

EFLAND-CHEEKS ELEMENTARY SCHOOL

GENERAL RENOVATIONS

**ORANGE COUNTY SCHOOLS
HILLSBOROUGH, NORTH CAROLINA**

February 26, 2024

SUD ASSOCIATES, P.A.
CONSULTING ENGINEERS

DURHAM, NORTH CAROLINA

Company License C-0315

SET NUMBER _____

EFLAND-CHEEKS ELEMENTARY SCHOOL

GENERAL RENOVATIONS

**ORANGE COUNTY SCHOOLS
HILLSBOROUGH, NORTH CAROLINA**

Division 02, 03, 04, 05, 06, 07, 08, 09, 10, 12 & 32



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EFLAND-CHEEKS ELEMENTARY SCHOOL

GENERAL RENOVATIONS

**ORANGE COUNTY SCHOOLS
HILLSBOROUGH, NORTH CAROLINA**

Division 01, 22, 23 & 31



Feb 26, 2024

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EFLAND-CHEEKS ELEMENTARY SCHOOL

GENERAL RENOVATIONS

**ORANGE COUNTY SCHOOLS
HILLSBOROUGH, NORTH CAROLINA**

Division 26, 27 & 28



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ADVERTISEMENT FOR BIDS

The Orange County Board of Education is seeking proposals for the furnishing of labor, material, and equipment for the Efland-Cheeks Elementary School – General Renovations. Bids must be delivered to 200 East King Street, Hillsborough NC 27278 no later than 3:00 PM on March 26, 2024. Bids will be opened publicly in the Board of Education meeting room at the King Street location.

In accordance with the instructions in Section 004393 “Bid Packet Requirements”, bids shall be submitted in **Two (2)** separate sealed envelopes. The envelopes shall be labelled in accordance with the instructions. Bidders shall review the information in Section 003100 “Information Available to Bidders”.

The scope of work includes:

- Site work to install new exterior walkways, ramps and railings for emergency egress.
- Demolish and replace flooring, ceilings, walls, toilet partitions, interior and exterior doors, exterior windows and other architectural items on the drawings.
- An alternate price to add new aluminum canopies as shown on the drawings.
- Demolish existing plumbing fixtures and domestic water heaters and provide new ones. Make needed adjustments in piping locations for revised locations of plumbing fixtures. Provide recirculation pumps, mixing valves, expansion tanks, recirculation piping, replace some water piping, etc.
- Demolish existing supply diffusers, some exhaust grilles, and exhaust fans and provide new ones. Make needed adjustments in duct locations for revised locations of exhaust grilles. Provide ductwork and dampers to reroute air during certain phases of work.
- Demolish existing light fixtures and provide new LED fixtures, provide new egress lighting, provide revisions to power as required by plumbing and mechanical renovations.
- Provide additional fire alarm devices, fire alarm programming, and testing as required for the renovations.
- There is an alternate and an allowance for running a camera through waste piping and replacing piping which is in poor condition.

Complete plans and contract documents can be obtained through the office of Sud Associates, 1813 Chapel Hill Road, Durham, NC 27707, sudmain@sudassociates.com, (919) 493-5277, beginning February 27, 2024.

A pre-bid conference will be held at Efland-Cheeks Elementary School, 4401 Fuller Road, Efland, NC 27243 on March 5, 2024, 2024 at 1:30 PM.

All prime bidders are required to attend the pre-bid conference, and all prime bidders and sub-contractors are required to participate in an arranged site visit.

A copy of pertinent sections of the performance standards may be obtained by contacting the designer at the address or phone number noted herein.

A single contract will be accepted for all work.

All contractors are hereby notified that they must have a proper license under the state laws governing their respective trades. Contractors are notified that provisions of Chapter 87, General Statutes of North Carolina, will be observed in receiving and awarding contracts.

Minority Business Participation: Bidders shall note that compliance with County of Orange MBE policies and the North Carolina Statute 143-128.2 (c) are required for this project. Bids not including the specified MBE submittal for bidding are considered non-responsive.

Iran Divestment Act: Bidders shall note that the submission of a bid constitutes the bidder's certification to the State Treasurer that, as of the date of bid, it is not listed on the Final Divestment List created and maintained by the North Carolina Department of State Treasurer (the "Treasurer's Office") pursuant to the Iran Divestment Act of 2015, Chapter 147-Article 6E of the General Statutes of North Carolina (the "Iran Divestment Act").

Each proposal shall be accompanied by a cash deposit or a certified check, drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than 5 per cent of the proposal, or in lieu thereof a bidder may offer a bid bond of 5 per cent of the bid executed by a surety company licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

Performance Bond and Payment Bond will be required for one hundred per cent (100%) of the contract price.

Payment will be made monthly based on completion of work, with retainage in accordance with NC General Statutes 143-134-1.

Any addenda to drawings and specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the bidder's responsibility to ascertain prior to bid time the addenda issued and to see that the bid includes any changes thereby required. Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the Designer in writing who will send written instructions in the form of addenda to all bidders. Notification must be no later than ten (10) days prior to the date set for receipt of bids. Neither the Owner nor the Designer will be responsible for any oral instructions. All addenda shall be acknowledged by the bidders on the Form of Proposal. Requests for substitutions of materials or equipment shall be submitted by prospective bidders in writing to the Designer no later than ten (10) days prior to the date set for receipt of bids. Approvals to bid equivalent products will be issued in addenda.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The Owner reserves the unqualified right to reject any or all bids and to waive minor irregularities.

Designer:

Ish Sud
Sud Associates, PA
1813 Chapel Hill Road
Durham, NC 27707
Tel: 919-493-5277
e-mail: sudmain@sudassociates.com

Orange County Schools:

Patrick Florence
Orange County Schools
200 E. King Street
Hillsborough, NC 27278
Tel: (919) 732-8126 ext. 12510
e-mail: patrick.florence@orange.k12.nc.us

Thank you for your consideration.

Signed: Patrick Florence
Orange County Schools,
Hillsborough, North Carolina

INFORMATION AVAILABLE TO BIDDERS

INFORMATION AVAILABLE TO BIDDERS
Orange County Schools / Orange CountyA-1. **SUBMISSION OF BIDS AND BID OPENING:**

- A. Bids will be received by Orange County Schools (OCS) and will be opened and read at the times and places set forth in the Advertisement for Bids. Bidders, or their representative, and other interested persons may be present at the opening of proposals.
- B. In accordance with the instructions in Section 004393 "Bid Packet Requirements", bids shall be submitted in **Two (2)** separate sealed envelopes. The envelopes shall be labelled in accordance with the instructions.
- C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.
- D. In accordance with the Advertisement for Bids, bids will be received for a Single Prime Construction Contract.

A-2. **BIDDING DOCUMENTS:**

- A. Bidding Documents include the Advertisement for Bids, Information for Bidders, Form of Proposal, the Bid Security and the proposed Contract Documents, including any Addenda issued prior to receipt of bids. All requirements and obligations of the Bidding Documents are hereby incorporated by reference into the Contract Documents and are binding on the Successful Bidder upon award of the contract.
- B. Bidders may obtain complete sets of the bidding Documents from the issuing office designated in the Advertisement for Bids in the number and for the price, if any, stated therein.
- C. Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor the Design Consultant shall assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- D. The Owner in making copies of the Bidding Documents available on the above terms does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

A-3. **DEFINITIONS:**A. **THE BID:**

A Bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents and North Carolina law.

B. **BASE BID:**

The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Bids, if any.

INFORMATION AVAILABLE TO BIDDERS

C. ALTERNATES:

An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

A-4. QUALIFICATION OF BIDDER:

- A. If requested by the Owner prior to the signing of the contract, the successful Bidder shall submit a statement of work to be performed by his own forces.
- B. Prior to Contract award or within seven days of the Owner's request to do so, the successful Bidder shall be prepared to demonstrate that his present organization, direct labor force and prior work experience is of adequate size and development to maintain responsible control of the project and to schedule, coordinate and perform the work in an expeditious manner and in accordance with the Contract Documents.
- C. Bidders, whether residents or nonresidents in North Carolina will be required to show evidence of a certificate of registration before their bids will be considered.
- D. The Owner will consider, in determining the qualifications of a Bidder, his record in the performance of any contracts for construction work into which he may have entered with the Owner or with similar public or private bodies or corporations. The Owner expressly reserves the right to reject the bid of any Bidder if such record discloses that such Bidder, in the opinion of the Owner, has not properly performed such contracts or has habitually and without just cause neglected the payment of bills, or has otherwise disregarded his obligations, Subcontractors, material men, suppliers or employees.
- E. The Owner may make such investigation as they deem necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as they may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of such Bidder, fails to satisfy the Owner that such Bidder is a responsive and responsible Bidder in accordance with N.C. Gen. Stat. 143-128 and 143-129, and the criteria set forth herein. Conditional bids will not be accepted.

A-5. BIDDER'S REPRESENTATIONS:

Each Bidder by submitting a Bid represents that:

- A. Bidder has read and understands that Bidding Documents and their Bid is made in accordance therewith; and Bidder agrees to be bound by the terms and requirements set forth in the Bidding and Contract Documents;
- B. Bidder has visited the site, has familiarized themselves with the local conditions under which the Work is to be performed in accordance with Article A-10 herein, and has correlated their observations with the requirements of the proposed Contract Documents;
- C. Bidder's Bid is based upon the materials, systems and equipment required by the Bidding Documents without exception; and
- D. Bidder has the capability, in all respects, and the moral and business integrity, reliability, technical ability, financial resources, plant, management, superintendence, equipment and materials which will assure effective and efficient good faith performance in full compliance

INFORMATION AVAILABLE TO BIDDERS

with the Contract Documents and with any and all schedules and Milestone and Completion dates required by the Owner. The Bidder acknowledges and represents that they have made allowances for normal inclement weather indigenous to the Project Site, in their estimating, planning and scheduling of the Work. The Bidder hereby certifies that the work shall be completed, in place, in full accordance with the Contract Documents, within the time limits specified.

- E. Bidder agrees that upon receipt of the Notice of Award, they will execute the formal Contract, and will deliver all bonds and proof of insurance coverage as required by the Specifications.
- F. Bidder agrees to execute the formal Contract within ten (10) days from the date of Notice of Award, and in case they fail or neglect to appear within the specified time to execute the Contract, they will be considered as having abandoned the Contract, and the Bid Security accompanying this Proposal will be forfeited to the Owner by reason of such failure on the part of the Bidder.
- G. Bidder has made a good faith effort to solicit Minority Business Enterprises (MBEs) per N.C. Gen. Stat. 143-128.2, as subcontractors. The Bidders shall provide the Owner a notarized affidavit with its bid stating that it made the good faith effort required pursuant to G.S. 143-128.2. The Bidder's failure to file the affidavit with its bid shall be grounds for rejection of the Bid.
- H. Bidder has received the the General Conditions dated December 2020.

A-6. BID SECURITY:

- A. Each bid must be accompanied by (1) cash; or (2) a Cashier's Check or a Certified Check of the Bidder in an amount not less than 5% of the bid, made payable to the Owner; or (3) a bidder's bond on the Bid Bond Form provided herein or on a similar form which in every respect materially complies with said Bid Bond, in the amount of 5% of his bid. For purposes of this provision, the amount of the bid shall be the Base Bid plus all positive amount alternates. The bidder's bond shall be issued by a surety company licensed to conduct business in North Carolina and acceptable to the Owner.
- B. Said bid security is given as a guarantee that the Bidder will enter into a contract if awarded the work and, in the case of refusal or failure to so enter into said contract, the security shall be declared forfeited to the Owner. Such security shall be returned to all but the three lowest Bidders within three days after the opening of bids and the remaining security will be returned within 48 hours after the Owner and the successful Bidder have executed the Contract. If no Contract has been awarded or the bidder has not been notified of the acceptance of his bid within sixty (60) days of the bid opening, the Bidder may withdraw his bid and request the return of his bid security. If, at the Owner's request, the Bidder agrees to extend and maintain his bid beyond the specified 60 days, his bid security will not be returned until the expiration of the period of extension.

A-7. FORFEITURE OF BID BOND:

The Successful Bidder, upon his failure or refusal to execute the Contract within ten (10) days after he has received Notice of Award, shall forfeit to the Owner the security deposited with his bid in accordance with North Carolina General Statute 143-129.

A-8. EQUAL EMPLOYMENT OPPORTUNITY

INFORMATION AVAILABLE TO BIDDERS

During the performance of this contract, the contractor agrees as follows:

- A. The contractor will not discriminate against any employee or applicant for employment because of race, handicap, age, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to race, handicap, age, color, religion, sex or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruiting advertising, layoff or termination rates of pay or other forms of compensation, and selection for training including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices setting forth the provisions of the nondiscrimination clause.
- B. The contractor will in all solicitations or advertisements for employees placed by or on behalf of the contractor state that all qualified applicants will receive consideration for employment without regard to race, handicap, age, color, religion, sex, or national origin.
- C. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding a notice to be provided advising the labor union or workers' representative of the contractor's commitments under the Equal Employment Opportunity section of this contract and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. In the event of the contractor's noncompliance with nondiscrimination clauses of this contract or with any such rules, regulations or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further County contracts.
- E. The contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Board of County Commissioners of the County of Orange, North Carolina so that such provisions will be binding such subcontractor or vendor.

A-9. MINORITY BUSINESS ENTERPRISES:

- A. Bidders are required to submit information about participating M/WBEs with their bid. Each bidder shall identify on its bid the minority businesses that it will use on the project and an affidavit listing the good faith efforts it has made pursuant to N.C. Gen. Stat. § 143-128.2(f). The information must include the name and address of each M/WBE, a description of the work to be performed by each, and the dollar value of the work to be performed by each. Any bidder who fails to achieve the indicated M/WBE participation goal stated above is required to provide the aforementioned documentation demonstrating that good faith efforts were made in an attempt to meet the established goal. AFFIDAVITS A through D and APPENDIX E are provided to record this information and must be completed as specified and enclosed with your bid. Any bid which does not include M/WBE information and documentation may be considered non-responsive.
- B. The apparent lowest responsible, responsive bidder, within three (3) business days, shall also provide either (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal or (2) documentation of its good faith effort that was identified in the bid to meet the goal (Affidavit D), including any advertisements, solicitations, and evidence of other specific actions demonstrating

INFORMATION AVAILABLE TO BIDDERS

recruitment and selection of minority businesses for participation in the contract. **Failure to file the required affidavit or supporting documentation that demonstrates that the contractor made the required good faith effort is grounds for rejection of the bid.**

- C. M/WBE: A business which is at least 51% owned and controlled by minority group members or a woman. A M/WBE is bona fide only if the minority group or female ownership interests are real and continuing and not created solely to meet the M/WBE requirement. In addition, the M/WBE must itself perform satisfactory work or service or provide supplies under the contract and not act as a conduit. The contractual relationship must be bona fide.
- D. Owned and controlled: (1) A sole proprietorship legitimately owned by an individual who is a minority group member or female; (2) a partnership or joint venture controlled by minorities and/or females; (3) a corporation or other entities controlled by minorities or females, and in which at least 51% of the voting interests and 51% of the beneficial ownership interests are legitimately held by minorities and/or females. These persons must control the management and operations of the business on a day-to-day basis.
- E. A person who is a citizen or lawful permanent resident of the United States and who is:
- “Black American”; a person having origins in any of the Black racial groups of Africa;
 - “Hispanic American”; a person of Spanish culture with origins in Mexico, Central or South America, or the Caribbean, regardless of race;
 - “Native American”; a person who is a member or is eligible to be a member of a federally recognized Indian tribe. A federally recognized Indian tribe means an Indian tribe, or band, nation, rancho, pueblo, colony, or other organized group or community, including any Alaska native village, which is recognized by the Secretary of the Interior on October 1, 1985 as having special rights and is recognized as eligible for service provided by the United States to Indians because of their status as Indians, and any tribe that has a pending application for federal recognition on October 1, 1985, as having special rights and is recognized as eligible for services provided by the United States to Indians because of their status as Indians, and any tribe that has a pending application for Federal recognition on October 1, 1985.
- F. During the construction of a project, if it becomes necessary to replace an M/WBE subcontractor, the prime contractor shall advise the owner. No M/WBE subcontractor may be replaced with a different subcontractor except (1) if the subcontractor's bid is later determined by the contractor to be nonresponsible or nonresponsive, or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work or (2) with the approval of the Owner for good cause.
- Good faith efforts as set forth in N.C. Gen. State. § 143-131(b) shall apply to the selection of a substitute subcontractor. Prior to substituting a subcontractor, the contractor shall identify the substitute subcontractor and inform the Board or its designee of its good faith efforts pursuant to N.C. Gen. State. § 143-131(b).
- G. If during the construction of a project additional subcontracting opportunities become available, the prime contractor shall make a good faith effort to solicit subbids from M/WBEs.

A-10. **SITE CONDITIONS AND CONDITIONS OF THE WORK:**

INFORMATION AVAILABLE TO BIDDERS

- A. Each bidder must acquaint themselves thoroughly as to the character and nature of the work to be done. Each bidder furthermore must make a careful examination of the site of the work and inform themselves fully as to the difficulties to be encountered in the performance of the work, the facilities for delivering, storing and placing materials and equipment, and other conditions relating to construction and labor.
- B. No plea of ignorance of conditions that exist or may hereafter exist on the site of the work, or difficulties that may be encountered in the execution of the work, as a result of failure to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the successful Bidder to fulfill in every detail all the requirements of the Contract Documents and to complete the work or the consideration set forth therein, or as a basis for any claim whatsoever.
- C. Insofar as possible, the Successful Bidder, in carrying out its work, must employ such methods or means as will not cause interruption of or interference with the work of the Owner or any separate contractor.

A-11. BIDDER'S QUESTIONS, ADDENDA AND INTERPRETATIONS:

- A. Bidders and Sub-bidders shall promptly notify the Design Consultant of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding and Contract Documents or of the site and local conditions. No interpretation of the meaning of the drawings, specifications or other contract documents will be made to any Bidder orally.
- B. Every request for such interpretation should be in writing addressed to the Design Consultant with a copy forwarded to the Owner.
- C. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Bidding Documents which, if issued, will be transmitted to all prospective Bidders (at the respective addresses furnished for such purposes) not later than three calendar days prior to the date fixed for the opening of bids. Neither the Design Consultant nor the Owner will be responsible for any other explanations or interpretations of the proposed documents. Failure of any Bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligation under its bid as submitted. All addenda so issued shall become part of the Contract Documents.
- D. Each Bidder shall ascertain prior to submitting his bid that it has received all Addenda issued, and shall acknowledge receipt and inclusion in its proposal of all Addenda.

