO CONFIRM THAT EXISTING LOADS HAVE BEEN RELOCATED TO NEW PANELS. IF A LOAD EXISTS THAT HAS NOT BEEN RELOCATED TO NEW PANELS, CONTACT THE ENGINEER FOR INSTRUCTIONS.

LIGHTING DEMOLITION PLAN NOTES

LD2 EXISTING FOOTBALL FIELD LUMINAIRE HEADS TO BE REMOVED AND REPLACED WITH NEW LED LIGHTING. EXISTING FOOTBALL FIELD LIGHT POLE TO BE REMOVED AND RELOCATED. EXISTING CIRCUIT TO BE USED TO PROVIDE POWER TO NEW LIGHTING AT NEW POLE LOCATION.

ELECTRICAL DEMO SITE PLAN NOTES

EDS1 EXISTING SPORTS LIGHTING PANEL MOUNTED ON LIGHT POLE TO BE REMOVED. REMOVE EXISTING CONDUIT AND WIRING DOWN TO GROUND LEVEL TO BE EXTENDED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. CAP AND MARK CONDUIT. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION.

EDS11 ALL EXISTING SPORTS LIGHTING CONTROL CABINETS, CONTACTORS, SWITCHES, ETC IN FENCED ELECTRICAL AREA TO BE REMOVED AND REPLACED WITH NEW SPORTS LIGHTING CONTROL CABINET WITH INTEGRAL CONTACTORS. EXISTING CONDUIT AND WIRING FROM EXISTING CONTACTOR CABINETS TO SPORTS LIGHTING POLES TO REMAIN IN PLACE. CAP AND MARK CONDUIT TO BE EXTENDED TO NEW SPORTS LIGHTING CONTROL CABINET.

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ELECTRICAL DEMOLITION SITE PLAN - ROCKWALL HS

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LIGHTING PLAN NOTES

L10 PROVIDE POWER TO NEW FOOTBALL FIELD SECURITY LUMINAIRE HEADS FROM EXISTING PANEL THROUGH SPORTS LIGHTING CONTROL CABINET. PROVIDE A NEW 2 POLE 30A BREAKER TO FEED NEW SECURITY LIGHTING WITH #8 WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

LIGHTING PLAN NOTES

L3 PROVIDE POLE MOUNTED SPORTS LIGHTING REMOTE DRIVER ENCLOSURE AT 10'-0" A.F.G. COORDINATE WITH SPORTS LIGHTING MANUFACTURER BEFORE INSTALLATION. EXTEND EXISTING CONDUIT AND WIRING TO REMOTE DRIVER ENCLOSURE LOCATION AS REQUIRED.

L9 PROVIDE POWER TO NEW FOOTBALL FIELD LUMINAIRE HEADS FROM EXISTING PANEL THROUGH SPORTS LIGHTING CONTROL CABINET. PROVIDE A NEW 3 POLE 60A BREAKER TO FEED NEW FIELD, TRACK AND BLEACHER LIGHTING USING EXISTING WIRE. EXTEND CONDUIT AND WIRING AS NECESSARY.

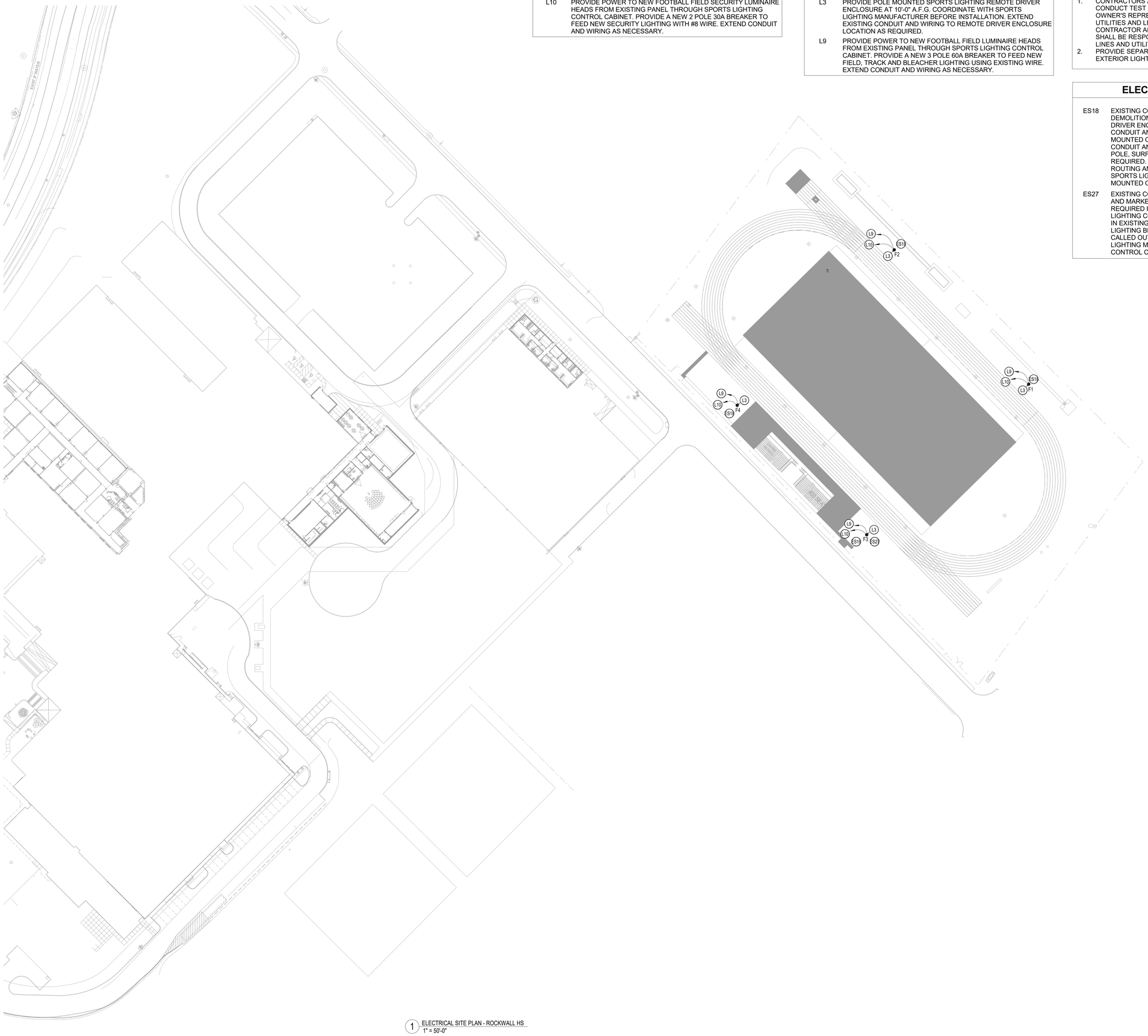
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2. PROVIDE SEPARATE CONTACTORS FOR INDEPENDENT CONTROL OF EXTERIOR LIGHTING GROUPS PER LIGHTING CONTROL DETAIL.

ELECTRICAL SITE PLAN NOTES

ES18 EXISTING CONDUIT AND WIRING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED TO NEW REMOTE DRIVER ENCLOSURE MOUNTED ON POLE. PROVIDE NEW CONDUIT AND WIRING FROM REMOTE DRIVER ENCLOSURE MOUNTED ON POLE TO NEW LUMINAIRE HEADS AS REQUIRED. IF CONDUIT AND WIRING CANNOT BE ROUTED WITHIN EXISTING POLE, SURFACE MOUNT CONDUIT ON BACK OF LIGHT POLE AS REQUIRED. COORDINATE ALL WORK, INCLUDING CONDUIT ROUTING AND MOUNTING OF REMOTE DRIVER ENCLOSURE WITH SPORTS LIGHTING MANUFACTURER. REFER TO EQUIPMENT MOUNTED ON SURFACE/WALL DETAIL FOR MORE INFORMATION.

ES27 EXISTING CONDUIT AND WIRING FOR SPORTS LIGHTING CAPPED AND MARKED DURING DEMOLITION TO BE EXTENDED AS REQUIRED IN FENCED ELECTRICAL AREA TO NEW SPORTS LIGHTING CONTROL CABINET AND TO EXISTING BREAKER SPACE IN EXISTING PANEL THAT POWERED THE EXISTING SPORTS LIGHTING BEING REPLACED. PROVIDE NEW BREAKER(S) AS CALLED OUT FOR EACH POLE. COORDINATE WITH SPORTS LIGHTING MANUFACTURER FOR MORE INFORMATION ON CONTROL CABINET.



1 ELECTRICAL SITE PLAN - ROCKWALL HS
1" = 50'-0"

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LICENSED PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

ELECTRICAL SITE PLAN - ROCKWALL HS

JOB 23162.000
DATE 02/26/2026
SHEET ES01-08

EMA Engineering & Consulting, Inc.
Tyler | Austin | Houston | El Paso
DFW | San Antonio | Shreveport
Texas Firm Registration No. F-893
Louisiana Firm Registration No. EF-5818
DESIGN SOLVE ENHANCE www.EMAengineer.com

SUBMISSION OF BID WILL BE CONSIDERED ACKNOWLEDGMENT THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS VERIFIED ALL EXISTING JOB CONDITIONS AND INCLUDED ANY NECESSARY MODIFICATION TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND WORKING SYSTEM.

TECHNOLOGY GENERAL NOTES

1. SEE ET700 SERIES SHEETS FOR GENERAL NOTES, DETAILS AND SCHEDULES APPLICABLE TO THE ENTIRE DRAWING SET.

TECHNOLOGY PLAN NOTES

(1) SPEAKER TO BE MOUNTED 12'-0" A.F.F. SPEAKERS TO BE AIMED 20 DEGREES DOWNWARD. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION PRIOR TO INSTALLATION.