A-12. SECURITY FOR FAITHFUL PERFORMANCE:

The Successful bidder shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum, as security for the payment of all persons performing labor and furnishing materials under this Contract. The successful bidder shall provide a Performance Bond and a Labor and Material Payment Bond using the forms attached as Exhibits A and B. The Performance Bond and the Labor and Material Payment Bond shall be delivered to the Owner not later than the date of execution of the Contract.

A-13. TIME FOR COMPLETION AND LIQUIDATED DAMAGES FOR NON-COMPLETION:

INFORMATION AVAILABLE TO BIDDERS

The time for completion of this Contract and liquidated damages for non-completion within the stipulated time shall be as fixed in the General Conditions and Supplemental General Conditions.

A-14. LOCATION OF WORK:

The site of the proposed work is on Owner owned property, public streets, easements and/or other right-of-ways, as shown on the drawings.

A-15. LIABILITY INSURANCE AND WORKMEN'S COMPENSATION:

The Successful Bidder will be required to carry public liability and workmen's compensation and other insurance in the amounts and under the terms stipulated under the General Conditions.

A-16. BIDDERS REFERRED TO LAWS:

A. The attention of Bidders is called to the provisions of all Municipal, County and State laws, regulations, ordinances and resolutions, as well as laws, regulations, ordinance resolutions and permits relating to obstructing streets, maintaining signals, storing and handling of explosives, or affecting the Bidder, or his employees or his work hereunder in his relation to the Owner or any other person. The Bidder shall obey all such laws, regulations, ordinances, permits or resolutions controlling or limiting Contractors while engaged in the prosecution of work under this Contract.

B. The provisions of this contract shall be interpreted in accordance with the laws of North Carolina and in accordance with the laws, ordinances, regulations, permits and resolutions of Orange County.

A-17. TAXES

All applicable Federal, State and Local Taxes shall be included in the Bidder's proposal. The successful bidder shall provide the Owner with monthly documentation of North Carolina sales taxes paid for all purchases on the project in a form acceptable to the Owner.

Owner has determined this project to be a Capital Improvement as defined by the NC General Statute § 105-164.

A-18. RIGHT TO REJECT BIDS:

The Owner expressly reserves the right to reject any or all bids, to waive any irregularities in the bids received, and to accept that bid which in its sole judgment, best serves the interests of the Owner.

A-19. EQUAL PRODUCTS AND SUBSTITUTIONS:

A. Whenever possible, the Design Consultant shall specify in the plans the required performance and design characteristics for materials as required by N.C. Gen. Stat. § 133-3. When it is impossible or impractical to specify the required performance and design characteristics for materials, the Design Consultant may use a certain brand, make, manufacturer, article, device, product, material, fixture, form or type construction by name, make or catalog number to convey the general style, type, character and standard of quality of the article desired. Unless specifically stated to the contrary, all materials, supplies and articles furnished under this Contract shall, whenever specified and otherwise practicable, be the standard products of recognized, reputable manufacturers.

INFORMATION AVAILABLE TO BIDDERS

Unless otherwise specifically provided in the Contract Documents, the naming of a certain brand, make, manufacturer or article, device, product, material, fixture or type of construction shall convey the general style, type, character and standard of quality of the article desired and shall not be construed as limiting competition. If approval by the Design Consultant prior to bid opening is desired, the bidder shall request approval in writing at least ten (10) days prior to the bid date. The Design Consultant's approval will be in the form of an Addendum to the Specifications issued to all prospective Bidders indicating that the additional makes or brands are equivalent to those specified. Nothing in this paragraph is intended to restrict or inhibit free and open competition on school system projects.

- B. The bidder may request approval for substitutions of materials or type of construction in writing up to ten (10) days prior to the bid date. The standard for acceptance of substitutions shall be as expressed in Paragraph 4.15 of the contract General Conditions.

A-20. PREPARATION AND SUBMITTAL OF FORM OF BID:

- A. Bids shall be submitted utilizing the Form of Proposal as bound herein, or otherwise provided with the Contract Documents, and shall be complete in every respect. The total bid amount shall be entered in words and figures in the space provided. Where applicable, the unit price or lump sum items, and their extensions, shall be entered in figures in the respective columns provided for each bid item. All entries shall be typewritten or printed in ink. The signatures of all persons shall be in longhand. Any entry of amount that appears on the face of the bid to have involved an erasure, deletion, white-out and/or substitution or other such change or alteration, shall show by them the initials of the person signing the bid and the date of the change or alteration. A failure to comply with this requirement may be cause for disqualification of the bid.
- B. For Unit Price bids, in the event of any discrepancies between the unit prices and the extensions thereof or the total bid amount, the unit prices shall govern. For Lump Sum bids, in the event of a discrepancy between the bid amount in writing and that in figures, the written value shall govern.
- C. Bids shall not contain any restatement or qualifications of work to be done, and alternate bids will not be considered unless called for. No oral bids or modifications will be considered.
- D. The amount of a bid submitted by a subcontractor to the general contractor under the single prime contracting system shall not exceed the total bid.

A-21. MODIFICATION OR WITHDRAWAL OF BID:

- A. A Bidder may withdraw his bid from consideration if such bid was based upon a mistake as provided in North Carolina General Statute 143-129.1.
- B. Prior to the time and date designated for receipt of bids, any bid submitted may be modified or withdrawn by notice to the party receiving bids at the place designated for receipt of bids. Such notice shall be in writing over the signature of the Bidder or by telegrams; if by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of bids, and it shall be so worded as not to reveal the amount of the original bid.

INFORMATION AVAILABLE TO BIDDERS

- C. Withdrawn bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with this Information for Bidders.
- D. Bid security, if any is required, shall be in an amount sufficient for the bid as modified or resubmitted.

A-22. DETAILED BID BREAKDOWN:

If the Owner directs, the Bidder shall provide a detailed breakdown of its bid acceptable to the Owner. In addition to verifying accounting requirements, the breakdown may be used by the Owner to determine whether the Bidder has grossly misjudged the requirements of any area. Failure to provide the requested detailed breakdown may result in rejection of the bid proposal.

A-23. AWARD OF CONTRACT:

- A. Orange County and the Orange County Schools Board of Education have entered into an Interlocal Agreement under which the Board of Education is the authorized agent for real property sites leased by Orange County in order to facilitate the refund of sales taxes paid to the State of North Carolina for tangible personal property, building materials, supplies, fixtures, and equipment used in the erection, construction and development of school buildings, additions or renovations to school buildings upon these sites.
- B. The Orange County Schools Board of Education as the agent of Orange County is appointed to manage design and construction contracts of school buildings or additions to school buildings on the property leased by the County. As such, all Bidding, Award, and Contract documentation will follow Orange County Procurement Policies and will be received, reviewed, recommended, and managed by Orange County Schools. The contract will be awarded to the lowest responsive and responsible bidder under the single prime system, taking into consideration quality, performance, and the time specified in the bids for the performance of the contract.
- C. The lowest bidder shall be determined by the aggregate amount of the unit prices set forth in the form of bid, if work is bid on a unit price basis, or the aggregate amount of the Base Bid, plus any Alternates selected by the Owner. Single prime bids will be received and awarded according to state law.
- D. A Responsive Bidder shall mean a Bidder who has submitted a bid which conforms, in all material respects, to the Bidding Documents.
- E. A Responsible Bidder shall mean a Bidder who has the capability, in all respects, to perform fully the contract requirements and the moral and business integrity and reliability which will assure good faith performance. In determining responsibility, the following criteria will be considered:
 - 1. The ability, capacity and skill of the Bidder to perform the contract or provide the service required;
 - 2. Whether the Bidder can perform the contract or provide the service promptly, or within the time specified, without delay or interference;
 - 3. The character, integrity, reputation, judgment, experience and efficiency of the Bidder;
 - 4. The quality of performance of previous contracts or services. For example the following information will be considered:

INFORMATION AVAILABLE TO BIDDERS

- a. the administrative and consultant cost overruns incurred by Owners on previous contracts with Bidder,
 - b. the Bidder's compliance record with contract general conditions on other projects,
 - c. the submittal by the Bidder of excessive and/or unsubstantiated extra cost proposals and claims on other projects,
 - d. the Bidder's record for completion of the work within the Contract Time or within Contract Milestones and Bidders compliance with scheduling and coordination requirements on other projects,
 - e. the Bidder's demonstrated cooperation with the Owner or the Design Consultant and other contractors on previous contracts,
 - f. whether the work performed and materials furnished on previous contracts was in accordance with the Contract Documents;
5. The previous and existing compliance by the Bidder with laws and ordinances relating to contracts or services;
 6. The sufficiency of the financial resources and ability of the Bidder to perform the contract or provide the service;
 7. The quality, availability and adaptability of the goods or services to the particular use required;
 8. The ability of the Bidder to provide future maintenance and service for the warranty period of the contract;
 9. Whether the Bidder is in arrears to the Owner on debt or contract or is a defaulter on surety to the Owner;
 10. Whether the Bidder has demonstrated a good faith effort to use MBEs as subcontractors;
 11. Such other information as may be secured by the Owner having a bearing on the decision to award the contract, to include, but not limited to:
 - a. the ability, experience and commitment of the Bidder to properly and reasonably plan, schedule, coordinate and execute the Work,
 - b. whether the Bidder has ever been debarred from bidding or found ineligible for bidding on any other projects.
- F. The purpose of the above is to enable the Owner in its opinion, to select the lowest responsible bidder. The ability of the low Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder.
- G. In addition to the qualifications package submitted with the bid, the Owner reserves the right to require from the Bidder: (1) submissions of additional references, within seven days of bid opening, to include a listing of previous and current projects and (2) financial statements indicating current financial status, prepared in accordance with generally accepted accounting principles, by a CPA licensed to do business in North Carolina, and (3) any other information deemed necessary in order to establish the responsiveness and responsibility of the bidder.
- H. The Owner reserves the right to defer award of this contract for a period of sixty (60) days after the due date of bids. During this period time, the Bidder shall guarantee the prices quoted in his bid.

A-24. ADDITIONAL REQUIREMENTS:

INFORMATION AVAILABLE TO BIDDERS

- A. Security of Non-public Records: Pursuant to N.C.G.S. § 132-1.7, entitled, "Sensitive Public Security Information", public records, as defined in G.S. 132-1, shall not include information containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities. Therefore, all information provided, received, gathered or obtained by Bidder containing specific details of public security plans and arrangements or the detailed plans and drawings of public buildings and infrastructure facilities shall be held confidential and shall be used by the Bidder only for the purpose of responding to this bid. All plans and drawings shall be returned to the Owner no later than the bid closing date. Any breach of this paragraph by the Bidder may result in Bidder being barred from being awarded any contracts with the Owner.
- B. To ensure a fair bidding process, questions and/or clarifications requested by contractors will be accepted up to **seven (7) days prior to Bid Opening**. Bidders/contractors are required to submit their questions in writing to the Designer, **Michael Szigeti** at **michael@sudassociates.com**, with a copy to the Owner.
- C. The following forms must be returned with one (1) original of the Bid Proposal:
- a. Bid Forms
 - b. Non-Collusion Affidavit
 - c. Bid Bond
 - d. Power of Attorney
 - e. MBE Forms:
 - i. Identification of Minority Business Participation with contract amounts (\$)
 - ii. Affidavit A – Listing of Good Faith Efforts - OR -
 - iii. Affidavit B – Intent to Perform Contract with Own Workforce
- D. Following the bid opening, the Owner will issue a Determination of Apparent Low Bidder letter to the contractor it has deemed to be the apparent low responsible, responsive bidder based on the initial bid documentation. The contractor is required to submit Affidavit C or D including all statute-required back-up information within seventy-two (72) hours of the receipt of the letter.
- E. Within 30 calendar days of the contract award, the contractor shall submit a complete list of all identified subcontractors the contractor will use on the project.

RELATED SECTIONS:

- A. Exhibit A – Performance Bond Form (Section 00 61 13)
- B. Exhibit B – Material and Labor Payment Bond Form (Section 00 61 13)

END OF INFORMATION FOR BIDDERS

BID FORM – SINGLE PRIME CONTRACT

TO: Orange County Schools – Construction & Facilities
200 East King Street
Hillsborough, North Carolina, 27278

FROM: BIDDER _____

ADDRESS

CITY _____ STATE _____ ZIP _____

The undersigned Bidder agrees, if this Bid is accepted, to enter into an agreement with Owner, in the form included in the Bidding Documents, to perform and furnish the work as specified or indicated in the Bidding Documents for the Bid Price and within the Bid Times indicated in this Bid in accordance with the other terms and conditions of the Contract Documents.

1. BASE BID PROPOSAL:

Having become completely familiar with the local conditions affecting the cost of work at the place where work is to be executed, and having carefully examined the site conditions as they currently exist, and having carefully examined Bidding Documents prepared by

Name: Sud Associates, P.A.
Address: 1813 Chapel Hill Road
City / State / Zip: Durham, NC 27707

and titled:

Name of Project: Efland-Cheeks Elementary School – General Renovations
Address: 4401 Fuller Road
City / State / Zip: Efland, NC 27243

Dated 2/26/2024 together with any addenda to such Bidding Documents as listed hereinafter, the undersigned hereby proposes and agrees to provide all labor, materials, plant, equipment, transportation, and other facilities as necessary and/or required to execute all of the work described by the aforesaid Bidding Documents for the lump sum consideration of:

Base Bid: _____

Dollars (\$ _____),

Said amount being hereinafter referred to as the Base Bid or Base Bid Proposal.

Base Bid Breakdown:

General Dollars (\$ _____)

Plumbing Dollars (\$ _____)

Mechanical Dollars (\$ _____)

Electrical Dollars (\$ _____)

Fire Alarm Dollars (\$ _____)

2. ALTERNATES:

The Bidder proposes to perform the work indicated as alternates for the amounts entered below, which amounts shall be added to or deducted from the Base Bid as indicated in the space below. (**Bidders must enter an amount for each alternate.** If acceptance of the alternate will not change the contract amount, enter “**No Change**”. Insert the words “**Add**” or “**Deduct**” in the space provided before the amount.)

<u>List of Owner Preferred Alternates:</u>	<u>Add/Deduct</u>	<u>Amount</u>
Owner Preferred Alternate OP-G1: Under Section 087000 Hardware, provide cylinders and cores by Corbin Russwin.		
Owner Preferred Alternate OP-P1: Provide Elkay Model LZSTL8WSSK dual height filtered bottle filler refrigerated drinking fountains where called for in the drawings and Plumbing Schedule.		
Alternate: G1: Provide all work associated with new aluminum canopies in Phase 2 & Phase 3. See drawings for details and locations.		
Alternate: G2: ADD alternate for all work associated with Phase 6 of the project		

3. ALLOWANCES:

<u>Description of Allowances:</u>	<u>Quantity / Amount</u>
Allowance No. 1: GENERAL RENOVATION ALLOWANCE Allowance for unforeseen conditions	Base Bid = \$60,000
Allowance No. 2: DOOR HARDWARE ALLOWANCE Allowance for door hardware	Base Bid = \$280,000
Allowance No. 3: UNSUITABLE SOIL REPLACEMENT Allowance for unsuitable soil replacement with ABC stone including compaction and haul off of unsuitable soil	10 cubic yards
Allowance No. 4: SANITARY SEWER ALLOWANCE Allowance for replacement of sanitary sewer piping below floor slab that is determined to be in poor condition	Base Bid = \$200,000

4. BID UNIT PRICES:

General Construction

	<u>Description</u>	<u>Unit</u>	<u>Amount</u>
A.	Unsuitable soil replacement with ABC stone including compaction and haul off of unsuitable soils	Per cubic yard	

5. BID ACKNOWLEDGEMENTS:

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

1. This Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening.
2. The Owner has the right to reject this bid.
3. Accompanying this proposal is a certified check (or bid bond) for \$_____, which represents not less than five (5) percent of the aggregate amount of the proposal. Said check, or the full amount of the bond, shall become the property of the Owner and be retained by the Owner in the event of withdrawal of the bid after the public opening or should the undersigned fail to execute a contract with the Owner and give satisfactory surety within ten (10) days after the award. Otherwise, said check or bid bond, to be returned to the undersigned. The undersigned agree, if awarded the contract, to deliver satisfactory surety bond in the amount equal to not less than 100 per cent of the contract within ten (10) days after Notice of Award.
4. Bidder will sign and submit the Agreement with the Bonds and other documents within 10 days after the date of the Owner’s Notice of Award.
5. Bidder has examined copies of all the Bidding Documents.
6. Bidder has visited the site and become familiar with the general and local site conditions.
7. Bidder is familiar with federal, state, and local laws and regulations.
8. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, tests, studies and data with the Bidding Documents;
9. Bidder certifies that this proposal is made in good faith and without collusion or connection with any other person bidding on the same work, or that any official or employee of Orange County, or Orange County Schools will be admitted to any share or part of the contract or any benefits that may arise therefrom if the contract is awarded to this company.

6. ADDENDA ACKNOWLEDGMENT:

The undersigned acknowledges receipt of the following addenda: (List by number and date appearing on addenda.)

Addendum No.	Date	Addendum No.	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

7. SUBCONTRACTOR LISTING:

Pursuant to N.C.G.S. 143-128(d), all bidders shall identify on their bid the contractors they have selected for the subdivisions or branches of work for:

Subcontract Trade	Subcontractor Name	License #
General		

Plumbing		
Mechanical		
Electrical		
Fire Alarm		

8. ACKNOWLEDGEMENTS & AUTHORIZATION:

- A. The undersigned declares that the person or persons signing this Proposal is/are fully authorized to sign on behalf of the firm listed and to fully bind the firm listed to all the Proposal’s conditions and provisions thereof.
- B. It is agreed that no person or persons or company other than the firm listed below or as otherwise indicated has any interest whatsoever in this proposal or the contract that may be entered into as a result of the Proposal and that in all respects the proposal is legal and firm, submitted in good faith without collusion or fraud.
- C. It is agreed that the undersigned has complied or will comply with all requirements of local, state, and national laws, and that no legal requirement has been or will be violated in making or accepting this Proposal, in awarding the contract to him and/or in the prosecution of the work required.
- D. It is agreed that the undersigned shall provide any information deemed necessary by the Owner to establish the responsiveness and responsibility of the bidder.
- E. The Bidder acknowledges that the submission of this bid constitutes the Bidder’s certification to the State Treasurer that, as of date of bid, it is not listed on the Final Divestment List created and maintained by the North Carolina Department of State Treasurer (the “Treasurer’s Office”) pursuant to the Iran Divestment Act of 2015, Chapter 147 Article 6E of the General Statutes of North Carolina (the “Iran Divestment Act”)” The individual signing this bid form certifies that he or she is authorized by the bidder to make the foregoing statement.
- F. The following information is provided pursuant to the Contract Documents:
Legal Name of Firm:

1. If Firm is a corporation, state that corporation is organized under the laws of the State of _____ . Please affix corporate seal to this Form of Bid.