1 TECHNOLOGY FLOOR PLAN - LEVEL ONE - OVERALL
1" = 20'-0"

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	ISSUES	
1	02/26/2026	ISSUE FOR CONSTRUCTION
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	REVISIONS	

STATE OF TEXAS
JAMES M. TATE III
102427
LICENSED PROFESSIONAL ENGINEER
02-26-2026

WILLIAMS MS ATHLETIC, SITE AND INTERIOR RENO

625 E FM 552, Rockwall, TX 75087

TECHNOLOGY FLOOR PLAN - LEVEL ONE - OVERALL

JOB 23162.000
DATE 02/26/2026
SHEET ET02-01

EMA
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RESPONSIBILITY MATRIX	FURNISHED BY		INSTALLED BY		
TASK	CONTRACTOR	OWNER	CONTRACTOR	OWNER	NOTES
DATA CABLING PLANT	○		○		DEVICES NOTED AS OWNER FURNISHED, OWNER INSTALLED SHALL BE INSTALLED BY OWNER SELECTED CONTRACTOR. OWNER'S INSTALLER SHALL COORDINATE WITH GENERAL CONTRACTOR FOR INSTALLATION OF THESE SYSTEMS.
NETWORK SWITCHES/SERVERS		○		○	
WIRELESS ACCESS POINTS		○	○		
BACK BOX, CONDUIT	○		○		
GYMNASTICS & TRACK FIELD AUDIO SYSTEM	○		○		
BACK BOX, CONDUIT	○		○		
INTERCOM COMMUNICATION SYSTEM	○		○		EXPAND UPON EXISTING.
BACK BOX, CONDUIT	○		○		
VIDEO SURVEILLANCE SYSTEM	○		○		EXPAND UPON EXISTING.
IP CAMERA SERVER		○		○	
BACK BOX, CONDUIT	○		○		

INTERCOM COMMUNICATION SYSTEM SCHEDULE

SYMBOL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS
	Intercom Server	Bogen	NQ-SYSCTRL		○		Expand upon existing as required.
	Intercom Mixer Pre-Amp	Bogen	NQ-P0100		○		
—(P) A/E	Administrative Phone	Bogen	NQ-T1100		○		
	Analog Station Bridge	Bogen	NQ-E7030		○		
	Input/Output Controller	Bogen	NQ-E7010		○		
	Phone Adapter	Cisco	ATA-190		○		
(VC)	Volume Control	Bogen	ATP10			○	Zone exterior separately
	Amplifier	Extron	XPA/MPA Amps			○	Provide as required
(S)	Lay-in speaker	Bogen	CSD1X2			○	Drop Ceiling Locations
(S)	Ceiling speaker	Bogen	S86T725PG8W			○	Hard Ceiling Locations
—(S)	Wall-mount speaker	TOA Electronics	H-2			○	Mounted at 12'-0" A.F.F. unless otherwise noted.
—(S)ext	Interior/Exterior recessed horn speaker	Bogen	FMH15T	Backbox - BBFM6; Grille - SGHD8		○	Mounted at 12'-0" A.F.F. unless otherwise noted.
	Master Clock	Bogen	BCMA-3RO-1000-1				With wireless Transmitter
—(C) 2	4" Digital Clock	Bogen	BCBL-32S-404-4R	Double Mount: BCAB-1BD-00S-0			
—(C)	12" Analog Clock	Bogen	BCAL-4BS-12R-0				Classroom locations
—(C)	16" Analog Clock	Bogen	BCAL-4BS-16R-0				Cafe, Gym, Library, etc.
	UPS	Tripp Lite	1500MXLZU				

NOTES:
1. REFER TO SPECIFICATIONS 27 51 40 FOR ADDITIONAL INFORMATION.

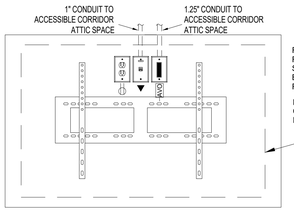
TECHNOLOGY GENERAL NOTES

1. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT AND STANDARD BACK BOXES FOR SYSTEMS SHOWN ON THIS DRAWING IN BASE PROPOSAL.
2. IN ANY EXPOSED CEILING AREAS ALL LOW VOLTAGE CABLING SHALL BE ENCLOSED IN CONDUIT. THIS SHALL INCLUDE SPACES WITH SUSPENDED ACOUSTICAL CLOUD AND/OR CANOPY TYPE CEILINGS.
3. ALL COMMUNICATIONS CABLING SHALL RUN DOWN THE CORRIDORS. TRUNKING SHALL BE RUN PRIMARILY PERPENDICULAR TO BUILDING WALLS.
4. WHERE NO FINISHED CEILINGS ARE SCHEDULED ALL DEVICES, CONDUIT, AND BACK BOXES SHALL BE INSTALLED UP AGAINST BOTTOM OF DECK AND SHALL NOT PROTRUDE BELOW BOTTOM OF STEEL. THE ARCHITECT SHALL APPROVE ROUTING OF ALL EXPOSED ROUGH-INS PRIOR TO PLACEMENT.
5. ANY SIGNAL, OUTLET OR OTHER DEVICE MOUNTED ON A COLUMN, PILASTER, OR SIMILAR WALL OFFSET AREA SHALL BE CENTERED.
6. COORDINATE MOUNTING HEIGHT OF DEVICES ABOVE MILLWORK WITH ARCHITECTURAL PLANS.
7. VERIFY DOOR SWING LOCATIONS AND ARCHITECTURAL WALL FIXTURES WITH ARCHITECTURAL PLANS - DO NOT INSTALL DEVICES IN THESE AREAS.
8. COORDINATE EXACT LOCATION OF ALL DEVICES, ETC. INSTALLED IN MOVEABLE FURNITURE WITH ARCHITECT AND OWNER.
9. CONFIRM ALL COMMUNICATIONS DEVICE LOCATIONS WITH ARCHITECT PRIOR TO ROUGH-IN. THE ARCHITECT RESERVES THE RIGHT TO LOCATE DEVICES ANYWHERE WITHIN EACH ROOM AND DETERMINE SURFACE RACEWAY ROUTING IF APPLICABLE.
10. PROVIDE 4' X 8' X 3/4" C/D FIRE RATED PLYWOOD PANELS AS REQUIRED AND INDICATED ON DRAWINGS. MOUNT BOTTOM OF PLYWOOD AT 24"A.F.F. PAINT TO MEET UL723 REQUIREMENTS WITH RATING STAMP OF PLYWOOD LEFT EXPOSED.
11. REFER TO SPECIFICATION DIVISIONS 27 AND 28 FOR ADDITIONAL INFORMATION.

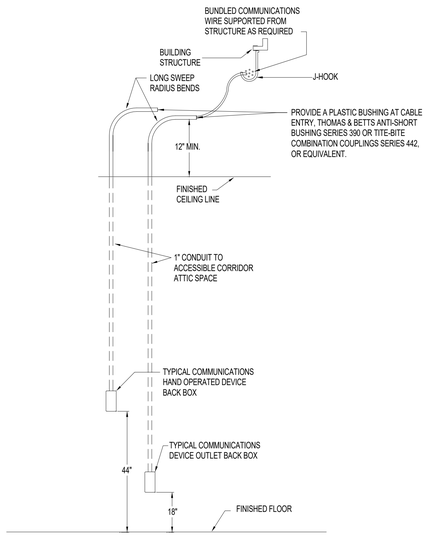
VIDEO SURVEILLANCE SYSTEM SCHEDULE

SYMBOL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
—(V)	Interior IP Camera	Techwin Wisenet	XND-6085	Ceiling Mount: SHP-1680F Wall Mount: SBP-300WM1 SBP-300HM6	○			
—(V)	Exterior IP Camera	Axis	P1468-LE		○			
	Camera License	Salient Systems	CVSW-PRO-IP		○			

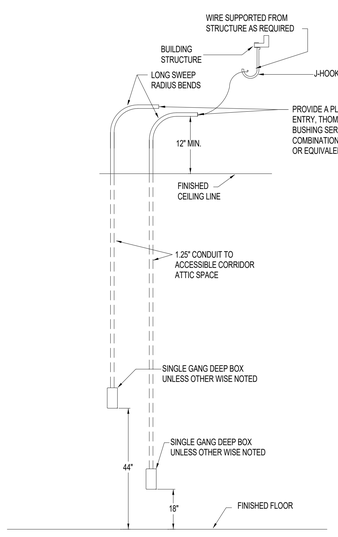
NOTES: 1. REFER TO SPECIFICATIONS 28 21 23 FOR ADDITIONAL INFORMATION.



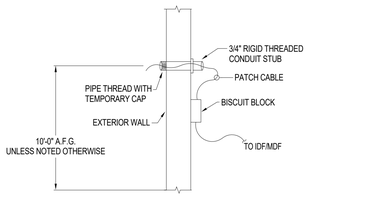
1 TYPICAL FLAT SCREEN MOUNTING DETAIL
N.T.S.



2 TECHNOLOGY DEVICE BACK BOXES
N.T.S.



3 AUDIO VIDEO DEVICE BACK BOXES
N.T.S.



4 EXTERIOR WALL WIRELESS ACCESS POINT/CAMERA MOUNTING DETAIL
N.T.S.

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DATA AND TELEPHONE CABLE PLANT SYSTEM SCHEDULE

PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS
Two Port Faceplates	Panduit	CFPE2xx	Jack Inserts: CJ688TGxx (Cat6)	○		Provide Jack colors per 27 10 30 Part 2.5 Color Coding. Blanks for unused ports. Provide Panduit CFPWR4CIG water resistant faceplate for any exterior or wet area locations.
Four Port Faceplates	Panduit	CFPE4xx		○		
NEMA Duplex Style Two Port Faceplates	Panduit	CF1062xx		○		
NEMA Duplex Style Four Port Faceplates	Panduit	CF1064xx		○		
Decora Style Faceplates	Panduit	CFGXxx		○		
Wall Station Telephone Jacks	Panduit	KWP6PY		○		
Above Ceiling/Structure Mounted Locations	Panduit	CBXQ2xx-A		○		Securely mount to structure. Provide jack inserts and blanks as required.
UTP Station Cabling (Riser)	Panduit	PUR6004XX-UY		○		
Data Patch Panels (Angle)	Panduit	CPPLA24WBLY		○		Provide patch panels to accomodate the drop count to the IDF/MDF room, plus a 20% spare capacity. Permanently Mark Panels with ANSI/TIA-606-C compliant Printed Labels.
Data Patch Panels (Angle)	Panduit	CPPLA48WBLY		○		
Interior Telephone Backbone Cable	Panduit	PUR5525WH-UY				
Interior Armored Multimode Fiber (Riser)	Panduit	FOPRZ12Y			○	All fibers terminated with duplex LC style connectors and bulkhead splice bushings at each end. Labeling shall note cable type, run designation, "Tx" for transmit fiber connectors and "Rx" for receive fiber connectors.
Indoor/Outdoor Fiber (Riser)	Panduit	FOLRX06			○	Refer to specification for use.
Rack Mount Fiber Termination Cabinet (1U)	Panduit	Opticom FRME1U	LC Opticom adaptor panels as required. FAPB blanks as required.	○		Mount in top portion of rack. Provide 4RU in MDF. Size as required for IDF, do not stack multiple 1RU enclosures. Provide blanks for unused spaces.
Rack Mount Fiber Termination Cabinet (2U)	Panduit	Opticom FRME2U		○		
Rack Mount Fiber Termination Cabinet (4U)	Panduit	Opticom FRME4		○		
Four Post Rack	Panduit	R4P23CN			○	Provide two Horizontal Cable Managers per rack; CMPH2
Two Post Rack	Panduit	R2P6S			○	
Vertical Cable Management (8")	Panduit	PR2VD08	(4) PRSP7 spools with each manager (1) PRD8 door with each manager		○	Provide on each side of each rack, double between rack locations
Power Strip	Middle Atlantic Products	PDT-2X320			○	Mount on lower portion of the left side of each rack.
Ladder Rack	Homaco Catalog	TR10-12B			○	Routed over all floor mounted racks from wall to wall.

NOTES: 1. REFER TO SPECIFICATIONS 27 10 30 FOR ADDITIONAL INFORMATION.
2. PATCH CORDS TO BE OFOI.

DATA AND TELEPHONE CABLE PLANT COLOR CODING

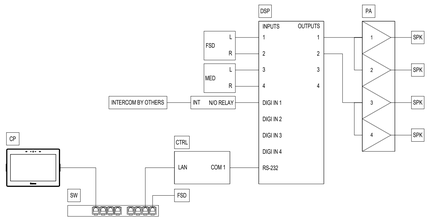
ITEM	DESCRIPTION	HORIZONTAL CABLE	INSERT	PATCH CABLES
1	Data	Blue	Blue	Blue
2	Phone	White	White	White
3	Wireless	Orange	Orange	Orange
4	Security	Green	Green	Green
5	IP Intercom	Red	Red	Red

NOTES: 1.Any Single-mode fiber to be Yellow.
2.Any Multi-mode fiber to be Aqua.

DATA CABLE PLANT SYMBOLS

D	TELEPHONE DESKSET JACK - WALL MOUNTED DEVICE JACK 18" A.F.F.
W	TELEPHONE WALLSET JACK - WALL MOUNTED DEVICE PLATE WITH MOUNTING STUDS 44" A.F.F.
D/2	COMBINATION TELEPHONE DESKSET/DATA JACK WALL PLATE, NUMBER DENOTES DATA LINE QUANTITY - WALL MTD. DEVICE 18" A.F.F.
2	DATA JACK, NUMBER DENOTES DATA LINE QUANTITY PER WALL PLATE - WALL MOUNTED DEVICE 18" A.F.F.
WL	DATA JACK FOR WIRELESS ACCESS POINT - WALL MOUNT AS NOTED OR USE SURFACE MOUNT BOX ABOVE CEILING, REFER TO SPEC.
J	JUNCTION BOX - WALL MOUNTED BACKBOX 18" A.F.F. OR AS NOTED
	FLOOR BOX WITH COVER FOR COMMUNICATION AND POWER - SEE DIVISION 26 ELECTRICAL PLANS AND SPECS AND ALSO REFERENCE ARCHITECTURAL PLANS
	COPPER GROUND BAR WITH INSULATED WALL MOUNTING BRACKETS - SEE ELECTRICAL SPECS. SECTION 26 05 34
	EQUIPMENT RACK, AS NOTED
EB	EQUIPMENT BACKBOARD, 3/4" C-D GRADE PLYWOOD AS REQUIRED - SEE DIV. 26 ELEC. SPEC.
	CABLE TRAY

NOTES: 1. SOME SYMBOLS MAY NOT BE USED.
2. ACCESSIBLE DEVICES HIGHEST OPERABLE PART TO BE 48" MAXIMUM/18" MINIMUM A.F.F. - REFER TO ARCHITECTURAL DRAWINGS.
3. DIMENSIONS GIVEN A.F.F. ARE TO BOTTOM OF BOX.



1 GYMNASTICS SOUND SYSTEM ONE-LINE
NTS

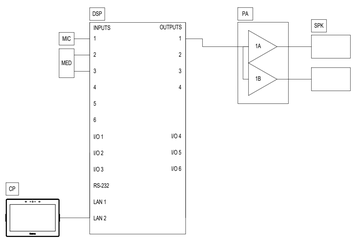
ER - GYMNASTICS

1	POWER
2	BLANK
3	DSP & CONTROLLER
4	BLANK
5	BLANK
6	MEDIA PLAYER
7	BLANK
8	BLANK
9	AMPLIFIER
10	BLANK

2 GYMNASTICS RACK ELEVATION
N.T.S.

GYMNASTICS

LAY-OUT	FUNCTIONAL	PRODUCT	ACCESSORIES	MANUFACTURER	PART NUMBER	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
	ER	Main Equipment Rack		Middle Atlantic	DWR-10-22		○		
				Middle Atlantic	LVFD-10		○		
				Middle Atlantic	DWR-RR10		○		
				Middle Atlantic	EB1 and EB2		○		
	PWR	Power Conditioner		Middle Atlantic	PD-920R		○		(1) 120V 20A
	DSP	DSP/Mixer		Extron	DMP 44LC	○			
			Rack mount kit	Extron	RSU 129	○			
	CTRL	Controller		Extron	IPL Pro S1	○			
CP	CP		Control panel	Extron	TLP Pro 725M	○			
	SW	Network switch		Netgear	GS108PP		○	Coordinate with the owner	
	PA	Power Amplifier		Extron	XPA U 4004 FX	○			
S	SPK	Loudspeaker		Electro-Voice	EVC-1082-00B	○			
			Wall bracket	Electro-Voice	EVC-WB-BLK	○			
	MED	Media player		Denon	DN-300z	○			
	INT	Paging interrupt		Bogen	VAR-1		○	Use the N/O relay connections	
			Power supply	Bogen	PRS40C		○		
FSD	FSD	Flat screen display		Viewsonic	CDE9830		○		(1) 120V 20A
			Flat screen mount	Chief Mfg.	XTM1U		○	Use the N/O relay connections	
AVI	AVI	A/V Input		Extron	DTP2 T 201 D		○		
AVO	AVO	A/V Output		Extron	DTP2 R 211				
			Audio interface	Extron	ASA 141				
			Brush Grommet	Vanco	120817X		○		
			HDMI cable	C2G	High-Speed Select		○	Length as required	



3 TRACK AUDIO ONE-LINE
NTS

ER - TRACK

1	NETWORK
2	NETWORK
3	NETWORK
4	NETWORK
5	NETWORK
6	NETWORK
7	BLANK
8	BLANK
9	BLANK
10	BLANK
11	POWER
12	BLANK
13	DSP/MIXER
14	BLANK
15	DRAWER
16	
17	BLANK
18	POWER AMPLIFIER

4 TRACK RACK ELEVATION
NTS

TRACK STADIUM

LAY-OUT	FUNCTIONAL	PRODUCT	MANUFACTURER	PART NUMBER	ACCESSORIES	NO EXCEPTIONS	APPROVED EQUIV.	COMMENTS	POWER REQUIREMENTS
TOP 6 RU TO BE RESERVED FOR NETWORK EQUIPMENT.									
	ER	Main Equipment Rack	Middle Atlantic	DWR-18-22			○		
			Middle Atlantic	LVFD-18			○		
			Middle Atlantic	EB1 and EB2	Blanks		○		
	PWR	Power Conditioner	Middle Atlantic	PD-920R-SP			○		(1) 120V 20A
	DSP	Digital Signal Proccessor	Extron	DMP 64 Plus C			○		
	PA	Amplifier	Dynacord	C1800FDI		○			
S	SPK	Loud Speaker	Danley Sound Labs	SH95HO-EW		○		Mount center of speaker @ 22 Ft.	
		Pole mount	Danley Sound Labs	PMK-1		○			
MIC	MIC	Microphone input		Whirlwind	WP1/1FW		○	Single gang, 1 XLR-F	
	BT	Bluetooth receiver		Klark Teknik	DW 20BR		○		
		Hand-over equipment	Microphone	Shure	SM58-LC		○	QTY: 2	
			Microphone stand	Atlas IED	DS7		○	QTY: 2	
			Microphone cable	RAPCO/Horizon	NBM5-10		○	QTY: 2	

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SHIPPING LABEL

This label should be affixed to the outside of the package when submitted in response to this request.

FROM: _____

_____

_____

Package _____ of _____

SHIP TO: Rockwall Independent School District
Attn: Jana Hunter, Director of Purchasing
1050 Williams Street
Rockwall, TX 75087

CONTENTS: BID RESPONSE
BID NUMBER: RFCSP 2526.03-002
BID TITLE: Cain and Williams MS Site Improvements
BID DUE DATE: March 31, 2026
TIME DUE: 2:00 P.M. (CST)

----------FOLD OR CUT HERE----------

FROM: _____

_____

_____

Package _____ of _____

SHIP TO: Rockwall Independent School District
Attn: Jana Hunter, Director of Purchasing
1050 Williams Street
Rockwall, TX 75087

CONTENTS: BID RESPONSE
BID NUMBER: RFCSP 2526.03-002
BID TITLE: Cain and Williams MS Site Improvements
BID DUE DATE: March 31, 2026
TIME DUE: 2:00 P.M. (CST)

Rockwall Independent School District
RFCSP 2526.03-002 Cain and Wiliams MS Site Improvements

OFFER FORM

This form should serve as the cover to all responses; failure to sign may result in disqualification.

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

- They are authorized to enter into contractual relationship on behalf of the responding company;
- They have carefully examined this document in its entirety;
- They propose to supply any products/services submitted under this solicitation at the prices quoted and in strict compliance with all terms, policies and procedures, unless any exceptions are noted;
- They understand verbal orders are not authorized and no order should be initiated without an authorized purchase order signed by the Director of Purchasing and that non-compliance may result in non-payment;
- Any and all exceptions have been noted in writing in the response and that no other exception will be claimed;
- The accuracy of all certifications which accompany this offer;
- The stated organization is an equal opportunity employer;
- The organization has not been a party to any collusion among offer/vendors in restraint of freedom of competition by agreement to offer at a fixed price or to refrain from offering; or with any RISD 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 RISD's Purchasing personnel; or in any discussions or actions between offer/vendors and any RISD employee, Board Trustee, or consultant concerning exchange of money or other things of value for special consideration in the award of this contract.
- The 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 vendor or with any competitor;
- Notice of award and/or any communication regarding an award will be submitted via RISD and not by any consultant, contractor or other party involved in this solicitation.