2. If Firm is a partnership, state names of partners:

3. If Firm is an individual using a trade name, state name of individual:

Contractor Registration Number: _____

Respectfully submitted, this _____ day of _____ 20 _____

(Signature)

(Name Typed)

(Title)

(SEAL IF BIDDER IS A CORPORATION)

END FORM OF PROPOSAL – SINGLE PRIME CONTRACT

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____

as principal, and _____

as Surety, who is duly licensed to act as surety in North Carolina, are held and firmly bound unto, Orange County Schools, Hillsborough, North Carolina as Obligee, in the penal sum of

_____ DOLLARS,
lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and dated this _____ day of _____, 20__

WHEREAS, the said Principal is herewith submitting proposal for

Efland-Cheeks Elementary School – General Renovations

and the Principal desires to file this Bid Bond in lieu of making the cash deposit as required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the Principal shall be awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful performance thereof within ten days after the award of same to the Principal, then this obligation shall be null and void; but if the principal fails to so execute such contract and give performance bond as required by G.S. 143-129, the Surety shall, upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. Provided further, that the bid may be withdrawn as provided by G.S. 143-129.1.

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

BID PACKET REQUIREMENTS

The bid package shall be submitted in **TWO separate envelopes**. Each envelope will be clearly marked on the exterior with the following:

ENVELOPE Number 1 (Bid Bond Package DO NOT PUT BID IN THIS PACKAGE)

Top left corner of the envelope will contain the following information:

- 1. Prime Contractor Name: _____
- 2. Prime Contractor License Number: _____
- 3. Prime Contractor Mailing address: _____

Top right corner of the envelope will contain the following information:

- 4. Names of First Tier Contractors
 - General _____
 - Mechanical _____
 - Electrical _____

Center of the envelope will contain the following information:

- 5. Mailing address for: Orange County Schools
 - Attn: Patrick Florence
 - 200 East King Street
 - Hillsborough, NC 27278

Lower front half of the envelope will have the following information:

- 6. This package contains the Bid Bond for Orange County Schools Project: **Efland-Cheeks Elementary School – General Renovations**

ENVELOPE Number 2 (Bid Package Documents DO NOT PUT BOND IN THIS PACKAGE)

Top left corner of the envelope will contain the following information:

- 1. Contractor Name: _____
- 2. Contractor License Number: _____
- 3. Contractor Mailing address: _____

Top right corner of the envelope will contain the following information:

- 4. Names of First Tier Contractors
 - General _____
 - Mechanical _____
 - Electrical _____

Center of the envelope will contain the following information:

- 5. Mailing address for: Orange County Schools
 - Attn: Patrick Florence
 - 200 East King Street
 - Hillsborough, NC 27278

Lower front half of the envelope will have the following information:

- 6. This Package contains the Completed Bid Package Documents as required in the Project Scope for Orange County Schools Project: **Efland-Cheeks Elementary School – General Renovations**

All envelopes must be SEALED and delivered by courier or hand delivered ON OR BEFORE the date and time noted on the bid documents. Note: OCS is not responsible for delays, late

BID PACKET REQUIREMENTS

arrivals, delivery errors or lost items transported by courier services. Contractor is responsible for ensuring bid packets are delivered during normal business hours from 8:30 am to 4:30 pm Monday-Friday excluding federal holidays. Orange County Schools will be closed on Federal and State Holidays.

The following completed documents will be required in your base bid package:

1. Form of Proposal – Single Prime Contract
 - a. NOTE: Part 5, Addenda Acknowledgment **must** be filled out with the correct number of Addenda's Issued before bid date.
2. Non-Collusion Affidavit
3. Bid Bond
4. Bid Bond Power of Attorney
5. M/WBE Forms
 - a. Identification of Minority Business Participation – **AND** –
 - b. Affidavit A – Listing of Good Faith Efforts – **OR** –
 - c. Affidavit B – Intent to Perform Contract with Own Workforce

The omission of any of the above forms will constitute the bid as invalid and the contractors bid amount will not be read.

NON-COLLUSION AFFIDAVIT

State of North Carolina
County of Orange

I _____, being first duly sworn, deposes and says that:

1. He/She is the _____ of _____, the offeror that has submitted the attached proposal.
2. He / She is fully informed respecting the preparation and contents of the attached proposal and of all pertinent circumstances respecting such proposal.
3. Such proposal is genuine and is not a **collusive** or **sham** proposal.
4. Neither the said offeror nor any of its officers, partners, owners agents, representatives, employees or parties of interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other offeror, firm or person to submit a **collusive** or **sham** proposal in connection with the contract for which the attached proposal has been submitted or to refrain from proposing in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other offeror, firm or person to fix the price or prices in the attached proposal or of any other offeror, or to fix any overhead, profit or cost element of the proposal price of any other offeror or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against Orange County Schools or any person interested in the proposed contract; and
5. The price or prices quoted in the attached proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the offeror or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

Signature of offeror

Date

Subscribed and sworn before me,
this _____ day of _____, 20_____

(SEAL)

TITLE

Notary Public
My Commission Expires _____

**MINORITY BUSINESS ENTERPRISE
PARTICIPATION IN CONSTRUCTION
CONTRACTS POLICY**

Date Reviewed/Approved: _____ *Policy Code:* **9125**

A. GENERAL

1. It is the policy of the Orange County Board of Education to provide minority business enterprises (MBEs) equal opportunity to participate in all aspects of the school system's construction contracting, including but not limited to participation in contracts for the construction, renovation or repair of school facilities and equipment.
2. It is further the policy of the Board to prohibit discrimination against any person or business enterprise on the basis of race, color, ethnic origin, sex, handicapping condition, or religion and to conduct its construction contracting so as to prevent such discrimination.
3. It is the policy of the Board, in concert with other local, state and federal agencies and with the assistance of minority groups and agencies, actively to seek and identify qualified MBEs and to offer them the opportunity to participate and to encourage them to participate in the school system's contracting program. Under this policy, the Board adopts the definition of MBEs contained in N.C. Gen. Stat. § 143-128.2
4. It is not the policy of this Board to provide information or other opportunities to minority business enterprises that will not be available to all other business enterprises. It is the intent of this policy to establish procedures designed to assure MBEs access to information and opportunities available to other business enterprises.
5. It is not the intent of this policy to establish procedures that will increase the cost of the school system's construction program. It is the intent of this policy to widen opportunities for participation, to increase competition, and to reduce costs.
6. The Board will award public building contracts without regard to race, religion, color, creed, national origin, sex, age, or handicapping condition, as defined in N.C. Gen. Stat. § 168A-3. The Board will award contracts to the lowest responsible, responsive bidder.

B. CONSTRUCTION OR REPAIR PROJECTS IN ANY AMOUNT

1. The Board shall have a verifiable goal of ten percent (10%) for participation by minority businesses in building construction and repair projects covered by this section. These projects shall be bid strictly in accordance with N.C. Gen. Stat. § 143-128, -128.1, -129, and -131. The school system shall require bidders on school construction and renovation projects to provide documentation demonstrating that they have met the verifiable goal for participation by minority business, or that they have made good faith efforts to do so as specified in the accompanying regulations and the N.C. Gen. Stat. § 143-128.2.

C. WHEN THE BOARD MAY LET CONTRACTS ON INFORMAL BIDS GREATER THAN \$5,000 (BUT LESS THAN THE LIMITS IN N.C. GEN. STAT § 143-129)

1. The school system shall solicit minority participation in the contracts for the erection, construction, alteration, or repair of any building covered by this section. The school system shall maintain a record of contractors solicited and shall document efforts to recruit minority business participation in those contracts. Nothing in this section shall be construed to require formal advertisement of bids.
2. The data generated pursuant to this section shall be reported to the Department of Administration, Office for Historically Underutilized Business, as required by N.C. Gen. Stat. § 143-131(b).

Legal Ref.: G.S. 143—48 to 63.1, and 143-128, 128.1, 128.2, 129, 131, 131(b), and 168A-3

Adopted:

Revised:

Minority Business Participation Requirements

Pursuant to Board of Education Policy 9125 Orange County Schools has established a verifiable ten percent (10%) participation goal for Minority Business Enterprises in **all** building construction and repair projects carried out by the district.

Under G.S. 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. Also list the good faith efforts (Affidavit A) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (B) to that effect in lieu of Affidavit (A) required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening—The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit D is not necessary;

OR

If less than the 10% goal, Affidavit (D) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always **submit with their bid the Identification of Minority Business Participation Form** listing all MB contractors, vendors and suppliers that will be used. **If there is no MB participation then enter none or zero on the form. Affidavit A or Affidavit B, as applicable, also must be submitted with the bid.** Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of bid.

Iran Divestment Act

As of February 26, 2016, each vendor doing business with governmental agencies must certify its name **does not appear** on the Iran Divestment List.

The list may be accessed via the State Treasurer’s website at www.nctreasurer.com/Iran

Certifications **shall be** attached to bids at the time of submittal.

State of North Carolina – AFFIDAVIT A

OCS Project Name: Efland-Cheeks Elementary School – General Renovations

Listing of Good Faith Efforts

OCS Project No.:

Orange County Schools

Date:

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

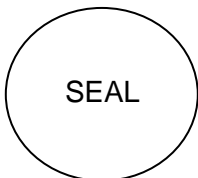
Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 - (10 pts) Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
2 --(10 pts) Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
3 - (15 pts) Broken down or combined elements of work into economically feasible units to facilitate minority participation.
4 - (10 pts) Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
5 - (10 pts) Attended prebid meetings scheduled by the public owner.
6 - (20 pts) Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
7 - (15 pts) Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
8 - (25 pts) Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
9 - (20 pts) Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
10 - (20 pts) Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d). Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____
Signature: _____
Title: _____



State of North Carolina, County of _____
Subscribed and sworn to before me this _____ day of _____ 20____
Notary Public _____
My commission expires _____

State of North Carolina – AFFIDAVIT B Intent to Perform Contract with Own Workforce

Orange County Schools

OCS Project Name: Efland-Cheeks Elementary School – General Renovations

OCS Project No.:

Date:

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____
_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

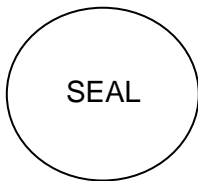
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of North Carolina, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina – AFFIDAVIT C Portion of Work to be Performed by Minority Firms

Orange County Schools

OCS Project Name: Efland-Cheeks Elementary School – General Renovations

OCS Project No.:

Date:

*******This form is to be submitted only by the apparent lowest responsible, responsive bidder*******

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

Project Name: _____

Project ID No. _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority businesses enterprises. Work will be subcontracted to the following firms listed below. Attach additional sheets if needed.

Name and Phone Number	*Minority Category	Work Description	Dollar Value	Percentage of Goal

***Minority categories:** Black American (B), Hispanic American (H), Asian American (A), American Indian (I), White Female (F)

Pursuant to GS 143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

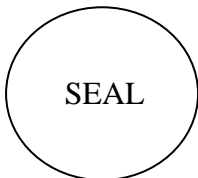
The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____



State of North Carolina, County of _____
Subscribed and sworn to before me this _____ day of _____ 20____
Notary Public _____
My commission expires _____

State of North Carolina – AFFIDAVIT D Good Faith Efforts

Orange County Schools

OCS Project Name: Efland-Cheeks Elementary School – General Renovations

OCS Project No.:

Date:

*******This form is to be submitted only by the apparent lowest responsible, responsive bidder*******

If the Orange County Schools goal for participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

Project Name: _____

Project ID No. _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Work will be subcontracted to the following firms listed below. Attach additional sheets if needed.

Name and Phone Number	*Minority Category	Work Description	Dollar Value	Percentage of Goal

***Minority categories:** Black American (B), Hispanic American (H), Asian American (A), American Indian (I), White Female (F)

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster.
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Do not submit with bid

Do not submit with bid

Do not submit with bid

Do not submit with bid

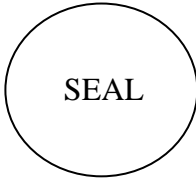
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina – APPENDIX E Documentation for Contract Payments

Orange County Schools

OCS Project Name: Efland-Cheeks Elementary School – General Renovations

OCS Project No.:

Date:

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MWBE FIRM NAME	* INDICATE TYPE OF MWBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

***Minority categories:** Black American (**B**), Hispanic American (**H**), Asian American (**A**), American Indian (**I**), White Female (**F**)

Date: _____

Approved/Certified By:

Name

Title

Signature

SUBMIT WITH ALL APPLICATIONS FOR PAYMENT

OWNER-CONTRACTOR AGREEMENT

PROJECT NUMBER: NC33X001

SCHOOL NAME: **Efland-Cheeks Elementary**

THIS AGREEMENT, in four (4) copies, made this () day of _____, Two Thousand and Twenty-four by and between Orange County Board of Education (herein referred to as the "Owner"), whose mailing address is 200 East King Street, Hillsborough, NC 27278 and _____ (herein referred to as the "Contractor"), whose mailing address is _____. Correspondence, submittals, and notices relating to or required under this Contract shall be sent in writing to the above addresses; unless either party is notified in writing by the other, of a change in address.

WITNESSETH:

WHEREAS, it is the intent of the Owner to obtain the services of the Contractor in connection with the Efland-Cheeks Elementary School HVAC Replacement (hereinafter referred to as the "Project" or the "Work"); and

WHEREAS, the Contractor desires to perform such construction in accordance with the terms and conditions of this Agreement,

NOW, THEREFORE, in consideration of the promises made herein and other good and valuable consideration, the following terms and conditions are hereby mutually agreed to, by and between the Owner and Contractor:

Article 1

DEFINITIONS

- 1.1 All terms in this Agreement which are defined in the Information for Bidders and the General Conditions shall have the meanings designated therein.
- 1.2 The Contract Documents are as defined in the General Conditions. Such documents form the Contract, and all are as fully a part thereof as if attached to this Agreement or repeated herein. The Contract Documents consist of the Owner-Contractor Agreement, the General and Supplemental Conditions of the Contract, the Drawings, the Specifications, all Addenda issued prior to bidding, and all Modifications and Change Orders issued after execution of the Contract.

Article 2

STATEMENT OF THE WORK

- 2.1 The Project is the Work identified in the plans and specifications prepared by Sud Associates, 1813 Chapel Hill Road, Durham, NC 27707, dated February 26, 2024 for the Orange County Board of Education, including the following addenda:

A listing of the plans and specifications included in the Contract Documents is attached as Exhibit A.

2.2 The Parties agree that the Project shall include the following alternates:

2.3 The Parties agree to the following modifications to the Project's plans and specifications, including the noted value engineering items:

List item(s) and proposed deduct/add(s). If none, delete this language list "None"

2.4 The Parties agree that the following allowances are included in the Contract Sum in Section 5.1 below:

List item(s) and proposed allowance(s). If none, delete this language list "None"

2.5 The Contractor shall provide and pay for all materials, tools, equipment, labor and professional and non-professional services, and shall perform all other acts and supply all other things necessary, to fully and properly perform and complete the Work, as required by the Contract Documents.

2.6 The Contractor shall further provide and pay for all related facilities described in any of the Contract Documents, including all work expressly specified therein and such additional work as may be reasonably inferred therefrom, saving and excepting only such items of work as are specifically stated in the Contract Documents not to be the obligation of the Contractor. The totality of the obligations imposed upon the contractor by this Article and by all other provisions of the Contract Documents, as well as the structures to be built and the labor to be performed, is herein referred to as the "Work".

Article 3

DESIGN CONSULTANT

3.1 The Design Consultant (as defined in the General Conditions) shall be Sud Associates, whose address is 1813 Chapel Hill Road, Durham, NC 27707, however, that the Owner may, without liability to the Contractor, unilaterally amend this Article from time to time by designating a different person or organization to act as its Design Consultant and so advising the Contractor in writing, at which time the person or organization so designated shall be the Design Consultant for purposes of this Contract.

Article 4

TIME OF COMMENCEMENT AND COMPLETION

- 4.1 The Contractor shall commence the Work promptly upon the date established in the Notice to Proceed. If there is no Notice to Proceed, the date of commencement of the Work shall be the date of this Agreement or such other date as may be established herein.
- 4.2 Time is of the essence. The Contractor shall achieve Final Completion, as defined in the General Conditions on or before the date established for Final Completion in the Supplemental Conditions.
- 4.3 The Supplemental Conditions contains certain specific dates that shall be adhered to and are the last acceptable dates unless modified in writing by mutual agreement between the Contractor and the Owner. All dates indicate midnight unless otherwise stipulated. The only exceptions to this schedule are defined in the General Conditions under 8.3 DELAYS AND EXTENSIONS OF TIME.
- 4.4 Should the Contractor fail to complete the Work on or before the dates stipulated for Substantial Completion and/or Final Completion, or such later date as may result from an extension of time granted by the Owner, he shall pay the Owner, as liquidated damages the sums set forth in the General and Supplemental Conditions.

Article 5

CONTRACT SUM

- 5.1 Provided that the Contractor shall strictly and completely perform all of its obligations under the Contract Documents, and subject only to additions and deductions by Modification or as otherwise provided in the Contract Documents, the Owner shall pay to the Contractor, in current funds and at the time and in the installments hereinafter specified, the sum of _____ Dollars (\$ _____) herein referred to as the "Contract Sum". This amount includes the base bid and the Alternates in Section 2.2
- 5.2 The Contract Sum includes the value engineering items and other contract modifications noted in Section 2.3 above that total \$_____.
- 5.3 Unit Prices are established as follows for the Project:

Unit Price No. 1		\$
Unit Price No. 2		\$
Unit Price No. 3		\$
Unit Price No. 4		\$

Article 6

PROGRESS PAYMENTS

- 6.1 The Contractor hereby agrees that on or about the First day of the month for every month during the performance of the Work he will deliver to the Owner's Project Manager an Application for Payment in accordance with the provisions of Article 9 of the General Conditions. This date may

be changed upon mutual agreement, stated in writing, between the Owner and Contractor. Payment under this Contract shall be made as provided in the General Conditions. Payments due and unpaid under the Contract Documents shall not bear interest.

Article 7

OTHER REQUIREMENTS

- 7.1 The Contractor shall submit the Performance Bond, Labor and Material Payment Bond and Certification of Insurance as required by the Contract Documents.
- 7.2 The Owner shall furnish to the Contractor one **(1)** set of drawings and one **(1)** set of specifications, at no extra cost, for use in the Construction of the Work. Additional sets of drawings or specifications may be obtained by the Contractor by paying the Owner for the costs of reproduction, handling and mailing.
- 7.3 The Contractor shall make a good faith effort to utilize Historically Underutilized Businesses (HUB's) per N.C. Gen. Stat. 143-128.2, and as described in the construction documents.
- 7.4 The General Conditions, Supplemental Conditions and the plans and specifications, including any addenda, are incorporated herein by reference.

IN WITNESS WHEREOF, the Orange County Board of Education (hereinbefore called the "Owner") has caused these presents to be signed and its corporate seal to be hereunto affixed, attested by its Chairperson and Secretary, and _____ (hereinbefore called "Contractor") has caused these presents to be signed by its President and its Corporate seal to be hereunto affixed, as hereinafter attested, all as of the day and year first above written.

ORANGE COUNTY BOARD OF EDUCATION

Hilary McKenzie, Chair

[Corporate Seal]

ATTEST:

Dr. Monique Felder, Superintendent

By: _____
[Redacted], President or Vice-President
(Print Name)

[Corporate Seal]

ATTEST:

Corporate Secretary

This instrument has been preaudited in the manner required by the School Budget and Fiscal Control Act.

Finance Officer Date

PERFORMANCE BOND

IT IS HEREBY AGREED that

(Insert full name and address of Contractor)

as Principal, hereinafter called Contractor, and,

(Insert full name and address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto the

as Obligee, hereinafter called Owner, in the amount of _____ Dollars (\$ _____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these obligations.

WHEREAS, Contractor has by written agreement dated _____, 20____, entered into a contract with Owner for the construction of _____ (Insert the name of the Project)

in accordance with Drawings and Specifications prepared by _____ (Insert full name and address of Architect/Engineer)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect. The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default, under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term

“balance of the contract price,” as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of any applicable statute of limitations under the Contract.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this _____ day of _____ 20_____.

PRINCIPAL

[Affix corporate seal]

(Name) _____
(Title) _____

(Witness)

SURETY

[Affix corporate seal]

(Name) _____
(Title) _____

(Witness)

R1726188

LABOR AND MATERIAL PAYMENT BOND

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

IT IS HEREBY AGREED that

(Insert full name and address of Contractor)

as Principal, hereinafter called "Principal," and,

(Insert full name and address of Surety)

as Surety, hereinafter called "Surety," are held and firmly bound unto the

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of _____ Dollars (\$ _____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these obligations.

WHEREAS, Principal has by written agreement dated _____, 20_____, entered into a contract with Owner for the construction of _____ (Insert the name of the Project)

in accordance with Drawings and Specifications prepared by _____ (Insert full name and address of Architect/Engineer)

which contract is by reference made a part hereof, and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days, after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail; postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this _____ day of _____ 20 _____.

PRINCIPAL

[Affix corporate seal]

(Name)_____
(Title)_____

(Witness)

SURETY

[Affix corporate seal]

(Name)_____
(Title)_____

(Witness)

R1726188

ORANGE COUNTY SCHOOLS
SALES AND USE TAX REPORT DETAIL
APPENDIX A

CONTRACTOR: _____

Page: _____ of _____

PROJECT: _____

FOR PERIOD: _____

VENDOR NAME	PURCHASE DATE	TAXABLE AMOUNT (\$)	STATE TAX PAID (\$)	COUNTY TAX PAID (\$)	INVOICE TOTAL (\$)	COUNTY OF SALE
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
		\$	\$	\$	\$	
TOTAL =			\$	\$		

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,
This the _____ day of _____, 20____

Notary Public

My Commission Expires: _____

Seal:

Signed

Print or Type Name of Above

NOTE: This certified statement may be subject to audit.

** If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.*

CHANGE PROPOSAL WORKSHEET SUMMARY FORM

Project: _____
 Contract: _____
 Contractor: _____

Proposal #: _____
 Project #: _____
 Contractor #: _____

Description of change:

INSTRUCTIONS FOR FORM: Only enter data in yellow boxes - all other fields will automatically calculate.

Contractor's detailed breakdown of material & labor must accompany this form. Percentages shaded in gray boxes are established by contract requirements and should not be modified.

Materials	(Attach list with Qty, Item, Unit \$, Unit mh, Total mh, OT mh, Total \$)		SUBTOTALS
1	Total Direct Cost of Materials	\$0.00	\$0.00
2	Overhead & Profit on Item 1. (10% maximum, includes small tools & consumables)	10.0 % \$0.00	
3	Sales Tax	7.5 % \$0.00	
4	Shipping & Transportation	\$0.00	
			\$0.00
Labor			
5	Manhours - Straight Time 0 MH @ \$25.00 /hr.	\$0.00	\$0.00
	Overtime Premium 0 MH @ \$12.50 /hr.	\$0.00	
6	Overhead & Profit on Item 5. (10% maximum on straight labor cost, not premium portion) (O & P includes supervision time)	10.0 % \$0.00	
7	Payroll Taxes & Insurance	30.0% STRAIGHT TIME ONLY \$0.00	
		7.65% OVERTIME PORTION \$0.00	\$0.00
Equipment Rental (Include quotes)			
8	Equipment Rental	\$0.00	\$0.00
9	Overhead & Profit on Item 8. (6% maximum)	6.0 % \$0.00	
Subcontractors (Include quotes with material & equipment backup)			
10	Subcontractors	\$0.00	\$0.00
11	Overhead & Profit on Item 10. (6% maximum)	6.0 % \$0.00	
			\$0.00
			Subtotal of Proposal \$0.00
12	Bonds (% of subtotal of proposal)	1.5%	\$0.00
TOTAL OF CHANGE PROPOSAL			\$0.00

Time Extension Requests: _____ day(s) Schedule Activity # Affected: _____

The Contractor agrees to perform the work outlined in this change proposal for the amount specified above and in accordance with the Contract documents if the work is authorized by the Owner.

Contractor's Signature: _____ **Date:** _____

Recommended by Design Consultant: _____ **Date:** _____

Owner's Representative Approval: _____ **Date:** _____

GENERAL CONDITIONS

NOTICE OF DISCLAIMER

TAKE NOTICE, that these General Conditions may contain language and Article, Section or Paragraph headings or names which appear similar to or the same as the provisions of the "General Conditions of the Contract for Construction", published by the American Institute of Architects, AIA Document A-201.

TAKE NOTICE, however, that these General Conditions are substantially and materially different in many respects from the AIA Document A-201 and that certain additions, deletions or other modifications have been made to provisions similar to those contained in the AIA Document. This document, further, contains provisions, which do not appear in the AIA document.

The use of any language or Article or Paragraph format similar to or the same as AIA Document A-201 does not constitute an endorsement by the American Institute of Architects of this document.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

TABLE OF ARTICLES

1.	CONTRACT DOCUMENTS	9.	PAYMENTS AND COMPLETION
2.	DESIGN CONSULTANT	10.	PROTECTION OF PERSONS AND PROPERTY
3.	OWNER	11.	INSURANCE
4.	CONTRACTOR	12.	CHANGES IN THE WORK
5.	SUBCONTRACTORS	13.	UNCOVERING AND CORRECTION
6.	WORK BY OWNER OR BY SEPARATE CONTRACTORS	14.	TERMINATION OF THE CONTRACT
7.	MISCELLANEOUS PROVISIONS	15.	DISPUTE RESOLUTION
8.	TIME		

ARTICLE 1

CONTRACT DOCUMENTS

- 1.1 DEFINITIONS
 - 1.1.1 AS SHOWN, AS INDICATED, AS DETAILED: These words, and words of like implication, refer to information contained in Drawings and Specifications describing the Work, unless explicitly stated otherwise in the Contract Documents.
 - 1.1.2 CLAIM: A Claim as used in the Contract is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of contract terms, payment of money, a credit against the payment of money, extension of time or other relief with respect to the terms of the Contract. The term Claim also includes other disputes and matters in question between the parties to a contract involved in the Owner's construction and repair projects arising out of or relating to the Contract or the construction process.
 - 1.1.3 CONTRACT: The Contract is the sum of all the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and the Contractor and supersedes all

prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Paragraph 1.1.4. The Contract may also be referred to in the Contract Documents as “this Contract”, “this Agreement” or “the Agreement”.

- 1.1.4 **CONTRACT DOCUMENTS:** The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General and Supplemental Conditions), the Plans, Drawings, and Specifications, and all Addenda thereto issued prior to and all Modifications thereto issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties; (2) a Change Order or a Construction Change Directive issued pursuant to the provisions of Article 12; (3) a written interpretation issued by the Design Consultant pursuant to Paragraph 2.2.7; or (4) a written order for a minor Change in the Work issued pursuant to Section 12.4. The Contract Documents do not include any other documents including but not limited to soils, geotechnical or other reports, surveys and analysis, which may be printed, bound or assembled with the Contract Documents, or otherwise made available to the Contractor for review or information under this Contract, unless specifically enumerated and directly incorporated by reference in the Contract Documents.
- 1.1.5 **HE/HIS:** The term He or His is not intended to be gender specific.
- 1.1.6 **MANUFACTURER:** An individual, company, or corporation who manufactures, fabricates, or assembles a standard product. A standard product is one that is not made to special design, and if furnished by either direct sale or by contract to the Contractor, Subcontractor or Vendor.
- 1.1.7 **MATERIAL SUPPLIER OR VENDOR:** A person or organization who supplies, but who is not responsible for the installation of, materials, products and equipment.
- 1.1.8 **NOTICE:** The term Notice as used herein shall mean and include written notice. Notice shall be deemed to have been given when delivered to the address of the person, firm or corporation for whom intended, or to his, their or its duly authorized agent, representative or officer; or when enclosed in a postage prepaid wrapper or envelope addressed to such person, firm or corporation at his, their or its Notice Address and deposited in a United States mailbox by registered or certified mail. To “Notify” means to give Notice. The Notice Addresses for the Owner and Contractor are stated in the Owner-Contractor Agreement and may be changed by a party by giving Notice to the other of such change.
- 1.1.9 **PLANS OR DRAWINGS:** All drawings or reproduction of drawings pertaining to the Work.
- 1.1.10 **PRODUCT:** The term Product includes materials, systems and equipment.
- 1.1.11 **PROJECT:** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part.
- 1.1.12 **PROPOSAL:** A complete and properly signed document whereby the Contractor proposes to provide additional or a reduced scope of construction work on the Project for the sums stipulated therein, supported by data required by the Design Consultant or Owner.
- 1.1.13 **PROVIDE:** As a directive to the Contractor, and as pertaining to labor, materials or equipment, "provide" means "furnish and install completely".
- 1.1.14 **SPECIFICATIONS:** Descriptions, provisions and requirements, pertaining to method and manner of performing the Work, or to quantities and qualities of materials or equipment to be

furnished under terms of the Contract.

1.1.15 **WORK:** The Work comprises the construction and services required of the Contractor by the Contract Documents and includes all labor, supplies and other facilities or things necessary to produce such construction, and all materials, equipment, and supplies incorporated or to be incorporated in such construction.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contractor and Owner acknowledge that neither these General Conditions, nor any other Contract Document shall be construed against the Owner due to the fact that they may have been drafted by the Owner or the Owner's agent. For the purposes of construing these General Conditions, and any other Contract Document, both the Contractor and the Owner shall be considered to have jointly drafted them.

1.2.2 The Owner-Contractor Agreement shall be signed in not less than three (3) copies by the Owner and Contractor, and each of which shall be deemed an original, but all of which shall constitute one and the same instrument.

1.2.3 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.4 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings unless otherwise specifically defined herein. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light upon the interpretation of the provisions to which they refer.

1.2.5 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings are for convenience only. The Contractor may subcontract the Work in such divisions as he sees fit consistent with applicable law and he is ultimately responsible for furnishing all of the Work.

1.2.6 Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Detailed specifications take priority over general specifications and detailed drawings take precedence over general drawings. Any Work shown on one drawing shall be construed to be shown in all drawings. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: The Owner-Contractor Agreement; the Supplemental Conditions; the General Conditions; the Specifications; the Drawings. The Contractor shall notify the Design Consultant and the Owner of all such inconsistencies promptly. Any such conflict or inconsistency between or in the Drawings or Specifications shall be submitted by the Contractor promptly to the Owner and Design Consultant and the Design Consultant's decision thereon shall be final and conclusive.

- 1.2.7 The Contractor agrees that nothing contained in the Contract Documents or any contract between the Owner and the Design Consultant shall create any contractual relationship between the Design Consultant and the Contractor, or between the Design Consultant and any Subcontractor or Sub-subcontractors. The Contractor acknowledges and agrees that this Contract is not intended to create, nor shall any provision be interpreted as creating, any contractual relationship between the Owner or Contractor and any third parties.
- 1.2.8 The provisions of this Contract cannot be amended, modified, varied or waived in any respect except by a Modification. The Contractor is hereby given notice that no person has authority to orally waive, or to release the Contractor from any of the Contractor's duties or obligations under or arising out of this Contract. Any waiver, approval or consent granted by Modification to the Contractor shall be limited to those matters specifically and expressly stated thereby to be waived, approved or consented to and shall not relieve the Contractor of the obligation to obtain any future waiver, approval or consent.
- 1.2.9 Any material or operation specified by reference to published specifications of a Manufacturer, a society, an association, a code, or other published standard, shall comply with requirements of the listed document which is current on date the Owner received bids for the construction of the Project. In case of a conflict between referenced document and the Specifications, Specifications shall govern. In case of a conflict between such listed documents, the one having more stringent requirements shall govern.
- 1.2.10 The Contractor, if requested, shall furnish an affidavit from each or any Manufacturer certifying that materials or products delivered to the job meets requirements specified.
- 1.3 OWNERSHIP AND USE OF DOCUMENTS
- 1.3.1 All Drawings, Specifications and copies thereof furnished by the Design Consultant are and shall remain the property of the Owner. They are to be used by Contractor only with respect to the Project and are not to be used by Contractor on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Owner on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of Owner's rights or the Design Consultant's common law copyright or other reserved rights.

ARTICLE 2

THE DESIGN CONSULTANT

- 2.1 DEFINITIONS
- 2.1.1 The term "Design Consultant" or "A/E" or "Architect" or "Engineer" as used or set forth in the Contract Documents, shall mean the entity and its consultants or agents, or their duly authorized representatives, that is responsible for designing or engineering the Work, and performing the activities specified herein, and in the Agreement for Design Consultant Services, including any consultants to said entity or firm acting within the scope of their agreements with the Design Consultant. Such firm or agency and its representatives shall act severally within the scope of particular duties entrusted to them, unless otherwise provided for in the Contract Documents or in the Agreement for Design Consultant Services.

2.1.2 The Design Consultant may be identified in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The Design Consultant is further described as and, throughout this document, shall mean one or both of the following:

2.1.2.1 ARCHITECT, a person or other legal entity lawfully licensed to practice architecture in the State wherein the Project is located; or

2.1.2.2 ENGINEER, a person or other legal entity lawfully licensed to practice engineering in the State wherein the Project is located.

2.2 SERVICES OF THE DESIGN CONSULTANT

2.2.1 The Design Consultant will provide certain services as hereinafter described and further described in the Agreement for Design Consultant Services.

2.2.2 Should errors, omissions, or conflicts in the Drawings, Specifications, or other Contract Documents prepared by or on behalf of the Design Consultant be discovered, the Design Consultant will prepare such amendments or supplementary documents and provide consultation as may be required.

2.2.3 The Design Consultant will visit the site at intervals appropriate to the stage of construction to familiarize itself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. The Design Consultant will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work, but it shall make as many inspections as may reasonably be required to fulfill its obligations to the Owner. On the basis of such on-site observations, the Design Consultant and his consultants shall endeavour to guard the Owner against defects and deficiencies in the Work. The Design Consultant will conduct the weekly construction meeting and shall be responsible for preparing accurate and complete minutes of all such meetings and other Project meetings and distributing same to all participants.

2.2.4 The Design Consultant will render written field reports to the Owner in the form required by the Owner relating to the periodic visits and inspections of the Project required by Paragraph 2.2.3.

2.2.5 The Design Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Design Consultant will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any portion of the Work.

2.2.6 The Design Consultant shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide safe facilities for such access so the Design Consultant may perform his functions under the Contract Documents.

2.2.7 As required, the Design Consultant will render to the Owner, within a reasonable time, interpretations concerning the design and other technical aspects of the Work and the Contract Documents.