- Receipt of Addenda, or lack thereof:

None: _____ (initial)
1: _____ (initial) # 2: _____ (initial)
3: _____ (initial) # 4: _____ (initial)

Name of Company:	Date:
Signature of Authorized Rep:	Printed Name:
Position or Title:	Phone:
Email:	Fax:

RESPONDENT'S PROPOSAL

The undersigned has carefully examined the Request for Proposals, Contract Documents, Conditions of the Contract, the Specifications, the Drawings and any addenda to the Drawings and Specifications, the site, premises and all conditions affecting the work on the project listed above as prepared by Rockwall ISD. The undersigned proposes to furnish all labor, materials, services and equipment necessary to complete the entire work in strict accordance with the above documents for the following sum:

Description	LS	Amount
CAIN MIDDLE SCHOOL BASE BID *Base scope as identified in construction documents*		$
WILLIAMS MIDDLE SCHOOL BASE BID *Base scope as identified in construction documents*		$
OWNER'S CONTINGENCY		$70,000.00
TOTAL BID:		$
ALTERNATE # 1 – Scoreboard Cabinet Replacement		
	Cain MS	$
	Williams MS	$
ALTERNATE # 2 – Replace Tennis Court Light Fixture with LED		
	Cain MS	$
	Williams MS	$
ALTERNATE # 3 – Kyle Field/Heath HS Field Light Replacement		$
ALTERNATE # 4 – Triple Jump/Long Jump Relocation		
	Cain MS	$
	Williams MS	$
UNIT PRICING:		$
6' Ornamental Fence		$
Mow Curb		$
Sidewalk Replacement		$

VENDOR DATA

FOR PURCHASE ORDER: ORDERING ADDRESS INFORMATION		
Company Name:		
Address:		
City, State, Zip:		
Contact Person:		
Title:		
Phone | Fax:		
Email address:		
May we submit orders via email:		
Email address, if different:		

FOR PAYMENTS: REMITTANCE ADDRESS INFORMATION		
Company Name:		
Address:		
City, State, Zip:		
Contact Person:		
Title:		
Phone | Fax:		
Email address:		

FOR BID NOTIFICATIONS	
Contact Email:	

COOPERATIVE AGREEMENTS

If the vendor holds a contract with any of the following, please circle and provide contract number(s) as applicable.

Allied States	Choice Partners	CTPA	DIR	E&I	EPIC6	EPCNT	HGAC	Omnia Partners	PACE	Tarrant County	TASB Buy Board	TIPS

Contract Number(s):

REFERENCE SHEET
DO NOT LEAVE BLANK

REFERENCE 1

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

REFERENCE 2

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

REFERENCE 3

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

**Please note: Some projects may require more attention to be given to historical projects of like scope, type, location, institute, etc. While it is not a requirement, the District prefers references be given for school districts of similar size to Rockwall ISD and the district may evaluate responses as a whole, based on references provided.*

VENDOR ACKNOWLEDGEMENTS

RESIDENT BIDDER

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident bidder underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the great of the following (1) the amount by which a resident bidder would be required to underbid the resident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located; or (2) 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 a majority of the manufacturing relating to the contract will be performed.

A governmental entity 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 amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in (1) the state in which the nonresident's principal place of business is located; or (2) a state in which the nonresident is a resident manufacturer.

This subchapter does not apply to a contact involving federal funds.

FELONY CONVICTION AND CRIMINAL HISTORY NOTICE

Texas Education Code, 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. Vendor is responsible for the performance of the persons, employees and/or sub-contractors. Vendor assigns to provide services for Rockwall ISD pursuant to this proposal on any and all Rockwall ISD campus or facilities. Vendor will not assign individuals to provide services at a Rockwall ISD campus or facility who have a history of violent, unacceptable, or grossly negligent behavior or who have a felony conviction, without the prior written consent of the Rockwall ISD Purchasing Department.

CONFIDENTIALITY DECLARATION

Any portion of the response considered to be confidential or contain proprietary information, or to contain trade secrets, must be marked accordingly. This designation may not necessarily guarantee the non-release of the information under the Public Information Act or as otherwise required by law, but does provide the District with a means to review the issues thoroughly and, if justified, request an opinion by the Attorney General's office prior to releasing any information requested under the Public Information Act.

INTER-LOCAL AGREMEENTS WITH OTHER SCHOOL DISTRICTS

Rockwall ISD is a member of the Central Texas Purchasing Alliance (CTPA) and the Education Purchasing Cooperative of North Texas (EPCNT), each serving as an alliance of over 100 school districts in Texas representing millions of students, sharing information, services and contractual opportunities. A list of member districts can be found on the RISD Purchasing webpage.

In support of this collaborative effort, all awards made by Rockwall ISD may be adopted by other active member districts in either (or both) of the identified entities. By adopting a contract from another member district, the adopting district has met the competitive bidding requirements established by the Texas Education Code, Section 44.031 (a)(4). While there is no obligation to participate, doing so will streamline the public purchasing process and cut costs to the public. It will also keep vendors from having to answer multiple bids for many school districts for the same product(s) or services, thereby saving the vendors resources.

All purchases by members and participants other than Rockwall ISD will be billed directly to that entity and paid by that entity. Rockwall ISD will not be responsible for another entity's debts. Each governmental entity will order its own materials/services as necessary and according their policies.

COMMITMENT TO PROVIDE INSURANCE

Bidder will be able to furnish a valid insurance certificate reflecting as Certificate Holder: Rockwall ISD, 1050 Williams Street, Rockwall TX 75087. The vendor shall provide and maintain insurance in a company rated no less than an "A" by A.M. Best Company.

Vendor is aware of all costs to provide insurance, will do so pending contract award, and will provide a valid insurance certificate as describe within this solicitation.

DEBARMENT OR SUSPENSION CERTIFICATION

Non-Federal entities are prohibited from contracting with or making sub-awards under covered transaction to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement of goods or services equal to or in excess of $100,000. Vendors receiving individual awards of $100,000 or more and all sub-recipients must certify that the organizations and its principals are not suspended or debarred.

INDEMNIFICATION AND HOLD HARMLESS

Except as otherwise expressly provided, respondent shall defend, indemnify and hold RISD harmless from and against all claims, liability, loss and expenses, including reasonable costs, collection expenses, and attorney's fees incurred, which arise by reason of the acts or omissions of respondent, its agents or employees in the performance of its obligation under this contract.

STATEMENT OF COMPLIANCE/DEVIATION

Unless otherwise stated, this proposal complies with all specifications and/or scope of work contained in the solicitation document. Any deviations from any part of this solicitation shall be listed on a separate page as provided by the respondent with detailed conditions and information. RISD will consider any deviations in its evaluation, and reserves the right to accept or reject any bid based upon any deviations.

CONTRACTOR CERTIFICATION

If an employee of a contractor is covered under SB 9 the contractor must bear the burden of obtaining a national, fingerprint-based criminal history check. Under Section 22.0834 of the Education Code, the contractor is then required to certify to the district that the criminal history check has been performed. Under the statute SB 9, a contractor is required to conduct a criminal history review on an employee only when the following criteria has been met: 1) The employer has contracted with the district to provide services. 2) The particular employee will have continuing duties relating to the contract with the district. 3) The particular employee will have contact with students.

TOXIC CONTROL COMPLIANCE

Rockwall Independent School District has established Management Plans for ensuring a high level of environmental air quality through its Operations Department. All contractors performing construction projects for RISD must familiarize themselves with these Management Plans and comply prior to the beginning of any awarded construction project. RISD employees are available to review such plans and assist in interpretation and understanding its Asbestos Management Plans at any time prior to beginning construction.

Certification of non-use of Asbestos and Lead Containing Materials is required by all General and Sub-Contractors for all construction projects, by State and Federal regulations which RISD is subject to. Completion of this Affidavit is mandatory before final payment on a project will be made. Complete this certificate, have it notarized and submit it with your application for final payment, certifying that no materials used in conjunction with this project contain asbestos or lead in any form and that all Material Safety Data Sheets (MSDS) have been supplied to Owner before submitting application for final payment.

MWBE/HUB CERTIFICATION

A bidder/proposer that has been certified as a Minority/Women Business Enterprise (also known as "Historically Underutilized Business" or "HUB") is encouraged to indicate its MWBE certification status when responding to this Bid/Proposal. If so, please provide the Certificate Number and Name of Certifying Agency.

CERTIFICATION OF EQUAL EMPLOYMENT STATEMENT

It is the policy of the District not to discriminate on the basis of race, color, national origin, gender, limited English proficiency or handicapping conditions in its programs. Vendor agrees not to discriminate against any employee orapplicant for employment to be employed in the performance of this Contract, with respect to hire, tenure, terms, conditions and privileges of employment, or a matter directly or indirectly related to employment, because of age (except where based on a bona fide occupational qualification), sex (except where based on a bona fide occupationalqualification) or race, color, religion, national origin, or ancestry. Vendor further agrees that every subcontract entered into for the performance of this Contract shall contain a provision requiring non-discrimination inemployment herein specified, binding upon each subcontractor. Breach of this covenant may be regarded as a material breach of the Contract.

CERTIFICATION OF SECTION 2271.002 TEXAS GOVERNMENT CODE

This section applies to a contract that: (1) is between a governmental entity and a company with 10 or more full-time employees; and (2) has a value of $100,000 or more that is to be paid wholly or partly from public funds of the governmental entity. A governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that it: (1) does not boycott Israel; and (2) will not boycott Israel during the term of the contract.

CERTIFICATION OF SECTION 2252 TEXAS GOVERNMENT CODE

This section applies to contracts with companies engaged in business with Iran, Sudan, or foreign terrorist organization is prohibited. A governmental entity may not enter into a governmental contract with a company that is identified on a list prepared and maintained under Section 806.051, 807.051 or 2252.153. The comptroller shall prepare and maintain, and make available to each governmental entity, a list of companies known to have contracts with or provide supplies and services to a foreign terrorist organization.