- 2.2.8 All communications, correspondence, submittals, and documents exchanged between the Design Consultant and the Contractor in connection with the Project shall be copied to the Owner, unless the Owner provides otherwise. Further, all communications, correspondence, submittals and documents transmitted from the Owner or Design Consultant will be directed to the Contractor and copied to the Owner or Design Consultant.
- 2.2.9 All interpretations and decisions of the Design Consultant shall be consistent with the intent of and reasonably inferable from the Contract Documents.
- 2.2.10 The Design Consultant's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.
- 2.2.11 If the Design Consultant observes any Work that does not conform to the Contract Documents, the Design Consultant shall report this observation to the Owner. The Design Consultant will prepare and submit to the Owner "punch lists" of the Contractor's work, which is not in conformance with the Contract Documents. The Owner will transmit such "punch lists" to the Contractor.
- 2.2.12 The Design Consultant has the authority to condemn or reject any or all of the Work on behalf of the Owner when, in its opinion, the Work does not conform to the Contract Documents. Whenever, in the Design Consultant's reasonable opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the Design Consultant will have the authority to require special inspection or testing of any portion of the Work in accordance with the provisions of the Contract Documents whether or not such portion of the Work be then fabricated, installed or completed.
- 2.2.13 The Design Consultant will review the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and for general compliance with the Contract Documents. Such action shall be taken within fourteen (14) days of receipt unless otherwise authorized by the Owner.
- 2.2.14 The Owner will establish with the Design Consultant procedures to be followed for review and processing of all Shop Drawings, catalogue submittals, project reports, test reports, maintenance manuals, and other necessary documentation, as well as requests for changes and applications for extensions of time.
- 2.2.15 The Design Consultant will prepare Change Orders and Construction Change Directives when requested by the Owner.
- 2.2.16 The Design Consultant and the Owner will conduct inspections to determine the dates of Substantial Completion and Final Completion. The Design Consultant will issue a final Certification of Payment.
- 2.2.17 The Design Consultant will prepare three (3) printed copies and one (1) electronic computer file compatible with the latest version of AutoCAD, or other program designated by Owner, showing significant Changes in the Work made during the construction process, based on neatly and clearly marked-up Drawings, prints, and other data furnished by the Contractor(s) and the applicable Addenda, clarifications and Change Orders which occurred during the Project. The Design Consultant will also provide the Owner assistance in the original operation of any equipment or system such as initial start-up, testing, adjusting, and balancing.

- 2.2.18 In case of the termination of the employment of the Design Consultant, the Owner may appoint a Design Consultant whose status under the Contract Documents shall be that of the former Design Consultant.

ARTICLE 3

OWNER

3.1 DEFINITION

- 3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and may be referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized representative or agent. The phrase "Owner or its agent" as used in this Agreement, does not include the Separate Contractors or their Subcontractors.

- 3.1.1.1 Owner; Orange County c/o Orange County Schools
200 East King Street
Hillsborough, NC 27278

3.2 INFORMATION, SERVICES AND RIGHTS OF THE OWNER

- 3.2.1 The Owner will provide administration of the Contract as herein described. The Design Consultant shall also provide aspects of administration of the Contract as herein described or as specified in the Agreement for Design Consultant Services.
- 3.2.2 The Owner shall at all times have access to the Work whenever it is in preparation or progress. The Contractor shall provide safe facilities for such access.
- 3.2.3 The Owner shall not be responsible for or have control or charge of the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.
- 3.2.4 The Owner will have authority to require special inspection or testing of portions of the Work to the same extent as the Design Consultant in accordance with Paragraph 2.2.12 whether or not such portion of the Work be then fabricated, installed, or completed. However, neither the Owner's authority to act under Paragraph 3.2.4, nor any decision made by the Owner in good faith either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.
- 3.2.5 The Owner shall have the authority and discretion to call, schedule, and conduct job meetings to be attended by the Contractor, representatives of his Subcontractors, and the Design Consultant, to discuss such matters as procedures, progress, problems, and scheduling.
- 3.2.5.1 The Contractor is requested and required to attend weekly job site progress conferences as called by the Design Consultant. The Contractor shall be represented at these job progress conferences by project personnel authorized by the Contractor to make schedule and financial decision and by project personnel representatives. These meetings shall be open to Subcontractors, Material Suppliers, and any others who can contribute shall be encouraged by the Contractor to attend. It shall be the principal purpose of these meetings, or conferences, to affect coordination,

cooperation and assistance in every practical way toward the end of maintaining progress of the Project on schedule and to complete the Project within the specified Contract Time. The Contractor shall be prepared to assist progress of the Work as required in his particular contract and to recommend remedial measures for the correction of progress as may be appropriate. The Design Consultant shall be the coordinator of the conferences and shall preside as chairman.

- 3.2.5.2 If the Project is awarded as a single prime construction contract, the Design Consultant shall determine which, if any, Subcontractors and/or Material Suppliers shall be required to attend weekly job site progress conferences. The Contractor shall comply with this request and the meeting shall be conducted as described in Subparagraph 3.2.5.1.
- 3.2.6 The Owner will establish procedures to be followed for processing all Shop Drawings, catalogues, and other project reports, and other documentation, test reports, and maintenance manuals.
- 3.2.7 The Owner and Design Consultant will review all requests for changes and shall implement the processing of Change Orders, including applications for extension of the Contract Time.
- 3.2.8 The Owner, will not be responsible for the failure of the Contractor to plan, schedule, and execute the Work in accordance with the approved schedule or the failure of the Contractor to meet scheduled Completion Dates or the failure of the Contractor to schedule and coordinate the Work of his own trades and Subcontractors or to coordinate and cooperate with any Separate Contractors.
- 3.2.9 The Owner, in consultation with the Design Consultant, will review and process all Applications for Payment by the Contractor, including the final Application for Payment.
- 3.2.10 The Owner and Design Consultant shall not be responsible or liable to Contractor for the acts, errors or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons performing any of the Work or working on the Project.
- 3.2.11 The Owner shall furnish surveys describing the physical characteristics and legal limitations for the site of the Project, which are in its possession and are relevant to the Work.
- 3.2.12 The Owner shall secure and pay for necessary easements, required for permanent structures or for permanent changes in existing facilities.
- 3.2.13 The Owner shall furnish information or services under the Owner's control with reasonable promptness to avoid unreasonable delay in the orderly progress of the Work.
- 3.2.14 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, copies of Drawings and Specifications in accordance with the Supplemental Conditions.
- 3.2.15 The Owner will make reasonable efforts to make available for the Contractor's reasonable review, at the Owner's offices or together with the Contract Documents, certain boring logs, geotechnical, soils and other reports, surveys and analyses pertaining to the Project site of which the Owner is aware, has in its possession and are relevant to the Work. Any boring logs that are provided to the Contractor are only intended to reflect conditions at the locations of the borings and do not necessarily reflect site conditions at other locations. Any reports, surveys and analyses provided by Owner are for the Contractor's information only, and their accuracy and completeness are not guaranteed or warranted by the Owner or the Design Consultant, and such reports are not adopted by reference into, nor are they part of the Contract Documents.

Notwithstanding any factual statement, conclusion, or any language or recommendations contained in such reports, the Contractor shall not rely upon the accuracy or completeness of any reports, surveys and analyses.

3.2.16 The foregoing rights are in addition to other rights of the Owner enumerated herein and those provided by law.

3.3 OWNER'S RIGHT TO STOP OR TO SUSPEND THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Section 13.2 or fails to carry out the Work or supply labor and materials in accordance with the Contract Documents, the Owner by a written Notice may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

3.3.2 The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as he may determine to be appropriate for the convenience of the Owner.

3.3.3 If the performance of all or any part of the Work (including the work of the Contractor and its Subcontractors) is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner or the Design Consultant, or by failure of any one of them to act within the time specified in this Contract (or if no time is specified, within a reasonable time), an adjustment shall be made for an increase in the actual time required for performance of the Work by the Contractor, due solely to such unreasonable suspension, delay, or interruption and the Contract modified in writing accordingly. However, no Claim shall be made under this Paragraph for any suspension, delay, or interruption pursuant to Paragraph 3.4.1, or for which Claim is provided or excluded under any other provision of this Contract. No Claim under this Paragraph shall be allowed on behalf of the Contractor or its Subcontractors, unless within twenty (20) days after the act or failure to act involved, and for continuing or ongoing acts or failures to act within twenty (20) days of the first day of the act or failure to act, the Contractor submits to the Owner a written statement setting forth, as fully as then practicable, the extent of such Claim, and unless the Claim is asserted in writing within thirty (30) days after the termination of such suspension, delay, or interruption. For continuing or ongoing acts or failures to act, the Contractor shall update its written statement every twenty (20) days until the suspension, delay or interruption is terminated. The Contractor shall waive any and all Claims under this Paragraph 3.3.3 which are not filed in strict conformance with Paragraph 3.3.3. The Contractor shall indemnify, defend and hold the Owner harmless from any Claim by a Subcontractor that is waived because it is not filed in strict conformance with this Paragraph 3.3.3 or any other provision of the Contract regarding Claims.

3.3.4 In the event of a suspension of the Work or delay or interruption of the Work per Paragraph 3.3.3, the Contractor will and will cause his Subcontractors to protect carefully his, and their, materials and Work against damage, loss or injury from the weather and maintain completed and uncompleted portions of the Work as required by the Contract Documents. If, in the opinion of the Owner, any Work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of his Subcontractors to so protect same, such Work and materials shall be removed and replaced at the expense of the Contractor.

3.3.5 No Claim by the Contractor under Paragraph 3.3.3 shall be allowed if asserted after final payment under this Contract or if it is not asserted in strict conformance with Paragraph 3.3.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

- 3.4.1 If the Contractor defaults or otherwise neglects to carry out the Work in accordance with the Contract Documents and fails within ten (10) days after the date written Notice is given by the Owner, with a copy of such Notice sent to the Contractor's Surety, to commence and continue remedy of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedy he may have, make good such deficiencies and may further elect to complete all Work thereafter through such means as the Owner may select, including the use of a new contractor pursuant to Paragraph 3.4.2. In such case, the Owner shall provide Notice to the Contractor's Surety and an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Design Consultant's additional services made necessary by such default, neglect or failure and any other damages suffered by Owner as a result of Contractor's breach, including but not limited to Owner's reasonable attorney's fees and litigation costs and expenses. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor or its Surety shall pay the difference to the Owner. Notwithstanding the Owner's right to carry out a portion of the Work, warranty, maintenance and protection of the Work remains the Contractor's and Surety's responsibility. Further, the provisions of this Paragraph do not affect the Owner's right to require the correction of defective or non-conforming Work in accordance with Section 13.2.
- 3.4.2 Whenever the Contractor shall be, and declared by the Owner to be in default under the Contract, the Owner having substantially performed Owner's obligations thereunder, the Surety shall promptly remedy the default, or shall be liable to Owner for damages pursuant to the Performance Bond and as provided by law. Any action by Surety or by Owner against the Surety shall not relieve Contractor of its duties, responsibilities and liabilities to Owner pursuant to the Contract or as allowed by law.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

- 4.1.1 The Contractor is the person or organization identified as such in the Owner-Contractor Agreement and may be referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative, who shall have authority to bind the Contractor in all matters pertinent to the Contract.
- 4.1.2 The Contract is not one of agency by the Contractor for Owner but one in which Contractor is engaged independently in the business of providing the services and performing the Work herein described as an independent contractor.

4.2 REVIEW OF CONTRACT DOCUMENTS

- 4.2.1 The Contractor represents that prior to executing this Contract, the Contractor carefully reviewed and studied the Contract Documents and notified the Owner and Design Consultant of any errors, inconsistencies or omissions of which the Contractor is aware. The Contractor agrees to continuously and carefully study and compare the Contract Documents after the execution of this Contract and shall at once report to the Owner and Design Consultant any

error, inconsistency or omission he may discover, including, but not limited to, any requirement which may be contrary to any law, ordinance, rule, regulation, building code, or order of any public authority bearing on the Work. If the Contractor has reported in writing an error, inconsistency or omission, has promptly stopped the affected Work until otherwise instructed, and has otherwise followed the instructions of the Owner, the Contractor shall not be liable to the Owner or the Design Consultant for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without it being specified in Contract Documents and, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.2.2 The Contractor and his Subcontractors shall keep at the site of the Work at least one copy of the Drawings and Specifications and shall at all times give the Owner, the Design Consultant, inspectors, as well as other representatives of the Owner access thereto.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.1.1 It shall be the Contractor's responsibility to schedule the Work; to maintain a progress schedule for the Project; and to notify the Design Consultant and the Owner of any changes in the progress schedule. He shall be responsible for providing adequate notice to all Subcontractors to insure efficient continuity of all phases of the Project. The Contractor is responsible for keeping the Owner and Design Consultant fully informed as to the work progress, including immediate notification of any work progress changes.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and Sub-subcontractors, Suppliers, their agents and employees, and other persons performing any of the Work and for their compliance with each and every requirement of the Contract Documents, in the same manner as if they were directly contracted by the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the acts, failures to act or duties of the Owner or the Design Consultant in their administration of the Contract, or by inspections, tests or approvals (or the lack thereof) required or performed under Section 7.6 by persons other than the Contractor.

4.3.4 Before starting a section of the Work, the Contractor shall carefully examine all preparatory work that has been executed to receive his work to see that it has been completed in accordance with the Contract Documents. He shall check carefully, by whatever means are required, to ensure that his work and adjacent, related work will finish to proper and required standards for quality, contours, planes, and levels.

4.3.5 The Contractor understands and agrees that the Owner and Design Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner and the Design Consultant will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

4.3.6 The Contractor shall not use or provide Subcontractor equipment, materials, methods or persons to which Owner and Design Consultant have a reasonable objection and shall remove no portion of the Work or stored materials from the site of the Work, except for defective Work the Contractor may be required to replace or repair as set forth herein.

4.3.7 The Contractor shall verify all grades, lines, levels and dimensions as indicated and shown on the Drawings and in the Specifications prior to beginning any portion of the Work and shall immediately report in writing any errors or inconsistencies to the Design Consultant before commencing that portion of the Work.

4.4. CONTRACTOR'S REPRESENTATIONS

4.4.1 By entering into this Contract with the Owner, the Contractor represents and warrants the following, together with all other representations and warranties in the Contract Documents:

1. That he is experienced in and competent to perform the type of work required and to furnish the Subcontractors, materials, supplies, equipment and services to be performed or furnished by him;
2. That he is financially solvent, able to pay his debts as they mature, and possessed of sufficient working capital to initiate and complete the Work required under the Contract;
3. That he is familiar with all Federal, State, County, municipal and department laws, ordinances, permits, regulations, building codes and resolutions which may in any way affect the Work or those employed therein, including but not limited to any special laws or regulations relating to the Work or any part thereof;
4. That such temporary and permanent Work required by the Contract Documents will be satisfactorily constructed and fit for use for its intended purpose and that such construction will not injure any person, or damage any property;
5. That he has carefully examined the Contract Documents and the site of the Work and that from his own investigations, he has satisfied himself and made himself familiar with: (1) the nature and location of the Work; (2) the character, quality and quantity of surface and subsurface materials likely to be encountered, including, but not limited to, all structures and obstructions on or at the Project site, both natural and man-made; (3) the character of equipment and other facilities needed for the performance of the Work; (4) the general and local conditions including without limitation its climatic conditions, the availability and cost of labor and the availability and cost of materials, tools and equipment; (5) the quality and quantity of all materials, supplies, tools, equipment, labor and professional services necessary to complete the Work in the manner required by the Contract Documents; and (6) all other matters or things which could in any manner affect the performance of the Work;
6. That he will fully comply with all requirements of the Contract Documents;
7. That he will perform the Work consistent with good workmanship, sound business practice, and in the most expeditious and economical manner consistent with the best interests of the Owner;

8. That he will furnish efficient business administration and experienced project management and supervision, and an adequate supply of workers, equipment, tools and materials at all times;
9. That he has carefully reviewed the Work required and that the Work can be planned and executed in a normal and orderly sequence of Work and reasonably scheduled so as to ensure completion of the Work in accordance with the Contract Documents, allowing for normal and reasonably foreseeable weather, labor and other delays, interruptions and disruptions of the Work;
10. That he will complete the Work within the Contract Time and all portions thereof within any required Completion Dates;
11. That his Contract Sum is based upon the labor, materials, systems and equipment required by the Contract Documents, without exception; and
12. That he will make a good faith effort to utilize minority and Historically Underutilized Businesses (HUBs) as defined and required in N.C. Gen. Stat. 143-128.2 to -128.4, and as described in the Contract Documents.

4.5 LABOR AND MATERIALS

- 4.5.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, supplies, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary or proper for or incidental to the execution and completion of the Work required by and in accordance with the Contract Documents and any applicable code or statute, whether specifically required by the Contract Documents or whether their provision may reasonably be inferred as necessary to produce the intended results, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Final payment will not be made until the Work is so completed and Contractor has otherwise complied with the Contract Documents in full.
- 4.5.2 The Contractor shall at all times enforce strict discipline and good order among his employees and Subcontractors performing any of the Work and shall not employ or contract with on the Work any unfit person or entity or anyone not skilled in the task assigned to him. The Owner may, by Notice, require the Contractor to remove from the Work any employee or employee of a Subcontractor performing any of the Work, that the Owner deems incompetent, careless or otherwise objectionable.
- 4.5.3 The Contractor shall be responsible for ensuring that the Work is completed in a skilful and workmanlike manner.
- 4.5.4 All equipment, apparatus and/or devices of any kind to be incorporated into the Work that are shown or indicated on the Drawings or called for in the Specifications or required for the completion of the Work shall be entirely satisfactory to the Owner and the Design Consultant as regards operations, capacity and/or performance. No approval, either written or verbal, of any drawings, descriptive data or samples of such equipment, apparatus and/or device shall relieve the Contractor of his responsibility to turn over the same in good working order for its intended purpose at the completion of the Work in complete accordance with the Contract Documents. Any equipment, apparatus and/or device not fulfilling these requirements shall be removed and replaced by proper and acceptable equipment, etc. or put in good working order satisfactory to the Owner and Design Consultant without additional cost to the Owner.

4.6 WARRANTY

- 4.6.1 The Contractor warrants to the Owner and the Design Consultant that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all workmanship will be in accordance with generally accepted industry standards, free from faults and defects and in conformance with the Contract Documents and all other warranties and guaranties specified therein. Where no standard is specified for such workmanship or materials, they shall be the best of their respective kinds. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Owner or the Design Consultant, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Article 13.
- 4.6.2 The Contractor will be required to complete the Work specified and to provide all items needed for construction of the Project, complete and in good order.
- 4.6.3 The warranties set forth in this Section 4.6 and elsewhere in the Contract Documents shall survive Final Completion of the Work under Section 9.9.
- 4.6.4 The Contractor guarantees and warrants to the Owner all Work as follows:
1. That all materials and equipment furnished under this Contract will be new and the best of its respective kind unless otherwise specified;
 2. That all Work will be in accordance with generally accepted industry standards and free of omissions and faulty, poor quality, imperfect and defective material or workmanship;
 3. That the Work shall be entirely watertight and leak proof in accordance with all applicable industry customs and practices, and shall be free of shrinkage and settlement;
 4. That the Work, including but not limited to, mechanical and electrical machines, devices and equipment, shall be fit and fully usable for its intended and specified purpose and shall operate satisfactorily with ordinary care;
 5. That consistent with requirements of the Contract Documents, the Work shall be installed and oriented in such a manner as to facilitate unrestricted access for the operation and maintenance of fixed equipment;
 6. That the Work will be free of abnormal or unusual deterioration which occurs because of poor quality materials, workmanship or unsuitable storage; and
 7. That the products or materials incorporated in the Work will not contain asbestos.
- 4.6.5 All Work not conforming to guarantees and warranties specified in the Contract Documents, including substitutions not properly approved and authorized, may be considered defective. If required by the Design Consultant or Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
- 4.6.5.1 The Contractor will submit a written affidavit certifying that none of the materials incorporated in the Project contain asbestos.

- 4.6.6 If, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof as defined in Paragraph 8.1.3 or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective, not in accordance with the Contract Documents, or not in accordance with the guarantees and warranties specified in the Contract Documents, the Contractor shall correct it within five (5) working days or such other period as mutually agreed, after receipt of Notice from the Owner to do so. The Owner shall give such Notice with reasonable promptness after discovery of the condition. For items that remain incomplete or uncorrected on the date of Substantial Completion, the one (1) year warranty shall begin on the date of Final Completion of the Work or upon correction of the defective Work.
- 4.6.7 If at any time deficiencies in the Work are discovered which are found to have resulted from fraud or misrepresentation, or an intent or attempt to or conspiracy to defraud the Owner by the Contractor, any Subcontractor or Supplier, the Contractor will be liable for replacement or correction of such Work and any damages which Owner has incurred related thereto, regardless of the time limit of any guarantee or warranty.
- 4.6.8 Any materials or other portions of the Work, installed, furnished or stored on site which are not of the character or quality required by the Specifications, or are otherwise not acceptable to the Design Consultant or the Owner, shall be immediately removed and replaced by the Contractor to the satisfaction of the Design Consultant and Owner, when notified to do so by the Design Consultant or Owner.
- 4.6.9 If the Contractor fails to correct defective or non-conforming Work as required by Paragraph 4.6.6, or if the Contractor fails to remove defective or non-conforming Work from the site, as required by Paragraph 4.6.8, the Owner may elect to either correct such Work in accordance with Section 3.4 or remove and store materials and equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may upon ten (10) additional days written Notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Design Consultant's additional services and Owner's reasonable attorney's fees made necessary thereby. If such proceeds of sale do not cover all costs, which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.
- 4.6.10 The Contractor shall bear the cost of making good all of the Work of the Owner, Separate Contractors or others, destroyed or damaged by such correction or removal required under this Article 4, Article 13 or elsewhere in the Contract Documents.
- 4.7 TAXES
- 4.7.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time the Owner received bids for the construction of the Project, whether or not yet effective.
- 4.7.2 Sales and Use Tax. Contractor shall be responsible for complying with any applicable sales and use tax obligations imposed by Chapter 105, Article 5 of the North Carolina General Statutes. Where Contractor has been contracted with to oversee "new construction" or "reconstruction"

as defined in G.S. 105-164.4H, Contractor shall be responsible for issuing and maintaining an Affidavit of Capital Improvement.

The Committee Substitute for Senate Bill No. 78, passed by the 1961 Legislature, requires that contractors pay North Carolina Sales Tax on materials and equipment purchased for construction of municipal work, and further provides that those taxes on certain items are refundable to municipalities under submission of proper evidence by the Owner to the North Carolina Department of Revenue. Reference is made to "Sales and Use Tax Regulation 42".

The Contractor shall submit to the Owner information which will make it possible to show the sales tax as a separate item on each Application for Payment. The tax may be shown at the bottom of the Application for Payment in the following manner:

"Total of refundable N.C. Sales Tax paid on the above Application for Payment amounted to \$ _____."

To substantiate the payment of the sales tax indicated, the CONTRACTOR MUST IN ADDITION, submit a SWORN NOTARIZED statement itemizing the tax, showing each amount and to whom paid, and certifying that the articles purchased were used in the work performed for the Owner. Receipts for these amounts must be included with the Application for Payment. Such receipts shall include all taxes paid by the Contractor and any of its subcontractors.

4.8 PERMITS, FEES AND NOTICES

4.8.1 The Contractor shall secure and pay for the building permit and for all other permits and governmental fees, and inspections necessary for the proper execution and completion of the Work. Costs for service, final service connections and meter fees by public utilities will be paid by the Owner. The Contractor shall be responsible for all fees, permits and other costs associated with temporary utilities, including but not limited to installation, use, disconnection, removal and/or relocation.

4.8.3 The Contractor will pay for his own license, inspection and re-inspection fees for the proper execution and completion of the Work.

4.8.4 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work, including but not limited to all applicable building codes. If Contractor believes that any part of the Drawings or Specifications are inconsistent with applicable laws, rules, regulations, lawful orders of public authorities or building codes, Contractor shall Notify the Owner and Design Consultant of such inconsistencies immediately.

4.9 ALLOWANCES

4.9.1 The Contractor shall include in the Contract Sum all Allowances stated in the Contract Documents. Items covered by these Allowances shall be supplied for such amount and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.9.2 Unless otherwise provided in the Contract Documents:

1. Allowances for Work: These allowances shall cover the cost to the Contractor for the materials and equipment required by the allowance delivered at the site, all applicable taxes, unloading, uncrating and storage, protection from elements, labor, installation and

finishing and other expenses and time required to complete the installation, and a fixed percentage for overhead and profit as defined in Article 12.

2. Allowances for Products/Materials: Allowance includes the cost of the product, delivery to the site and applicable taxes. The Contractor's costs for unloading and handling on the site, labor, installation, time, overhead, profit and other expenses contemplated for the material allowance shall be included in the Contract Sum and not in the allowance;
3. Whenever the cost is more than or less than the Allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expense.

4.10 SUPERINTENDENT

4.10.1 The Contractor shall employ, and have approved by the Owner, a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. If the Contractor employs more than a single individual in this role, the Owner shall be provided an organizational chart and personnel listing for the staff performing the functions of a superintendent. In such event, all references to the superintendent elsewhere in the Contract Documents shall mean the staff performing the functions of a superintendent.

4.10.2 The superintendent shall be in attendance at the Project site at all times when and where work is in progress, unless the job is closed down due to conditions beyond the control of the Contractor or until termination of the Contract in accordance with the Contract Documents. It is understood that such superintendent shall be acceptable to the Owner and shall be the one who will be continued in that capacity for the duration of the Project, unless he ceases to be on the Contractor's payroll or the Owner otherwise agrees. The superintendent shall not be employed on any other project for or by Contractor or any other entity during the course of the Work.

4.11 PROGRESS SCHEDULE

4.11.1 The Contractor shall prepare and submit to the Design Consultant for its review and approval an estimated progress schedule for the Work pursuant to Division 01, Section 01 32 17 of the General Requirements entitled "Construction Scheduling".

4.12 RESPONSIBILITY FOR COMPLETION

4.12.1 The Contractor shall furnish such manpower, materials, facilities and equipment and shall work within the normal scheduled working hours to ensure the performance of the Work within the Completion Dates specified in the Owner-Contractor Agreement. If for any reason the Contractor must work outside of the normal scheduled working hours, the contractor and owner will determine a suitable procedure to allow the contractor to access the facility.

4.12.2 If it becomes apparent to the Design Consultant or Owner that the Work will not be completed within required Completion Dates, the Contractor agrees to undertake some or all of the following actions, at no additional cost to the Owner, in order to ensure, in the opinion of the Design Consultant and Owner, that the Contractor will comply with all Completion Date requirements:

1. Increase manpower, materials, crafts, equipment and facilities;
 2. Increase the number of working hours per shift, shifts per working day, working days per week, or any combination of the foregoing, including but not limited to night shifts, overtime operations and Sundays and holidays;
 3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities;
 4. Require that his superintendent be at the Project site not less than ten (10) hours per day, six (6) days per week; and
 5. Reimburse the Owner in accordance with Paragraph 4.12.1 above for all work performed outside of the normal scheduled work hours.
- 4.12.3 In undertaking the actions required under Paragraph 4.12.1, Contractor shall prepare and adhere to a recovery schedule if the Project is behind schedule by four (4) or more days.
- 4.12.4 If the actions taken by the Contractor are not satisfactory, the Design Consultant or Owner may direct the Contractor to take any and all actions necessary to ensure completion within the required Completion Dates, without additional cost to the Owner. In such event, the Contractor shall continue to assume responsibility for his performance and for completion within the required dates.
- 4.12.5 If, in the opinion of the Design Consultant or Owner, the actions taken by the Contractor pursuant to this Article or the progress or sequence of the Work are not accurately reflected on the construction schedule, the Contractor shall revise such schedule to accurately reflect the actual progress and sequence of the Work.
- 4.12.6 Failure of the Contractor to substantially comply with the requirements of this Article, may be considered grounds for a determination by the Owner, pursuant to Article 14, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.
- 4.12.7 The Owner may, at its sole discretion and for any reason, other than due to the fault of Contractor require the Contractor to accelerate the Work by providing overtime, Saturday, Sunday and/or holiday work and/or by having all or any Subcontractors designated by the Owner provide overtime, Saturday, Sunday, and/or holiday work. In the event that the Owner requires such acceleration a Change Order shall be issued in accordance with Article 12.
- 4.12.8 This Section 4.12 does not eliminate the Contractor's responsibility to comply with the local noise ordinances, all highway permit requirements and all other applicable laws, regulations, rules, ordinances, resolutions, and permit requirements.
- 4.12.9 The Contractor will provide the Owner assistance in the original operation of any equipment or system installed as Part of the Work, including initial start-up, testing, adjustment and balancing.

4.13 DOCUMENTS AND SAMPLES AT THE SITE

4.13.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be delivered to the Design Consultant upon completion of the Work.

4.14 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.14.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, Manufacturer, Supplier or distributor to illustrate some portion of the Work.

4.14.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

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

4.14.4 Manuals are manufacturer's installation, start-up, operating, and maintenance and repair instructions together with parts lists, pictures, sketches and diagrams, which set forth the manufacturer's requirements for the benefit of the Contractor and the Owner.

4.14.5 The Contractor shall prepare or have prepared at its expense and shall review, indicate approval thereupon, and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the other work of the Owner or any Separate Contractor, all Shop Drawings, Product Data, Manuals and Samples required by the Contract Documents.

4.14.5.1 Unless otherwise directed in writing, the Contractor shall submit no less than three (3) copies of each Shop Drawing, Product Data, or Manuals to the Design Consultant. Routing of said submittals will be from the Contractor to the Design Consultant with a copy of the transmittal to the Owner. The Design Consultant will return one (1) copy of the reviewed submittal to the Contractor.

4.14.5.2 Where the Contract calls for the submittal of manufacturer's data to the Design Consultant for information only, such submittals shall be made before the commencement of any portion of the Work requiring such submission. Work performed without benefit of approved Shop Drawings for any portion of the Work is subject to removal and replacement at no cost to the Owner.

4.14.5.3 For standard manufactured items not requiring special Shop Drawings for manufacture, Contractor shall submit no less than three (3) copies of Manufacturer's catalogue sheets showing illustrated cuts of item to be furnished, scale details, sizes, dimensions, performance characteristics, capacities, wiring diagrams and controls, and all other pertinent information. One (1) copy of reviewed submissions will be returned to the Contractor.

4.14.5.4 Unless otherwise directed in writing, all other Shop Drawings, Contractor shall submit no less than three (3) legible copies of each drawing. Each drawing shall have a clear space for stamps. When phrase "by others" appears on Shop Drawings, the Contractor shall indicate on the Shop Drawing who is to furnish material or operations so marked before submittal. When the Shop

Drawings are checked "revise and resubmit", the Contractor shall make corrections and submit new copies for review. The Shop Drawings shall contain the Contractor's "approval" and corrections.

- 4.14.5.5 For use of all trades, the Contractor shall provide such number of Shop Drawings as is required for field distribution.
- 4.14.5.6 The Design Consultant will review submittals and make marks to indicate corrections or revisions required and will stamp each submittal with an action stamp and will mark the stamp with the action required by the Contractor.
- 4.14.5.7 Contractor shall submit names of proposed Manufacturers, Material Suppliers, dealers, who are to furnish materials, fixtures, appliances or other fittings for approval as early as possible, to afford proper investigation and checking.
- 4.14.5.8 Transactions with manufacturers, or Subcontractors, shall be through Contractor.
- 4.14.5.9 Unless otherwise specified, Contractor shall submit samples in duplicate of adequate size showing quality, type, color range, finish, and texture as indicated in the Specifications.
- 4.14.5.10 Where Specifications require manufacturer's printed installation instructions, Contractor shall submit duplicate copies of such instructions for approval.
- 4.14.5.11 When several materials are specified by name for one use, Contractor shall select for use any of those so specified.
- 4.14.5.12 Whenever item or class of material is specified exclusively by trade name, manufacturer's name, or by catalogue reference, Contractor shall use only such item, unless written approval for substitution is secured, as outlined in the Specifications and in Section 4.15 of the General Conditions.
- 4.14.5.13 Contractor shall not order materials until receipt of written approval. Contractor shall furnish materials equal in every respect to approved samples.
- 4.14.6 By approving and submitting Shop Drawings, Product Data, Manuals and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instructions pertaining to Shop Drawings, which may be issued by the Design Consultant.
 - 4.14.6.1 Parts and details not fully indicated on the Drawings shall be detailed by the Contractor in accordance with standard engineering practice. Dimensions on the Drawings, as well as detailed drawings themselves are subject in every case to measurements of existing, adjacent, incorporated and completed, which shall be taken by the Contractor before undertaking any Work dependent on such data.
- 4.14.7 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Design Consultant's review of Shop Drawings, Product Data, Samples or Manuals under Paragraph 2.2.14 unless the Contractor has specifically informed the Design Consultant in writing of such deviation at the time of submission and the Design

Consultant has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility to Owner for errors or omissions in the Shop Drawings, Product Data, Samples, or Manuals by virtue of the Design Consultant's review or approval thereof.

- 4.14.8 The Contractor shall make corrections required by the Design Consultant and shall resubmit the required number of corrected copies of Shop Drawings or new Product Data or Samples. The Contractor shall direct specific attention, in writing on resubmitted Shop Drawings, Product Data or Samples or Manuals, to revisions other than those requested by the Design Consultant on previous submittals. Re-submittals necessitated by required corrections due to Contractor's errors or omissions shall not be cause for extension of Contract Time or an increase in the Contract Sum.
- 4.14.8.1 No portion of the Work requiring submission of Shop Drawings, Product Data, Samples or Manuals shall be commenced until the submittal has been approved by the Design Consultant as provided in Article 2. All such portions of the Work shall be in accordance with approved submittals.
- 4.14.9 Shop Drawings, Product Data and Samples shall be dated and shall bear the name of the Project; a description or the names or equipment, materials and items; and complete identification of locations at which materials or equipment are to be installed. Shop Drawings shall be stamped and signed stating that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- 4.14.10 Submittals of Shop Drawings, Product Data, Samples or Manuals shall be accompanied by a transmittal letter, in duplicate, containing the name of the Project, the Contractor's name, the number of Shop Drawings, Product Data, Samples, or Manuals, identification of Specification section and other pertinent data.
- 4.15 EQUAL PRODUCTS AND SUBSTITUTIONS
- 4.15.1 All materials, supplies and articles furnished under the Contract shall, whenever specified and otherwise practicable, be the standard products of recognized, reputable manufacturers. Unless otherwise specifically provided in the Contract Documents, the naming of a certain brand, make, manufacturer or article, device, product, material, fixture or type of construction shall convey the general style, type, character and standard of quality of the article desired and shall not be construed as limiting competition. The Contractor, in such cases, may with Owner's written approval, use any brand, make, manufacturer, article, device, product, material, fixture, form or type of construction which in the judgment of the Design Consultant is equal to that specified. An item may be considered equal to the item so named or described if, in the opinion of the Owner and Design Consultant (1) it is at least equal in quality, durability, appearance, strength, and design; (2) it will perform at least equally the specific function imposed by the general design for the Work being contracted for or the material being purchased; and (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the Specifications. Approval by the Owner and Design Consultant will be granted based upon considerations of quality, workmanship, economy of operation, suitability for the purpose intended, warranty and acceptability for use on the Project.
- 4.15.2 To obtain such approval on makes or brands of material other than those specified in Contract Documents, and not previously approved at the time the Owner received bids for the construction of the Project, the Contractor's request for approval of any substitution shall

include:

1. Complete data substantiating compliance of the proposed substitution with the Contract Documents;
2. Product identification including manufacturers' name, address, and phone number;
3. Manufacturer's literature showing complete product description, performance and test data, and all reference standards;
4. Samples and colors in the case of articles or products;
5. Names and addresses of similar projects on which the product was used and date of installation;
6. For construction methods, include a detailed description for the proposed method and drawings illustrating same;
7. Itemized comparison of proposed substitution with product or method specified and any cost reduction, which shall benefit the Owner;
8. Accurate cost data on proposed substitution in comparison with product or method specified;
9. All directions, specifications, and recommendations by manufacturers for installation, handling, storing, adjustment, and operation; and
10. Item by item comparison of characteristics of substitution item with those items specified.

4.15.3 The Contractor shall also submit with his request for approval a sworn and notarized statement which shall include all of the following representations by the Contractor, namely that:

1. He has investigated the proposed product or method and determined that it is equal or better in all respects to that specified and that it fully complies with all requirements of the Contract Documents;
2. He will meet all contract obligations with regard to this substitution;
3. He will coordinate installation of accepted substitutions into the Work, making all such changes and any required schedule adjustments, at no additional cost to the Owner, as may be required for the Work to be complete in all respects;
4. He waives all Claims for additional costs and additional time related to substitutions, which consequently become apparent. He also agrees to hold the Owner harmless from Claims for extra costs and time incurred by other Subcontractors and suppliers, or additional services which may have to be performed by the Design Consultant, for changes for extra work that may, at some later date, be determined to be necessary in order for the Work to function in the manner intended in the Contract Documents;
5. He will provide the same warranty and guarantee, and perform any work required in accordance therewith, for the substitution that is applicable to the specified item for which the substitution is requested;

6. Material will be installed, handled, stored, adjusted, tested, and operated in accordance with the manufacturers' recommendation and as specified in the Contract Documents.
7. In all cases new materials will be used unless this provision is waived by Notice from the Owner or his Design Consultant, or unless otherwise specified in the Contract Documents;
8. All material and workmanship will be in every respect in accordance with that which, in the opinion of the Owner or Design Consultant, is in conformity with approved modern practice; and
9. He has provided accurate cost data on the proposed substitution in comparison with the product or method specified.