CERTIFICATION OF SECTION 2276 TEXAS GOVERNMENT CODE

This section applies only to a contract that (1) is between a governmental entity and a company with 10 or more full-time employees; and (2) had a value of $100,000 or more that is to be paid wholly or partly from public funds of the governmental entity. Except as provided by Subsection (c), a governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that (1) does not boycott energy companies; and (2) will not boycott energy companies during the term of the contract.

CERTIFICATION OF SECTION 2274 TEXAS GOVERNMENT CODE

This section applies only to a contract that: (1) is between a governmental entity and a company with at least 10 full-time employees: and (2) has a value of at least $100,000 that is paid wholly or partly from public funds of the governmental entity. Except as provided by Subsection (c) and Section 2274.003, a governmental entity may not enter into a contract with a company for the purchase of goods or services unless the contract contains a written verification from the company that it: (1) does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and (2) will not discriminate during the term of the contract against a firearm entity or firearm trade association. Subsection (b) does not apply to a governmental entity that (1) contracts with a sole-source provider; or (2) does not receive any bids from a company that is able to provide the written verification required by that subsection.

CERTIFICATION OF SECTION 2273 TEXAS GOVERNMENT CODE

A governmental entity may not enter into a taxpayer resource transaction with an abortion provider or an affiliate of an abortion provider. This subsection does not apply to a taxpayer resource transaction that is subject to a federal law in conflict with Subsection (a) as determined b by the executive commissioner of the Health and Human Services Commission and confirmed in writing by the Attorney General.

CERTIFICATION OF SECTION 2274 TEXAS GOVERNMENT CODE

A governmental entity may not enter into a contract or other agreement relating to critical infrastructure in this state with a company that is (1) owned by or the majority of stock or other ownership interest of the company is held or controlled by (a) individuals who are citizens of China, Iran, North Korea, Russia, or a designated country; (b) a company or other entity, including governmental entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or a designated country; or (2) headquartered in China, Iran, North Korea, Russia, or a designated country.

CONFLICT OF INTEREST

Effective January 1, 2006, any person or entity who contracts or seeks to contract with RISD for the sale or purchase of property, goods, or services (as well as agents of such persons) (hereafter referred to as Vendors) are required to file a Conflict of Interest Questionnaire with the District. Each covered person or entity who seeks to or who contracts with RISD is responsible for complying with any applicable disclosure requirements. Forms received by the District become public records immediately and the law requires school districts that maintain web sites to place these records on the District's web site.

The Conflict of Questionnaire must be filed no later than the seventh business day after the date that the vendor begins contract discussions or negotiations with the government entity, or submits to the entity an application, response to a request for proposal or bid, correspondence, or other writing related to a potential agreement with the entity.

The vendor also shall file an updated questionnaire not later than September 1 of each year in which a covered transaction is pending, and the seventh day after the date of an event that would make a statement in the questionnaire incomplete and inaccurate.

Note: A vendor is not required to file an updated questionnaire if the person had filed an updated statement on or after June 1, but before September 1 of the year.

Completed forms should be sent to Rockwall Independent School District Purchasing Department, 1050 Williams Street, Rockwall, Texas 75087. Forms are available from the Texas Ethics Commission website.

The Rockwall ISD website provides a list of Local Government Officers, Superintendent and other Personnel

IRS FORM W9

This is a required form by the IRS for government entities that pay vendors in excess of $600.00 annually in order to issue a 1099 form and is required in conjunction with the reporting requirements by the Internal Revenue Service.

Please include a current W9 with vendor's response.

Vendor affirms they have read all certifications as described in this section and agrees to comply with all federal, state, and local laws, rules, regulations and ordinances, as applicable. It is further acknowledged the vendor certifies compliance with all provisions, laws, acts, regulations, etc. as specifically noted.

Company Name:	
Federal Tax ID #:	
City, State, Zip:	
Phone Number:	
Printed Name of Authorized Representative:	
Title of Authorized Representative:	
Email Address:	
Signature of Authorized Representative:	
Date Signed:	

SAMPLE

ROCKWALL INDEPENDENT SCHOOL DISTRICT
STANDARD FORM OWNER/CONTRACTOR AGREEMENT
Cain MS and Williams MS Site Improvement Project

ROCKWALL INDEPENDENT SCHOOL DISTRICT
STANDARD FORM OWNER/CONTRACTOR AGREEMENT
Cain MS and Williams MS Site Improvement Project

THIS AGREEMENT made and entered into on <Month> _____, <Year> by and between the **Rockwall Independent School District** called **"District,"** and (Insert Name)**,** herein called **"Contractor."**

The Owner's authorized representative is:

David Carter, CPA
Senior Chief Financial Officer
Rockwall Independent School District
1050 Williams Street
Rockwall, TX 75087
Phone number: (469) 698-7149

The term "Owner" means the Rockwall Independent School District or the Owner's authorized representative.

And the Contractor is: (Insert Name)

(Insert Address)

(Insert Address)

The Contractor's authorized representative is: (Insert Name and Title)

Phone number: (Insert Contact Number)

The Project is:

RFCSP 2526.XX-XXX
This project is to replace, repair or add existing equipment at Cain Middle School and Williams Middle School. This includes some site improvements at the fields such as additional bleachers, new LED lights for the field lighting, replacement of the track surface, and additional flatwork. Additional work will include selected alternates from the project scope.

SAMPLE

W I T N E S E T H:

The Owner and Contractor agree as follows:

I. THE CONTRACT DOCUMENTS.

The Contract Documents consist of this Standard form Owner/Contractor Agreement (the "Agreement"), all sections of the Project Manual, including Drawings, Specifications, and Addenda issued prior to execution of this Agreement, the Owner's Request for Proposals and Contractor's Proposal documents submitted in response to such Request, modifications to the Agreement issued and agreed to by the parties subsequent to the execution of this Agreement, and other documents as may be listed in this Agreement. A Modification is (1) a written amendment to the Agreement 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 Owner, and Architect, all of which must be signed by the parties. The Project Manual is a volume assembled for the work that is to be done on or relating to the Project (the "Work") which includes the bidding requirements, sample forms, Conditions of the Contract and Specifications.

In the event of conflict, terms and conditions contained in this Agreement shall take precedence over terms and conditions contained in the Project Manual, and the terms and conditions in the Project Manual, shall take precedence over all other terms and conditions contained in the other Contract Documents, unless specifically agreed otherwise herein.

The Contract Documents form the Contract for Construction (the "Contract"). 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 be amended or modified only by a written Modification signed by Contractor, approved by Owner's Board of Trustees, and signed by the representative of Owner's Board of Trustees who is authorized to sign contracts. As a material consideration for the making of the Contract, modifications to the Contract shall not be construed against the maker of said modifications. The Contract Documents shall not be construed to create a contractual relationship of any kind (l) 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.

II. DATE OF COMMENCEMENT, FINAL COMPLETION, AND LIQUIDATED DAMAGES.

A. The date of commencement is the date to be fixed in a written Notice to Proceed (NTP) issued by the Owner, which shall be not later than June 1, 2026. The NTP date is dependent upon the awarded contractor returning executed contracts and insurance/bonds, if required, prior to this date.

B. The Contractor shall achieve Final Completion of the entire Project not later than July 31, 2026, subject to adjustments as provided in the Contract.

SAMPLE

C. The Contractor and his surety or sureties shall be liable for and shall pay to the Owner the sum of $1,000.00 per day as fixed, agreed and liquidated damages for each calendar day after the date specified in Paragraph 2(b), as adjusted by written amendment, until Final Completion of the Project. The amount of damage to the Owner for delay in completion of the Project is difficult to ascertain and the amount of liquidated damages per calendar day is reasonable anticipated pecuniary damages for such delay and is not a penalty. Neither an extension of time nor the collection of liquidated damages shall limit or exclude any other right or remedy of the Owner under provisions of the Contract.

III. CONTRACT SUM.

The Owner shall pay the Contractor for the Contractor's full performance of the Contract, the Contract Sum of (Insert Contract Amount) (the "Contract Sum") subject to additions, deductions and/or liquidated damages as provided in the Contract.

The Contract Sum contains an Owner's Contingency in the amount of $70,000.00. This contingency is for the sole use of the Owner to be used for changes in the scope of the Work and for the betterment of the Project. Owner's authorized representative may approve any expenditure from Owner's Contingency without further Board of Trustees approval. If the Owner's Contingency is not expended or not fully expended, then any unused portion shall belong to the Owner and shall be credited to the Owner in calculating final payment.

IV. PROGRESS PAYMENTS.

A. Based upon Applications for Payment submitted to the Owner by the Contractor, the Owner will make progress payments as provided below.

B. Provided an Application for Payment is received and approved by the Owner not later than the twentieth (20th) day of a month, the Owner will make payment of the amount due, less five percent (5%) retainage, to the Contractor not later than the tenth (10th) day of the following month. If an Application for Payment is received by the Owner after the application date fixed above, payment in such amount as determined by Owner will be made by the Owner not later than fifty-one (51) days after the Owner receives and approves the Application for Payment.

C. Based on the Owner's observations and evaluations of the Project and the Contractor's Applications for Payment, the Owner will determine the amounts due to Contractor. If Owner determines, in Owner's reasonable discretion, that Contractor's Application for Payment contains discrepancies and/or errors, then Contractor shall resubmit said Application for Payment and the timeframe set forth in Section IV(B) above shall restart and apply from the date of resubmittal.

D. Any payment for undisputed amounts not paid in the time specified in paragraph 4.b. above shall be overdue. An overdue payment bears interest at the legal rate established by the Texas Government Code, §2251.025.

V. FINAL PAYMENT.

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A. Final payment, constituting the entire unpaid balance of the Contract Sum (less any offsets or damages as provided in the Contract Documents), will be made by the Owner when:

1. the Contract has been fully performed by the Contractor as determined by Owner, and Architect, and
2. the completed Project has been accepted by the Rockwall ISD Board of Trustees or its designee.

B. Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner:

1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Project have been paid or otherwise satisfied,

2. a certificate evidencing that the required insurance will remain in force after final payment and will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,

3. a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Owner,

4. consent of surety to final payment,

5. other data establishing payment or satisfaction of obligations, such as receipts, 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, and

6. written warranties and other documents required by the Contract and submitted to the Owner's Superintendent of Schools.

C. Acceptance of final payment by the Contractor shall constitute a waiver of all claims by the Contractor, except those previously made in writing and identified by the Contractor as unsettled at the time of final Application for Payment.

VI. OBLIGATIONS OF CONTRACTOR.

A. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR.

Before ordering materials or equipment or commencing the Project, the contractor shall carefully:

1. study and compare the Contract Documents with each other and with other information furnished by Owner,

SAMPLE

2. verify all indicated dimensions,

3. take field measurements,

4. verify field conditions, and

5. compare the field measurements and conditions and other information known to the Contractor with the Contract Documents, and verify that there are no impediments to the Project being constructed at the proposed site.

Errors, inconsistencies or omissions discovered shall be reported in writing to the Owner, and Architect at once. In the event that discrepancies occur between ordered material and actual conditions, of which the Owner, and Architect were not notified beforehand, costs to correct such discrepancies shall be borne by Contractor.

B. **SUPERVISION AND CONSTRUCTION PROCEDURES.**

1. The Contractor shall supervise and direct the Project, 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 Project under the Contract, unless the Contract gives other specific instructions concerning these matters.

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 performing portions of the Project under a contract with the Contractor.

3. On trench excavations in excess of five feet in depth, Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures as may be required by law, including but not limited to Texas Government Code §2166.303, Texas Health & Safety Code, Subchapter C, §756.021, *et seq.*, and OSHA 1926.652-.653. Contractor shall pay a qualified engineer to prepare detailed plans and specifications directing Contractor in safe execution of trenching and shoring.

C. **LABOR AND MATERIALS.**

1. Unless otherwise provided in the Contract, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Project, whether temporary or permanent and whether or not incorporated or to be incorporated in the Project.

2. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. As part of that responsibility, Contractor shall enforce the Owner’s alcohol-free, drug-free, tobacco-free, and weapon-free policies and zones, which will require compliance with

SAMPLE

those policies and zones by Contractor's employees, Subcontractors, and all other persons carrying out the Contract. Contractor shall also require adequate and appropriate dress of Contractor's employees, Subcontractors, and all other persons carrying out the Contract.

Contractor further agrees to submit any of its employees, agents, subcontractors or sub-subcontractors or their respective employees and agents, who meet the requirements of a covered employee under Texas Education Code §22.0834, to national criminal history checks or, alternatively, agrees to keep such employees and agents from having any direct contact with students of Owner. Failure to comply with the requirements of Texas Education Code §22.0834 shall constitute an immediate event of default by Contractor. Further, Contractor shall complete the "Contractor Certification" attached hereto as Exhibit "A" before beginning any Work that is the subject of this Agreement.

3. Contractor shall at all times maintain job records, including, but not limited to, invoices, payment records, payroll records, daily reports, logs, diaries, and job meeting minutes, applicable to the Project. Owner reserves the right to audit contractor's books and records relevant to all services provided under the Contract Documents. In the event such audit reveals any errors resulting in overpayments by the Owner, Contractor shall refund Owner the full amount of such overpayment within thirty (30) days of such audit findings, or the Owner, at its option, reserves the right to withhold such amounts owing the Owner from any payments due the Contractor. Contractor shall make such reports and records available to inspection or audit by the Owner and/or its agents within five (5) working days of request by Owner or its agent. Such records shall be maintained by Contractor for at least four (4) years.

D. **WARRANTY.**

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract, that work on the Project shall be performed in a good and workmanlike manner, that the Project will be free from defects not inherent in the quality required or permitted, and that the Project will conform with the requirements of the Contract. The contractor shall furnish the Contractor's warranty covering material and workmanship for a period of one year from the commencement date of the substantial completion. Manufacturer's material warranties shall be as issued by each manufacturer and provided in the close-out documentation.

E. **TAXES.**

The Owner qualifies for exemption from State and Local Sales Tax pursuant to the provisions of Chapter 151 of the Tax Code of the State of Texas. The Contractor may claim exemption from payment of applicable State and Local Sales Taxes by complying with such procedures as may be prescribed by the State Comptroller of Public Accounts. However, the Contractor shall pay all necessary local, county and state taxes, compensation tax, social security and withholding payments as required by law. **THE CONTRACTOR SHALL INDEMNIFY AND SAVE HARMLESS THE OWNER OF AND FROM ALL**

SAMPLE

CLAIMS AND DEMANDS MADE BY FAILURE OF THE CONTRACTOR OR SUBCONTRACTORS TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SAID LAWS AND AMENDMENTS.

F. **PERMITS, FEES AND NOTICES.**

1. The Contractor shall secure and pay for the building permit and other permits, governmental fees and licenses necessary for proper execution and completion of the Project which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

2. The Contractor shall comply with, give notices and provide certifications as may be required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Project including, but not limited to, 19 T.A.C. §61.1036.

G. **USE OF SITE.**

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract, as designated by the Owner, and shall not unreasonably encumber the site with materials or equipment.

H. **CLEANING UP.**

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Project the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. If the Contractor fails to clean up as provided in the Contract, the Owner may do so and the cost thereof shall be charged to the Contractor and may be offset against any amounts still owed to the Contractor.

I. **INDEMNIFICATION.**

TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, ITS TRUSTEES, AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES INCLUDING BUT NOT LIMITED TO, ATTORNEYS' FEES, ARISING OUT OF OR RESULTING FROM CONSTRUCTION OF THE PROJECT, BUT ONLY TO THE EXTENT CAUSED IN WHOLE OR IN PART BY ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR OR SUBCONTRACTORS OR ANYONE ELSE FOR WHOSE ACTS THEY MAY BE LIABLE, UNLESS SUCH CLAIM, DAMAGE, LOSS OR EXPENSE IS CAUSED SOLELY BY A PARTY INDEMNIFIED HEREUNDER.

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THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION SHALL NOT EXTEND TO THE LIABLITY OF THE ARCHITECT, THE ARCHITECT'S CONSULTANTS, OR AGENTS AND EMPLOYEES OF ANY OF THEM, CAUSED BY OR RESULTING FROM: (1) DEFECTS IN PLANS, DESIGNS OR SPECIFICATIONS PREPARED, APPROVED, OR USED BY THE ARCHITECT OR ENGINEER; OR, (2) NEGLIGENCE OF THE ARCHITECT OR ENGINEER IN THE RENDITION OR CONDUCT OF PROFESSIONAL DUTIES CALLED FOR OR ARISING OUT OF THE CONSTRUCTION CONTRACT IN THE PLANS, DESIGNS OR SPECIFICATIONS THAT ARE PART OF THE CONSTRUCTION CONTRACT; AND, (3) ARISING FROM: (A) PERSONAL INJURY OR DEATH; (B) PROPERTY DAMAGE; OR, (C) ANY OTHER EXPENSE THAT ARISES FROM PERSONAL INJURY, DEATH OR PROPERTY DAMAGE OR AS OTHERWISE LIMITED BY TEXAS CIVIL PRACTICE & REMEDIES CODE §130.001, ET SEQ.

FURTHER, AND IN ACCORDANCE WITH TEXAS INSURANCE CODE §151.102, AS APPLICABLE, THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION SHALL NOT REQUIRE CONTRACTOR TO INDEMNIFY, HOLD HARMLESS, OR DEFEND THE PARTY(S) INDEMNIFIED HEREUNDER AGAINST A CLAIM CAUSED BY (I) THE NEGLIGENCE OR FAULT, (II) THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE, OR (III) THE BREACH OF CONTRACT, OF THE OWNER, ITS AGENT OR EMPLOYEE OR ANY THIRD PARTY UNDER THE CONTROL OR SUPERVISION OF THE OWNER, OTHER THAN THE CONTRACTOR OR ITS AGENT, EMPLOYEE OR SUBCONTRACTOR OF ANY TIER.

J. **AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE PROJECT.**

1. The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the names of persons or entities proposed for each principal portion of the Project, if any. The Owner will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any proposed person or entity. Failure of the Owner to reply within ten (10) District business days shall constitute notice of no reasonable objection.

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

3. If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

SAMPLE

4. The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner makes reasonable objection to such change.

5. The Contractor shall not subcontract the Project as a whole. The approval of Subcontractors in no way relieves the Contractor from full responsibility.

6. Communications by and with Subcontractors and material suppliers shall be through the Contractor.

7. The Contract shall not be construed to create a contractual relationship of any kind:

a. between the Owner and a Subcontractor or Sub-subcontractor, or

b. between any persons or entities other than the Owner and Contractor.

K. **WORKERS' COMPENSATION.**

A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Department of Insurance, or a coverage agreement (DWC-81, DWC-82, DWC-83, or DWC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the Project.

Duration of the Project includes the time from the beginning of the Work on the Project until the Contractor's/person's work on the project has been completed and accepted by the Owner.

Persons providing services on the Project ("subcontractor" in Texas Labor Code §406.096) include 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 contracted 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 that 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 do not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

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 §401.011(44) for all employees of the Contractor providing services on the project for the duration of the Project.

The Contractor must provide a certificate of coverage to the Owner prior to being awarded the Contract.

SAMPLE

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.

The Contractor shall obtain from each person providing services on a project, and provide to the Owner:

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

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.

The Contractor shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.

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.

The Contractor shall post on each project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, 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.

The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

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 §401.011(44) for all of its employees providing services on the project for the duration of the Project;

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;

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.

4. Obtain from each other person with whom it contracts, and provide to the Contractor:

SAMPLE

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;

5. Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter;

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

7. Contractually require each person with whom it contracts to perform as required by items 1-6, with the certificates of coverage to be provided to the person for whom they are providing services.

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 commission's 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.

The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor that entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued for delivery, or renewed on or after January 1, 1996. 28 TAC §110.110(i)**.**

L. **PAYMENT AND PERFORMANCE BONDS.**

In accordance with Texas Government Code §2253.021, the Contractor shall furnish, before beginning the Work, a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum, if the Contract Sum meets or exceeds $100,000.00, to be used as security of the faithful performance of the Contract. The Contractor shall also furnish, before beginning the Work, a Payment Bond in accordance with Texas Government Code §2253.021, in an amount equal to one hundred percent (100%) of the Contract Sum, if the Contract Sum meets or exceeds $25,000.00, as security for the payment of all persons

SAMPLE

performing labor on the project under this Contract and furnishing materials in connection with the Contract. The Performance Bond, and the Payment Bond, may be in one or in separate instruments in accordance with local law. Surety companies must be authorized to write surety bonds in Texas and any such surety bond must comply with the requirements Section 7.19-1, Texas Insurance Code. Proof of such Performance, and Payment, shall be submitted to the Superintendent for his inspection and review prior to beginning any Work on the Project.