4.15.4 Subject to the provisions of any applicable laws, approval for substitutions or equal products shall be at the sole discretion of the Owner, shall be in writing to be effective, and the decision of the Owner shall be final. The Owner or Design Consultant may require tests of all materials proposed for substitution so submitted to establish quality standards, at the Contractor's expense. After approval of a substitution, if it is determined that the Contractor submitted defective information or data regarding the substitution upon which Owner's approval was based, and that unexpected or unanticipated extensive redesign or rework of the Project will be required in order to accommodate the substitution, or that the substituted item will not perform or function as well as the specified item for which substitution was requested, the Contractor will be required to furnish the original specified item or obtain approval to use another substitution; the Contractor shall pay all costs, expenses or damages associated with or related to the unacceptability of such a substitution and the resultant utilization of another item and no time extension shall be granted for any delays associated with or related to such substitution.

4.15.5 If a substitution is approved, no further change in brand or make will be permitted unless satisfactory, written evidence is presented to and approved by the Owner that the manufacturer cannot make scheduled delivery of the approved substituted item. The Owner will not consider substitutions for approval if:

1. The proposed substitution is indicated or implied on the Contractor's Shop Drawing or product data submittal and has not been formally submitted for approval by the Contractor in accordance with the above-stated requirements, or
2. Acceptance of the proposed substitution will require substantial design revisions to the Contract Documents or is otherwise not acceptable to the Owner and Design Consultant.

4.15.6 Except as otherwise provided for by the provisions of any applicable laws, the Contractor shall not have any right of appeal from the decision of the Owner rejecting any materials submitted if the Contractor fails to obtain the approval for substitution under this Article.

4.16 USE OF SITE

4.16.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, easements, right-of-way agreements and within the limits of construction as shown on the Contract Documents. The Contractor shall not unreasonably encumber the site, in the opinion of the Owner, with any materials, equipment or trailers nor shall he block the entrances or otherwise prevent reasonable access to the site, other working and parking areas, completed portions of the Work and/or properties, storage areas, areas of other facilities that are adjacent

to the worksite. If the Contractor fails or refuses to move said material, equipment or trailers within twenty four (24) hours of notification by the Owner, to so do, the Owner shall have the right, without further notice, to remove, at the Contractor's expense, any material, equipment and/or trailers which the Owner deems are in violation of this Paragraph.

4.17 CUTTING AND PATCHING OF WORK

4.17.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly and in accordance with the Contract Documents.

4.17.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any Separate Contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any Separate Contractor except with the written consent of the Owner and of such Separate Contractor. The Contractor shall not unreasonably withhold from the Owner or any Separate Contractor his consent to cutting or otherwise altering the Work. The Owner shall not be required to accept work with a cut, splice, or patch when such cut, splice or patch is not generally accepted practice for the particular work involved or is otherwise unworkmanlike in the opinion of the Design Consultant or the Owner.

4.17.3 Existing structures and facilities including but not limited to building, utilities, topography, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced by the Contractor to satisfaction of the Design Consultant and the Owner of such structures and facilities and authorities having jurisdiction. In event the local jurisdictional authorities require that such repairing and patching be done with their own labor and materials, the Contractor shall abide by such regulations and pay for such work with no increase in the Contract Sum.

4.18 CLEANING UP

4.18.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work and before final payment is made, he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.18.2 If the Contractor fails to clean up during or at the completion of the Work, the Owner may do so as provided in Section 6.3 and the cost thereof shall be charged to the Contractor.

4.19 COMMUNICATIONS

4.19.1 All communications from the Contractor relating to the Contract Documents or the construction schedule will be directed to the Design Consultant and copied to the Owner. Similarly, all correspondence from the Owner or Design Consultant will be directed to the Contractor and copied to the Owner or Design Consultant.

4.20 ROYALTIES AND PATENTS

4.20.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights arising out of the Work and shall save the Owner harmless from loss on account thereof.

4.21 INDEMNIFICATION

- 4.21.1 To the fullest extent permitted by law, the Contractor shall, at its sole cost and expense, indemnify, defend, and hold harmless the Owner and its agents, representatives, and employees from and against all claims, actions, judgments, costs, liabilities, penalties, damages, losses and expenses, including but not limited to attorneys' fees, arising out of and/or resulting from the performance of the Work, provided that any such claim, action, judgment, cost, liability, penalty, damage, loss or expense is caused by any negligent act, error or omission of the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be legally liable. The above obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Section 4.21.1. The parties agree that this indemnification clause is an "evidence of indebtedness" for purpose of N.C. Gen. Stat. § 6-21.2. The parties also specifically acknowledge that the Owner is a public body and it is the intent of the parties that the Owner not incur any expenses when the Contractor is solely responsible for the claims.
- 4.21.2 In any and all claims against the Owner or the Design Consultant or any of their agents, representatives, or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Section 4.21 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.
- 4.21.3 No provision of this Section 4.21 shall give rise to any duties on the part of the Design Consultant or the Owner, or any of their agents, representatives, or employees.

4.22 PERSONS AUTHORIZED TO SIGN DOCUMENTS

- 4.22.1 The Contractor, within five (5) days after the earlier of the date of a Notice to Proceed or the date of the Owner-Contractor Agreement, shall file with the Owner a list of all persons who are authorized to sign documents such as contracts, certificates, and affidavits on behalf of the Contractor and to fully bind the Contractor to all the conditions and provisions of such documents, except that in the case of a corporation he shall file with the Owner a certified copy of a resolution of the Board of Directors of the corporation in which are listed the names and titles of corporation personnel who are authorized to sign documents on behalf of the corporation and to fully bind the corporation to all the conditions and provisions of such documents.

4.23 CONDITIONS AFFECTING THE WORK

- 4.23.1 The Contractor shall be responsible for taking all steps necessary to ascertain the nature and location of the Work and the general and local conditions that can affect the Work or the cost thereof. Failure by the Contractor to fully acquaint himself with conditions which may affect the Work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of labor, water, roads, weather, topographic and subsurface conditions, Multi-Prime Contract conditions, applicable provisions of law, and the character and availability of equipment and facilities needed prior to and during the execution of the Work, shall not relieve the Contractor of his responsibilities under the Contract Documents and shall not constitute a basis for an adjustment in the Contract Sum or the Contract Time under any circumstances. The Owner assumes no responsibility for any understanding or representation

about conditions affecting the Work made by any of his officers, employees, representatives, or agents prior to the execution of the Contract, unless such understandings or representations are expressly stated in the Contract Documents.

- 4.23.2 If in the execution of the Work any valuable items or materials of any kind are discovered buried or hidden within the Work, such items or materials shall be the property of the Owner. The Contractor shall take reasonable precautions to prevent any persons from removing or damaging such items or materials and shall immediately upon discovery thereof and before removal, acquaint the Owner or the Design Consultant with such discovery and carry out, at the expense of the Owner, the Owner's or the Design Consultant's orders as to disposal of the same.

4.24 COMPLIANCE WITH BOARD POLICIES AND PROCEEDURES

The Contractor acknowledges that Board policies are available for review at the Owner's website and agrees to comply with the policies. The Contractor also agrees to comply with the following provisions:

- 4.24.1 The Contractor, its Subcontractors and employees shall not possess or carry, whether openly or concealed, any gun, rifle, pistol, or explosive on any property owned by the Owner. This includes firearms locked in containers, vehicles or firearm racks within vehicles. The Contractor, its Subcontractors and employees shall not cause, encourage or aid a minor, who is less than 18 years old to possess or carry, whether openly or concealed, any weapons on any property owned by the Owner.
- 4.24.2 The Contractor, its Subcontractors and employees, are prohibited from profane, lewd, obscene or offensive conduct or language, including engaging in sexual harassment.
- 4.24.3 The Contractor and its Subcontractors shall not manufacture, transmit, conspire to transmit, possess, use or be under the influence of any alcoholic or other intoxicating beverage, narcotic drug, hallucinogenic drug, amphetamine, barbiturate, marijuana or anabolic steroids, or possess, use, transmit or conspire to transmit drug paraphernalia on any property owned by the Owner.
- 4.24.4 The Contractor and its Subcontractors may not at any time use or display tobacco or nicotine-containing products, including but not limited to electronic cigarettes (e-cigarettes), on school premises, both indoor and outdoor. The prohibition of the display of tobacco or nicotine products shall not extend to a display that has a legitimate instructional or pedagogical purpose. For purposes of this Contract, "tobacco product" is defined to include cigarettes, cigars, blunts, bidis, pipes, chewing tobacco, snuff, and any other items containing or reasonably resembling tobacco, tobacco products, or any facsimile thereof. "Tobacco use" includes smoking, chewing, dipping, or any other use of tobacco products.
- 4.24.5 The Contractor, its Subcontractors and employees shall not solicit from or sell to students or staff within the Owner's facilities or campuses, and shall not give gifts of any value to school system employees.
- 4.24.6 Operators of all commercial vehicles on any property owned by the Owner shall be subject to post-accident, random, reasonable suspicion and follow-up testing for drugs and alcohol.

- 4.24.7 The Contractor, its Subcontractors and employees are prohibited from using access to the site pursuant to this Agreement as a means to date, court, or enter into a romantic or sexual relationship with any student enrolled in the Owner's schools. The Contractor agrees to indemnify the Owner for claims against the Owner resulting from relationships which have occurred or may occur between a student and an employee of the Contractor or Subcontractor.
- 4.24.8 Lunsford Act/Criminal Background Checks. The Contractor shall conduct at its own expense sexual offender registry checks on each of its owners, employees, agents, or Subcontractors ("contractual personnel") who will engage in any service on or delivery of goods to school system property or at a school-system sponsored event, except checks shall not be required for individuals who are solely delivering or picking up equipment, materials, or supplies at: (1) the administrative office or loading dock of a school; (2) non-school sites; (3) schools closed for renovation; or (4) school construction sites.. The checks shall include at a minimum checks of the State Sex Offender and Public Protection Registration Program, the State Sexually Violent Predator Registration Program, and the National Sex Offender Registry ("the Registries"). For the Contractor's convenience only, all of the required registry checks may be completed at no cost by accessing the United States Department of Justice Sex Offender Public Website at [http:// www.nsopw.gov/](http://www.nsopw.gov/). The Contractor shall provide certification that the registry checks were conducted on each of its contractual personnel providing services or delivering goods under this Agreement prior to the commencement of such services or the delivery of such goods. The Contractor shall conduct a current initial check of the registries (a check done more than 30 days prior to the date of this Agreement shall not satisfy this contractual obligation). In addition, Contractor agrees to conduct the registry checks and provide a supplemental certification before any additional contractual personnel are used to deliver goods or provide services pursuant to this Agreement. Contractor further agrees to conduct annual registry checks of all contractual personnel and provide annual certifications at each anniversary date of this Agreement. Contractor shall not assign any individual to deliver goods or provide services pursuant to this Agreement if said individual appears on any of the listed registries. Contractor agrees that it will maintain all records and documents necessary to demonstrate that it has conducted a thorough check of the registries as to each contractual personnel, and agrees to provide such records and documents to the school system upon request. Contractor specifically acknowledges that the school system retains the right to audit these records to ensure compliance with this Section at any time in the school system's sole discretion. Failure to comply with the terms of this provision shall be grounds for immediate termination of the Agreement. In addition, the Owner may conduct additional criminal records checks at the Owner's expense. If the school system exercises this right to conduct additional criminal records checks, Contractor agrees to provide within seven (7) days of request the full name, date of birth, state of residency for the past ten years, and any additional information requested by the school system for all contractual personnel who may deliver goods or perform services under this Agreement. Contractor further agrees that it has an ongoing obligation to provide the school system with the name of any new contractual personnel who may deliver goods or provide services under the Agreement. The Owner reserves the right to prohibit any contractual personnel of Contractor from delivering goods or providing services under this Agreement if the Owner determines, in its sole discretion, that such contractual personnel may pose a threat to the safety or well-being of students, school personnel or others.
- 4.24.9 Contractor shall not employ any individuals to provide services to the Owner who are not authorized by federal law to work in the United States. Contractor represents and warrants that it is aware of and in compliance with the Immigration Reform and Control Act and North Carolina law (Article 2 of Chapter 64 of the North Carolina General Statutes) requiring use of the E-Verify system for employers who employ twenty-five (25) or more employees and that

- it is and will remain in compliance with these laws at all times while providing services pursuant to this Agreement. Contractor shall also ensure that any of its Subcontractors (of any tier) will remain in compliance with these laws at all times while providing subcontracted services in connection with this Agreement. Contractor is responsible for providing affordable health care coverage to all of its full-time employees providing services to the School System. The definitions of “affordable coverage” and “full-time employee” are governed by the Affordable Care Act and accompanying IRS and Treasury Department regulations.
- 4.24.10 The Contractor, its Subcontractors and employees shall not interact with any students. Nothing in Paragraph 4.24 shall be construed to prevent the Contractor, its Subcontractors and employees from taking necessary measures to protect students, staff or other employees.
- 4.24.11 The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ any unfit person or anyone not skilled in the task assigned to it. The Owner may require the Contractor to remove any employee the Owner deems incompetent, careless or otherwise objectionable.
- 4.24.12 All agents and workers of the Contractor and its Subcontractors shall wear identification badges provided by the Contractor at all times they are on the Owner’s property. The identification badges shall at a minimum display the company name, telephone number, employee name and a picture of the employee.
- 4.24.13 The Contractor shall comply with the Owner’s site or school building access procedures when working on any existing school campus.
- 4.24.14 Anti-Nepotism. The Contractor warrants that, to the best of its knowledge and in the exercise of due diligence, none of its corporate officers, directors, or trustees and none of its employees who will directly provide services under this Agreement are immediate family members of any member of the Owner’s Board of Education or of any principal or central office staff administrator employed by the Owner. For purposes of this provision, “immediate family” means spouse, parent, child, brother, sister, grandparent, or grandchild, and includes step, half, and in-law relationships. Should Contractor become aware of any family relationship covered by this provision or should such a family relationship arise at any time during the term of this Agreement, Contractor shall immediately disclose the family relationship in writing to the Superintendent. Unless formally waived by the Owner, the existence of a family relationship covered by this Agreement is grounds for immediate termination by Owner without further financial liability to Contractor.
- 4.24.15 Restricted Companies Lists. Contractor represents that as of the date of this Agreement, Contractor is not included on the Final Divestment List created by the North Carolina State Treasurer pursuant to N.C. Gen. Stat. § 147-86.58. Contractor also represents that as of the date of this Agreement, Contractor is not included on the list of restricted companies determined to be engaged in a boycott of Israel created by the North Carolina State Treasurer pursuant to N.C. Gen. Stat. § 147-86.81.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor may be referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any Separate Contractor or his subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site or who contracts to perform or supply any of the Work under the scope of a Subcontractor's subcontract. The term Sub-subcontractor may be referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.
- 5.1.3 Nothing contained in the Contract Documents is intended to, nor shall it create, any contractual relationship between the Owner, the Design Consultant, or any of their agents, consultants, employees, independent contractors, or representatives and any Subcontractor, Sub-subcontractor, Supplier or Vendor of the Contractor, except the relationship between Owner and Contractor, but the Owner shall be entitled to performance of all obligations intended for his benefit, and to enforcement thereof.
- 5.1.4 The Owner and Design Consultant will not deal directly with any Subcontractor, Sub-subcontractor or Material Supplier. Communication will be made only through the Contractor. Subcontractor, Sub-subcontractors or Material Suppliers shall route requests for information or clarification through the Contractor to the Design Consultant.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 The Contractor, in compliance with the requirements of the Contract Documents and within ten (10) days after the Notice to Proceed, shall furnish in writing to the Owner the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Owner will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within a reasonable time shall constitute notice of no reasonable objection. The Contractor understands and agrees that no contractual agreement exists for any part of the Work under this Contract between the Owner and any of the Contractor's Subcontractors or Sub-subcontractors. Further, the Contractor understands and agrees that he alone is responsible to the Owner for the Work under this Contract and that any review of Subcontractors or Sub-subcontractors by the Owner will not in any way make the Owner responsible to any Subcontractor, nor responsible for the actions or failures of any Subcontractor or Sub-subcontractor.
- 5.2.1.1 The Contractor shall identify in the list of names of the Subcontractors proposed, those Subcontractors that are minority or Historically Underutilized Businesses (HUBs) and indicate the portion of the Work that each Subcontractor will perform.

- 5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner has made reasonable objection under the provisions of Paragraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.
- 5.2.3 If the Owner has reasonable objection to any proposed person or entity under Paragraph 5.2.1, the Contractor shall name a substitute to whom the Owner has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued, subject to an audit of said difference by the Owner; provided, however, that no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting names as required by Paragraph 5.2.1 and the original proposed Subcontractor was: (i) able to carry out his work under his proposed subcontract, (ii) able to comply with all applicable laws, (iii) was an ongoing business in the field of his proposed subcontract, and (iv) had a labor force, capital and a means of supply compatible with the scope of his proposed subcontract.
- 5.2.4 If the Owner requires a change of any proposed Subcontractor or person or organization previously accepted by him on the Project, 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, subject to an audit by Owner.
- 5.2.5 The Contractor shall notify the Owner and the Design Consultant of any substitution for any Subcontractor identified in accordance with Subparagraph 5.2.1.1. The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or the Design Consultant makes reasonable objection to such substitution. Also, Contractor may make no substitution of Subcontractors in violation of applicable law.
- 5.2.6 If during the duration of the Project, the Contractor effects a substitution for any Subcontractor per Paragraph 5.2.5, or if additional subcontract opportunities become available, the Contractor shall make a good faith effort to utilize minority and Historically Underutilized Businesses (HUBs).

5.3 SUBCONTRACTUAL RELATIONS

- 5.3.1 By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Contract Documents, assumes toward the Owner. Said agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the agreement between the Contractor and Subcontractor, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Section 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Contract Documents available to his Sub-subcontractors.

5.3.2 The provisions herein regarding Subcontractor approvals shall in no way affect the liability of the Contractor to the Owner regarding performance of all obligations by or payment of Subcontractors. Approval to subcontract with any given Subcontractor shall not to any degree relieve the Contractor of his obligation to perform or have performed to the full satisfaction of the Owner the Work required by this Contract.