1. The Contractor shall deliver the required Bonds to the Owner not later than the date set in the Notice to Proceed. All Bonds will be reviewed by the District for compliance with the Contract Documents prior to the start of construction.

2. 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.

M. **CONTRACTOR'S INSURANCE.**

Contractor shall carry the following insurance with the minimum limits set forth herein. Such insurance must be carried with insurance companies acceptable to Owner. Contractor shall maintain such insurance, at its sole cost and expense, in full force and effect until this Contract has been fully performed, all equipment, implements and machinery of Contractor has been removed from, and all employees, agents, representatives and Subcontractors of Contractor have left Owner's premises, and final payment of the Contract Sum is made, unless any such coverage is required pursuant to the terms of the Contract Documents to be maintained after all of the foregoing items have been completed. Contractor shall cause each insurance company (i) to issue the insurance on an occurrence basis; (ii) to provide defense as additional benefit and not within the limits of liability, (iii) to issue an endorsement to all policies that the policies are primary and that Owner's policies are excess, secondary and noncontributing, (iv) to issue an endorsement to all policies to provide a waiver of subrogation in favor of Owner, (v) to issue an endorsement to all policies, except the workers' compensation and employer's liability insurance policies, to include Owner and its trustees, officers, employees, and agents as "additional insureds," and, (vi) to include in each insurance policy a provision that the insurance company or companies shall not cancel, non-renew, or change coverage from the requirements of the Contract Documents without providing at least 30 days' advance written notice to Owner. The insurance company or companies shall not exclude from coverage the negligence, of the "additional insureds," unless such negligence is solely attributable to the conduct of an "additional insured." Contractor releases Owner and its trustees, officers, employees and agents from any liability covered by the insurance for which subrogation is waived. Contractor shall provide to Owner at least 30 days' advance written notice of any contemplated cancellation, non-renewal, or material reduction in insurance coverage. Contractor shall provide to Owner a certified copy of any and all insurance policies required in this Contract if Owner requests a copy.

SAMPLE

Insurance coverage shall be written for the greater of the following limits or as specified in Owner's RFP/CSP, or as required by law, if greater:

1. Employer's Comprehensive General Liability insurance with minimum limits of $1,000,000 for each employee for bodily injury by accident and for each employee for bodily injury by disease.

2. Commercial General Liability insurance, including liability for the Project and blanket coverage, Personal and Advertising Injury, Products-Completed Operations, Medical Payments, Bodily Injury, and Property Damage, with minimum limits of $300,000 per occurrence, $300,000 general aggregate, $300,000 products-completed operations aggregate, $50,000 fire damage (any one fire), and $5,000 medical expense. Contractor shall obtain an endorsement to each insurance policy to provide aggregate limits per location. Contractor shall cause each insurance company to delete any contractual liability exclusion with respect to the insurance, including insurance coverage for personal injury, hazards of explosion, collapse, fire, and underground property damage.

3. Business Automobile Liability insurance with minimum combined single limits of $1,000,000. Contractor shall cause each insurance company to provide coverage for liability arising out of the operation of owned, hired, and non-owned vehicles.

4. Contractual Liability insurance with minimum limits of $1,000,000 per occurrence, and $1,000,000 general aggregate. Contractor shall obtain an endorsement to each insurance policy to provide aggregate limits per location. The contractual liability insurance shall not be limited to coverage for the Indemnity, Waiver, and Obligation to Defend provisions in this Contract, but, instead, the contractual liability insurance shall cover all of Contractor's obligations to the fullest extent possible under the contractual liability endorsement. Further, the contractual liability insurance shall not limit, in any way, coverage provided to Owner and its trustees, officers, employees, and agents as additional insureds under each of Contractor's insurance policies.

5. Builder's Risk "all-risk" or equivalent insurance policy, including boiler and machinery insurance, in the amount of the initial Contract Sum plus the value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis. Coverage shall insure against the perils of fire, (with extended coverage) and physical loss or damage including, without limitation or duplication of coverage, lightning, collapse, earthquake, flood, wind storm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, theft, vandalism, malicious mischief, falsework, testing and start-up, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and all other perils, and shall include materials stored on-site, off-site and in transit. Owner shall be a named insured under the policy, and the insurance shall also include the interests of Contractor, subcontractors, and sub-subcontractors. Contractor shall be responsible for maintaining said builder's risk insurance until the date of Final

SAMPLE

Completion. For any claim made against the builder's risk insurance, the deductible shall not exceed $2,500.

6. Umbrella/Excess Liability Insurance with minimum limits of $1,000,000. Contractor shall cause each insurance company to provide the insurance on an umbrella basis in excess over and no less broad than the liability coverages required in this Contract, with the same inception and expiration dates as Commercial General Liability insurance, and with coverage that "drops down" for exhausted aggregate limits under liability coverages in this Contract.

Contractor shall provide to Owner before the Work is started and at least 30 days prior to the expiration of a policy or policies of insurance in effect during the term of this Contract a certificate or certificates of insurance evidencing all required insurance in the Contract Documents and acceptable to Owner. All certificates, among other things, shall:

1. Show Owner as a certificate holder.

2. Show Contractor as the Named Insured.

3. Show the names of the insurance companies providing each coverage, the policy numbers of each coverage, and policy dates of each coverage.

4. Show the name of the person providing the certificate and that person's address and telephone number.

5. Contain the signature of an authorized representative of the person providing the certificate.

6. Show that each insurance company named Owner and its trustees, officers, employees, and agents as additional insureds in each insurance policy.

7. Show the primary status of each insurance policy.

8. Have attached copies of all required endorsements to each insurance policy, and not contain the phrases "endeavor to" and "but failure to mail such notice will impose no obligation or liability of any kind upon Company, its agents or representatives," or similar phrases and shall include the commitment that each insurance company shall issue each insurance policy to the named and additional insureds, that each policy is in full force and effect, and that each insurance company shall give to Owner at least 30 days' advance written notice, by certified mail, return receipt requested in the event of cancellation, non-renewal, or material reduction in coverage of any insurance policy.

Contractor shall not procure an insurance policy or policies with deductibles or self-insured retention in excess of $10,000 or with an endorsement restricting, limiting, or excluding coverage in any manner without Owner's prior written approval. Contractor shall pay all deductibles in the insurance that Contractor is required to provide under the Contract Documents.

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The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract. This coverage can be afforded by adding Owner as additional insured on general liability insurance coverage.

Contractor's failure to procure and maintain the required insurance shall constitute a material breach of, and default under, this Contract. If Contractor fails to remedy the breach within five (5) days after notice from Owner, Owner may, in addition to any other remedy available to it, at its option, purchase the insurance, at Contractor's expense, or immediately terminate this Contract. Contractor shall Indemnify and Defend Indemnified Persons from and against any Claims Arising from Contractor's failure to procure and/or maintain the insurance.

N. **EQUAL EMPLOYMENT OPPORTUNITIES.**

Contractor acknowledges that Owner, as an independent school district, is a political subdivision of the State of Texas and has certain requirements concerning equal employment and affirmative action under state and federal law, and shall comply with all applicable laws, regulations and special requirements under such federal and state laws, and the Contract Documents regarding equal employment opportunity and affirmative action programs.

Contractor and Contractor's Subcontractors, if any, shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth policies of nondiscrimination.

SAMPLE

VII. OWNER'S RIGHTS AND REMEDIES.

A. OWNER'S RIGHT TO REJECT THE PROJECT AND TO REQUIRE TESTING.

The Owner may reject all or part of the Project which does not conform to the Contract. Whenever the Owner considers it necessary or advisable, the Owner may require additional inspection or testing of the Project. Owner reserves the right to withhold any Progress Payment or portion thereof for any non-conforming or inferior Work, and the cost of any additional testing associated with non-conforming portions of the Work shall be charged to the Contractor and may be offset against any amounts still owed to the Contractor.

B. **OWNER'S RIGHT TO STOP THE PROJECT.**

If Owner discovers any defective Work, including any portion of Work not constructed in accordance with the Contract Documents, Contractor shall promptly, without cost to the Owner, correct such defective Work. If Contractor fails to commence such corrections within a reasonable period of time, not to exceed thirty (30) days, and does not diligently continue the prosecution of such corrections, or if the Contractor persistently fails to do the Project in accordance with the Contract, the Owner, by written order, may order the Contractor to stop the Project, or any portion thereof, until the cause for such order has been eliminated.

C. **OWNER'S RIGHT TO CARRY OUT THE PROJECT.**

If the Contractor defaults or neglects to carry out the Project in accordance with the Contract and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a second seven-day period. If the Contractor within such second seven-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case the Owner shall deduct from payments then or thereafter due the Contractor the cost of correcting such deficiencies. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

D. **TERMINATION BY THE OWNER FOR CAUSE.**

1. The Owner may terminate the Contract if the Contractor:

   a. persistently or repeatedly refuses or fails to do the work on the Project, or any part thereof, in accordance with the Contract and/or fails to supply enough properly skilled workers or proper materials;

   b. fails to make prompt payment to Subcontractors or for materials or labor;

   c. repeatedly disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;

   d. otherwise is guilty of substantial breach of a provision of the Contract; or

   e. is adjudged bankrupt, makes a general assignment for the benefit of his creditors, or has a receiver appointed on account of its insolvency.

2. When any of the above reasons exist, the Owner may, but shall not be obligated to, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety seven days' written notice, terminate employment

SAMPLE

of the Contractor and may, but shall not be obligated to, subject to any prior rights of the surety:

a. take possession of the site and all materials, including tools, and construction equipment and machinery located thereon which have been leased by the Contractor on behalf of the Owner;

b. accept assignment of subcontracts; and/or

c. finish the Project by whatever reasonable method the Owner may deem expedient.

3. When the Owner terminates the Contract for one of the reasons stated in Subparagraph 7(d)(1) above, the Contractor shall not be entitled to receive further payment until the Project is finished, if at all.

4. If the unpaid balance of the Contract Sum exceeds costs of finishing the Project, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be an obligation for payment which shall survive termination of the Contract.

E. **TERMINATION BY THE OWNER FOR CONVENIENCE.**

The Owner may, for convenience and without cause, terminate the Contract upon not less than seven (7) days' prior written notice to the Contractor. In the event of such termination for convenience and without cause, the Contractor shall be compensated for services performed prior to termination.

F. **SUSPENSION BY THE OWNER FOR CONVENIENCE.**

1. The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as the Owner may determine.

2. An adjustment may be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

a. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

b. that an equitable adjustment is made or denied under another provision of this Contract.

VIII. CLAIMS.

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A. **CLAIMS FOR ADDITIONAL COST.**

If the Contractor wishes to make a claim for an increase in the Contract Sum or for extra costs or damages, the Contractor shall give the Owner written notice thereof within five (5) days after the event giving rise to such claim. Such claim will be submitted to the Superintendent of the Rockwall Independent School District, or designee, and that action shall be final and binding. Failure to give such notice shall be a waiver of the claim and such claim or possible claim shall be invalid and unenforceable unless so made.

B. **CLAIMS FOR ADDITIONAL TIME.**

1. If the Contractor wishes to make claim to change the date of Final Completion to allow for additional time, the Contractor shall give the Owner written notice thereof within five (5) days following the beginning of any such delay. In the case of a continuing delay only one claim is necessary. Such claim will be submitted to the Superintendent of the Rockwall Independent School District, or designee, and reviewed and approved or denied. Failure by Contractor to give such notice shall be a waiver of the claim and such claim or possible claim shall be invalid and unenforceable unless so made.

2. If adverse weather conditions are the basis for a claim for additional time, such claim shall be accompanied by Weather Bureau documentary evidence showing by comparison that such weather is abnormal to each of the past five (5) years. The guide for average climatological conditions will be the bulletin "Summary of Monthly Normals," for DFW Airport published by the Department of Commerce in cooperation with the National Oceanic & Atmospheric Administration.

IX. MISCELLANEOUS.

A. **AUTHORITY OF BOARD.**

The Owner is the Rockwall Independent School District, as identified in the Contract Documents. 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 Work, to approve and execute a Change Order or Construction Change Directive modifying the Contract Sum or Guaranteed Maximum Price, or agree to an extension to the date of Substantial or Final Completion. The Board will act as soon as reasonably possible to avoid undue delays. The Board designates authorized representatives to act on its behalf for day-to-day operations under the Contract. Unless otherwise designated in the Contract Documents, Owner's authorized representative shall be the Superintendent of Schools, who may delegate responsibilities as appropriate. Owner's Board of Trustees hereby delegates to the Superintendent of Schools or designee(s) the authority to approve changes to the Work where such changes are within the Owner's Contingency not to exceed $35,000.00 per campus or $70,000.00 total, or will not increase the dates for Substantial or Final Completion by more than zero days. Any such change shall be confirmed in writing between the Contractor and Owner's Superintendent or designee(s), and notice of such approved changes shall be given to the Board at its next regular meeting;

SAMPLE

except as otherwise provided in the Contract Documents, the Architect or Owner's Consultant does not have such authority. Neither Architect or Owner's Consultant nor Contractor may rely upon the direction of any employee of Owner who has not been designated in writing by the Superintendent or Board of Trustees; Owner shall not be financially responsible for actions taken by the Architect or Owner's Consultant or Contractor in reliance upon direction from unauthorized persons.

B. **HAZARDOUS MATERIALS.**

IF HAZARDOUS MATERIALS ARE ENCOUNTERED AS A RESULT OF CONTRACTOR OR ITS SUBCONTRACTORS' IMPORTATION OF SUCH MATERIALS ONTO THE PROJECT SITE, THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS THE OWNER, ITS OFFICERS, DIRECTORS, AND EMPLOYEES FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, COSTS AND EXPENSES, INCLUDING BUT NOT LIMITED TO, ATTORNEYS' FEES, ARISING OUT OF OR RELATED TO THE IMPORTATION OF SUCH MATERIALS ONTO THE PROJECT SITE AND/OR CONSTRUCTION WORK IN ANY AREA AFFECTED BY HAZARDOUS MATERIALS.

If hazardous materials are encountered as a result of the Owner's failure to identify or remove hazardous materials prior to the commencement of construction, Owner agrees to (1) release the Contractor and its subcontractors, officers, directors, and employees from any and all claims, damages, losses, or expenses incurred by Owner arising out of or related to the performance of the Construction Work in the area affected by the hazardous material up to and including the time when Contractor first learns of or discovers the existence of the hazardous materials, but not for any additional work done by the Contractor after the identification of such hazardous materials; (2) release the Contractor from any indemnification obligations in this Agreement arising out of or related to the hazardous materials, except to the extent that any such claims, damages, losses, or expenses incurred by Owner arise from Contractor's actions or inaction after the initial discovery and identification of hazardous materials; and (3) extend the contract time by the actual number of days that Contractor is delayed in the completion of the contract arising out of or related to the identification, test, and/or abatement of the hazardous material if Contractor is unable to complete the Project by the scheduled completion date plus any agreed extension under other conditions of the Agreement.

C. **IMMIGRATION LAW.**

Contractor represents and warrants that all contractors and subcontractors working on this project for Owner will comply with all applicable federal and state immigration laws, and verify all employees' eligibility to work in this country. Further, Contractor shall ensure that all contractors and subcontractors will indemnify the Owner for any damages and legal fees that the Owner incurs as a result of Contractor's and/or any subcontractor's failure to comply with applicable immigration laws.

SAMPLE

D. **PREVAILING WAGE RATES.**

1. Contractor, Contractor's Subcontractors and Sub-subcontractors shall pay all workers not less than the general prevailing rate of per diem wages for work of a similar character where the Project is located, as detailed in the "Minimum Wage Schedule" provided herein. Wages listed are minimum rates only. However, no claims for additional compensation above the Contract Sum shall be considered by the Owner because of payments of wage rates in excess of the applicable rate provided herein. Texas Government Code §2258, *et seq*.; Texas Labor Code §62.0512, *et seq*.

2. Contractor shall forfeit, as a penalty to the Owner, $60 for each laborer, worker or mechanic employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the Contract Documents.

3. Owner reserves the right to receive and review payroll records, payment records, and earning statements of employees of Contractor, and of Contractor's Subcontractors and Sub-subcontractors.

4. In executing the Work under the Contract Documents, Contractor shall comply with all applicable state and federal laws, including but not limited to, laws concerned with labor, equal employment opportunity, safety and minimum wages.

5. If no "minimum wage schedule" is provided herein, the Contractor shall use the wage rates determined by the US Department of Labor in accordance with the Davis-Bacon Act, 40 USC Section 3141, which can be accessed on the internet at www.gpo.gov/davisbacon/, or determined by any local contractor association, whichever is less.

E. **TIME.**

1. Time limits stated in the Contract are of the essence. By executing the Agreement, the Contractor confirms that the date selected for Final Completion provides a reasonable period for performing the Project. Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Project is to be performed and correlated personal observations with requirements of the Contract.

2. The Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion by the date selected for Final Completion.

F. **GOVERNING LAW.**

This Contract shall be governed by the law of the State of Texas. Venue for any legal action arising out of the Project shall be in a state or federal court, as appropriate, in the county where the Owner's Administrative Offices are located.

G. **NO ASSIGNMENT.**

SAMPLE

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

H. **WRITTEN NOTICE.**

Written notice shall be deemed to have been duly served if delivered in person or if delivered at or sent by registered or certified mail to the following:

If to Owner:

Superintendent of Schools
Rockwall Independent School District
1050 Williams Street
Rockwall, Texas 75087

and to the Owner's authorized representative at the address set forth above.

David Carter, Senior Chief Financial Officer

If to Contractor:

(Insert Name and Address)

Contractor's authorized representative or, if a corporation, to an officer of the corporation at the address set forth above.

I. **RIGHTS AND REMEDIES.**

Duties and obligations imposed by the Contract 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.

J. **ENTIRE AGREEMENT.**

This Agreement and the additional documents identified and referenced herein represent the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral.

K. **NO ISRAEL BOYCOTT.**

Pursuant to the requirements of Texas Government Code Chapter 2270, Contractor verifies that it does not boycott Israel, and it will not boycott Israel during the term of this Agreement.

[*the remainder of this page is intentionally left blank*]

SAMPLE

This Agreement is entered into as of the day and year first written above and is executed in at least two original copies, one of which is to be delivered to the Contractor and one to the Owner.

OWNER:	**CONTRACTOR:**
_____	_____
Signature	Signature
_____	_____
Date	Date
David Carter, CPA	(Insert Name)
Senior Chief Financial Officer	(Insert Title)
Rockwall Independent School District	(Insert Company Name)
1050 Williams Street	(Insert Company Address)
Rockwall, Texas 75087	(Insert Contact Number)

SAMPLE

Contractor Certification

Introduction: Texas Education Code Chapter 22 requires service contractors to obtain criminal history record information regarding covered employees and to certify to Rockwall Independent School District (the "District") that they have done so. Covered employees with disqualifying convictions are prohibited from serving at a school district.

Definitions:

Covered employees: All employees of a contractor who have or will have continuing duties related to the service to be performed at the District and have or will have direct contact with students. The District will be the final arbiter of what constitutes direct contact with students.

Disqualifying conviction: One of the following offenses, if at the time of the offense, the victim was under 18 or enrolled in a public school: (a) a felony offense under Title 5, Texas Penal Code; (b) an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or (c) an equivalent offense under federal law or the laws of another state.

On behalf of_____ ("Contractor"), I certify that [check one]:

[ ] None of Contractor's employees are *covered employees,* as defined above. Or

[ ] Some or all of Contractor's employee are *covered employees.* If this box is selected, I further certify that:

(1) Contractor has obtained all required criminal history record information, through the Texas Department of Public Safety, regarding its covered employees. None of the covered employees has a disqualifying conviction. Contractor has taken reasonable steps to ensure that its employees who are not covered employees do not have continuing duties related to the contract services or direct contact with students.

(2) If Contractor receives information that a covered employee has a disqualifying conviction, Contractor will immediately remove the covered employee from contract duties and notify the District in writing within 3 business days.

(3) Upon request. Contractor will make available for the District's inspection the criminal history record information of any covered employee. If the District objects to the assignment of a covered employee on the basis of the covered employee's criminal history record information, Contractor agrees to discontinue using that covered employee to provide services at the District.

Noncompliance by Contractor with this certification may be grounds for contract termination.

_____
Signature

_____
Date

Exhibit "A"

SAMPLE