5.3.3 The Contractor shall submit Notice to the Owner of any Claims by Subcontractors for which the Owner is believed to be responsible, in strict conformance with the same time requirements and other procedures established for the submission of the Contractor's Claims to the Owner.

5.4 QUALIFICATION SUBMITTALS

5.4.1 Specific qualification submittals may be required of Subcontractors, installers and suppliers for certain critical items of the Work. Required qualification submittals are set forth in detail in the Specifications and shall be collected and submitted by the Contractor for review and approval by the Design Consultant. All information required of a single Subcontractor, installer or supplier shall be contained in a single, complete submittal. The Contractor shall submit the required qualification information within ten (10) days after receipt of the Design Consultant's request.

5.4.2 The Owner and Design Consultant shall reject any proposed Subcontractor, installer or supplier, or any qualification submittals related thereto, for the following reasons:

1. The Contractor's failure to submit requested information within the specified time; or
2. The Contractor's failure to provide all of the requested information; or
3. The Contractor's submission of a Subcontractor, installer or supplier, or qualifications thereof, which are unacceptable in the judgment of the Owner or Design Consultant.

5.4.3 Should the Owner or Design Consultant have reasonable objection to any proposed Subcontractor, installer or supplier, the Contractor shall submit another person or firm who are reasonably acceptable to the Owner and Design Consultant.

5.5 PREPARATORY WORK

5.5.1 Before starting a portion of the Work, the Contractor and the responsible Subcontractor shall carefully examine all preparatory work that has been executed to receive his work. The Subcontractor shall check carefully, by whatever means are required, to ensure that his work and adjacent related work will finish to proper contours, planes and levels. He shall promptly notify the Contractor and the Design Consultant of any defects or imperfections in preparatory work, which will, in any way, affect satisfactory completion of his work. Absence of such notification will be construed as an acceptance of preparatory work and later Claims of defects therein will not be recognized.

5.5.2 Under no conditions shall a portion of the Work proceed prior to preparatory work having been completed, cured, dried, and otherwise made satisfactory to receive such related work. Responsibility for timely installation of all materials rests solely with the Contractor, who shall maintain coordination control at all times.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar conditions of the Contract.

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

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford Separate Contractors and the Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate the Work with that of the Owner and other contractors to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the Work as will not unduly or unreasonably interfere with the progress of the Work or the work of any other contractors.

6.2.1.1 If the execution or result of any part of the Work depends upon any work of the Owner or of any Separate Contractor, the Contractor shall, prior to proceeding with the Work, inspect and promptly report to the Owner in writing any apparent discrepancies or defects in such work of the Owner or of any Separate Contractor that render it unsuitable for such proper execution or result of any part of the Work.

6.2.1.2 Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or Separate Contractor's work as fit and proper to receive the Work, except as to defects which may develop in the Owner's or Separate Contractor's work after completion of the Work and which the Contractor could not have discovered by its inspection prior to completion of the Work.

6.2.2 Should the Contractor cause damage to the Work or property of the Owner or of any Separate Contractor on the Project, or to other work on the site, or delay or interfere with the Owner's work on ongoing operations or facilities or adjacent facilities or said Separate Contractor's work, the Contractor shall be liable for the same; and, in the case of another contractor, the Contractor shall attempt to settle said Claim with such other contractor prior to such other contractor's institution of litigation or other proceedings against the other contractor.

6.2.2.1 Should a Separate Contractor be declared in default by the Owner, the Owner shall not be obligated to hire a contractor to perform the work of the Separate Contractor during the time the Separate Contractor's surety is remedying the default pursuant to Paragraph 3.4.2.

6.2.2.2 If such Separate Contractor sues the Owner or Design Consultant on account of any damage, delay or interference cause or alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend the Owner and Design Consultant in such proceedings at the Contractor's expense. If any judgment or award is entered against the Owner or Design Consultant in such proceedings, the Contractor shall satisfy the same and shall reimburse the

Owner and Design Consultant for all damages, expenses, attorney's fees and other costs which the Owner or Design Consultant incurs as a result thereof.

6.2.3 Should a Separate Contractor cause damage to the Work or to the property of the Contractor or cause delay or interference with the Contractor's performance of the Work, the Contractor shall present directly to said Separate Contractor any Claims it may have as a result of such damage, delay or interference (with an information copied to the Owner) and shall attempt to settle its Claim against said Separate Contractor prior to the institution of litigation or other proceedings against said Separate Contractor.

6.2.3.1 In no event shall the Contractor seek to recover from the Owner or the Design Consultant, and the Contractor hereby waives any Claims against the Owner and Design Consultant relating to any costs, expenses (including, but not limited to, attorney's fees) or damages or other losses incurred by the Contractor as a result of any damage to the Work or property of the Contractor or any delay or interference caused by any Separate Contractor.

6.2.4 Whenever Contractor receives items from another contractor or from Owner for storage, erection or installation, the Contractor receiving such items shall give receipt for items delivered, and thereafter will be held responsible for care, storage and any necessary replacing of item or items received.

6.2.5 When certain items of equipment and other work are indicated as "NIC" (not in contract), or to be furnished and installed under other contracts, any requirements set forth in the Contract Documents for preparation of openings, provision of backing, etc., for receipt of such "NIC" work will be furnished upon written request of the Contractor who shall properly form and otherwise prepare his work in a satisfactory manner to receive such "NIC" work.

6.3 OWNER'S RIGHT TO PERFORM DISPUTED WORK

6.3.1 If a dispute arises between the Contractor and Separate Contractors as to their responsibility for cleaning up as required by Section 4.18 or for accomplishing coordination or doing required cutting, filling, excavating or patching as required by Section 4.17, the Owner may carry out such work and charge the cost thereof to the responsible party as the Owner shall determine to be just.

6.4 COORDINATION OF THE WORK

6.4.1 By entering into this Contract, Contractor acknowledges that there may be other contractors on the site whose work will be coordinated with that of his own. Contractor expresses, warrants and guarantees that he will cooperate with other contractors and will do nothing to delay, hinder or interfere with the work of other Separate Contractors, the Owner or Design Consultant. Contractor also expressly agrees that, in the event his work is hindered, delayed, interfered with or otherwise affected by a Separate Contractor, his sole remedy will be a direct action against the Separate Contractor as described in this Article 6. Contractor will have no remedy, and hereby expressly waives any remedy, against the Owner and/or the Design Consultant on account of delay, hindrance, interference or other event caused by a Separate Contractor.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 This Contract shall be governed by the laws of the State of North Carolina.

7.1.2 Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein. If through mistake or otherwise, any such provision is not inserted or is not correctly or fully inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Owner, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner and the Contractor's Surety.

7.3 CLAIMS AND DAMAGES

7.3.1 Should the Contractor, Subcontractor or any Sub-subcontractor suffer injury or damage to person or property because of any act or omission of the Owner or Design Consultant, or of any of their employees, agents or others for whose acts either is legally liable, the Claim on behalf of the Contractor its Subcontractors or Sub-subcontractors shall be made by giving Notice to the Owner, as provided in Article 15 ; otherwise, the Contractor, Subcontractors and Sub-subcontractors shall have waived any and all rights he may have against the Owner or the Design Consultant, or their employees, representatives and agents. The Contractor shall indemnify, defend and hold the Owner harmless from any Claim by a Subcontractor that is waived because it is not filed in strict conformance with this Paragraph or any other provision of the Contract regarding Claims.

7.4 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.4.1 The Contractor shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in a form and with a Surety satisfactory to the Owner.

7.4.2 The Contractor is required to furnish in duplicate a Performance Bond and a Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the Contract Sum, written by a surety company licensed to do business in North Carolina and with a minimum AM Best "A" rating or comparable rating from another service reasonably acceptable to Owner.

7.5 RIGHTS AND REMEDIES

- 7.5.1 The duties and obligations of the Contractor imposed by the Contract Documents and the rights and remedies of the Owner available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.
- 7.5.2 Except as may be specifically agreed in writing, the failure of the Owner or the Design Consultant to insist in any one or more instances upon the strict performance of any one or more of the provisions of the Contract, or to exercise any right herein contained or provided by law, shall not be construed as a waiver or relinquishment of the performance of such provisions or right(s) or of the right to subsequently demand such strict performance or exercise such right(s), and the rights shall continue unchanged and remain in full force and effect.
- 7.5.3 The Contractor agrees that he can be adequately compensated by money damages for any breach of the Contract which may be committed by the Owner and hereby agrees that no default, act, or omission of the Owner or the Design Consultant, except for failure to make progress payments as required by the Contract Documents, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of the Contract or (unless the Owner shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which he might otherwise be or become entitled, save only his right to money damages.

7.6 TESTS AND INSPECTIONS

- 7.6.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved, the Contractor shall give the Owner and Design Consultant timely Notice of its readiness so the Design Consultant and the Owner may observe such inspection, testing or approval. Unless otherwise specifically provided in the Contract Documents, the Contractor shall bear all costs of such inspections, tests or approvals, except that Owner shall pay for “special inspections” as defined and required in Section 1704, the North Carolina State Building Code, or successor section. In the event that such “special inspections” reveal a failure of the Work to comply with the Contract Documents or applicable laws, ordinances, regulations or orders of public authorities having jurisdiction, Contractor shall reimburse the Owner for the costs of such “special inspections”.
- 7.6.1.1 Unless otherwise stipulated in the Contract Documents, the Contractor shall pay for all utilities required for testing of installed equipment of all of his work and work of each Subcontractor. Boiler fuel other than gas shall be provided by Subcontractor furnishing boilers. Labor and supervision required for making such tests shall be provided at no additional cost to the Owner.
- 7.6.2 If the Design Consultant or the Owner determines that any portion of the Work requires additional inspection, testing, or approval which Paragraph 7.6.1 does not include, the Owner will instruct the Contractor to order such additional inspection, testing or approval, and the Contractor shall give Notice as provided in Paragraph 7.6.1. If such additional inspection or testing reveals a failure of any portion of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including compensation for the Design Consultant's and Owner's additional construction management expenses made necessary by such failure.

- 7.6.3 With regard to inspections and tests, the costs of which the Owner is responsible for paying, they will be made by a pre-qualified, independent testing agency selected by the Owner. The cost of the initial services of such agency will be paid by the Owner. When the initial tests indicate non-compliance with the Contract Documents, any subsequent testing occasioned by non-compliance shall be performed by the same agency and the cost thereof shall be borne by the Contractor. Representatives of the testing agency shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its functions.
- 7.6.4 The independent testing agency, contracted by the Owner, shall prepare the test reports, logs, and certificates applicable to the specific inspections and tests and promptly deliver the specified number of copies to the designated parties. Certificates of inspection, testing or approval required by public authorities shall be secured by the Contractor and promptly delivered by him to the Owner, in adequate time to avoid delays in the Work or final payment therefore.
- 7.6.5 If the Design Consultant or the Owner is to observe the inspections, tests or approvals required by the Contract Documents, laws, ordinances, rules, regulations, or order of any public authority having jurisdiction or that are required to establish compliance with the Contract Documents, he will do so promptly and, where practicable, at the normal place of testing.
- 7.6.6 The Contractor shall pay for and have sole responsibility for inspections or testing performed exclusively for his own convenience.
- 7.7 UNENFORCEABILITY OF ANY PROVISION
- 7.7.1 If any provision of this Contract is held as a matter of law to be unenforceable or unconscionable, the remainder of the Contract shall be enforceable without such provision.
- 7.8 ATTORNEYS' FEES AND OTHER EXPENSES
- 7.8.1 The Contractor hereby agrees that he will not submit, assert, litigate or otherwise pursue any frivolous or unsubstantiated Claims or Claims he has specifically waived under the terms of the Contract Documents. In the event that the Contractor's or its Subcontractor's or Sub-subcontractor's Claims, or any separate item of a Claim, is without substantial justification, the Contractor shall reimburse the Owner or Design Consultant for all costs and expenses associated with defending such Claim or separate item, including but not limited to, attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, or services and any other consultant costs.
- 7.8.2 If the Contractor breaches any obligation under the Contract Documents, the Contractor shall reimburse the Owner and Design Consultant for all costs and expenses incurred by the Owner relating to such breach, including but not limited to attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, and any other consultant costs.
- 7.8.3 If the Owner or Design Consultant substantially prevails in a Claim brought against the Contractor, or in defending a Claim brought by the Contractor, including but not limited to, Claims for fraud or misrepresentation, overpayment, defective work, delay damages, and recovery of termination expenses, the Contractor shall reimburse the Owner and/or Design Consultant for all costs and expenses incurred by them relating to such Claim, including but not limited to attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, and any other consultant costs.

ARTICLE 8

TIME

8.1 DEFINITIONS

- 8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Final Completion of the Work as defined in Paragraph 8.1.4, including authorized adjustments thereto. The Contractor shall achieve Final Completion within the Contract Time.
- 8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein. The Contractor shall not commence work or store materials or equipment on site until written Notice to Proceed is issued or until the Contractor otherwise receives the Owner's written consent.
- 8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date certified by the Design Consultant and the Owner when the Work or a designated portion thereof is sufficiently complete, in accordance with the Contract Documents, so the Owner can fully and legally occupy and utilize the Work or designated portion thereof for the use for which it is intended, with all of the parts and systems operable as required by the Contract Documents, including a preliminary test and balance report for the mechanical system. Only incidental corrective work and any final cleaning beyond that needed for the Owner's full use may remain for Final Completion. The Contractor acknowledges and agrees that the intercom, telephone, data security, building automation system (including functional graphics at the site), MATV, and other educational operational systems are required for the Owner's use of the building for its intended purpose. The Contractor shall provide operation and maintenance manuals to the Owner as required by the Contract Documents prior to Substantial Completion and shall provide the required training on the operation of the equipment and systems within two weeks of Substantial Completion. The Contractor shall achieve Substantial Completion by the date specified in the Supplemental Conditions including authorized adjustments thereto. The Owner's occupancy of incomplete work shall not alter the Contractor's responsibilities pursuant to this paragraph. Only incidental corrective work and any final cleaning beyond that needed for the Owner's full use may remain for Final Completion. The issuance of a temporary or final certificate of occupancy shall not, in itself, constitute Substantial Completion.
- 8.1.4 Final Completion of the Work occurs on the date certified by the Design Consultant and the Owner when the Work is totally complete, to include punch list work, in accordance with the Contract Documents and the Owner may fully occupy and utilize the Work for the use for which it is intended. The issuance of a temporary or final certificate of occupancy shall not, in itself, constitute Final Completion.
- 8.1.5 The term Day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated. All dates shall mean midnight of the indicated day unless otherwise stipulated.
- 8.1.6 Completion Dates shall mean the dates set forth in the Supplemental Conditions for Substantial Completion and Final Completion.

8.2 PROGRESS AND COMPLETION

- 8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract with respect to the Contractor's performance.
- 8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Paragraph 8.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the time frames stated in the Contract Documents.
- 8.2.3 Attention is directed to the fact that the Work is urgently needed by the Owner; for this reason, it shall be agreed that the Contractor and its Subcontractors will achieve Substantial Completion of the Work under the Contract within the time established under Paragraph 8.2.4 of the Supplemental Conditions after award of Contract, or Notice to Proceed, and that he will achieve Final Completion of the Work in all its details for final acceptance within the time established under Paragraph 8.2.4 of the Supplemental Conditions.

8.3 DELAYS AND EXTENSIONS OF TIME

- 8.3.1 The time during which the Contractor or any of the Subcontractors is delayed in the performance of the Work by the issuance of any required permits, acts of god, excessive inclement weather, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotions or freight embargoes, or other conditions beyond the Contractor's or the Subcontractors' control and which the Contractor or the Subcontractors could not reasonably have foreseen and provided against, except for delays caused solely by the Owner, Design Consultant or their consultants, shall be added to the time for completion of the Work stated in the Contract. Neither the Owner nor the Design Consultant shall be obligated or liable to the Contractor or the Subcontractors for indirect or direct damages, costs or expenses of any nature which the Contractor, the Subcontractors, or any other person may incur as a result of any of the delays, interferences, changes in sequence in the Work included in this Section 8.3.1. The Contractor hereby expressly waives any Claims against the Owner and the Design Consultant on account of any indirect or direct damages, lost profits, costs or expenses of any nature which the Contractor, the Subcontractors or any other person may incur as a result of any delays, interferences, changes in sequence or the like, and it is understood and agreed that the Contractor's sole and exclusive remedy in any such events shall be an extension of the Contract time in accordance with the Contract Documents.
- 8.3.2 In the event Project delays arise from or out of any act or omission of the Owner, Design Consultant or their consultants, the time during which the Project is delayed shall be added to the Contract and the Contractor may be reimbursed for its direct Project damages, excluding general overhead expenses and indirect costs, if the Contractor strictly complies with this Article 8.3. Notwithstanding the previous sentence, if the Contractor or Subcontractor in any way shares in responsibility for the delay, neither the Owner nor the Design Consultant shall be obligated or liable to the Contractor or the Subcontractors for indirect or direct damages, costs or expenses of any nature which the Contractor, the Subcontractors, or any other person may incur as a result of any of the delays, interferences, changes in sequence of the Work, and the Contractor's sole remedy, if any, shall be an extension of the Contract time.
- 8.3.3 In the event Project delays arise solely from or out of any act or omission of the Contractor, Subcontractors or their agents, the Contractor shall not be entitled to extension of the Contract time and shall be subject to the payment of Liquidated Damages as provided in this Contract.

- 8.3.4 The Contract time shall be adjusted only for changes pursuant to section 12.1, suspension of the Work pursuant to paragraph 3.3.2 or paragraph 3.3.3, and excusable delays pursuant to paragraph 8.3.4. In the event the Contractor requests an extension of the Contract time or files a Claim related to any form of delay, it shall furnish such justification and supporting evidence as the Owner may deem necessary for a determination of whether or not the Contractor is entitled to an extension of time under the provisions of the Contract, and shall further conform to all of the requirements of the specifications and the Contract regarding construction schedules and reports. The burden of proof to substantiate a Claim shall rest with the Contractor, including evidence that the cause was beyond its control. The Owner shall base its findings of fact and decision on such justification and supporting evidence, including a finding that the alleged delay impacted the Project's critical path, and shall advise the Contractor in writing thereof. If the Owner finds that the Contractor is entitled to any extension of the Contract time, the Owner's determination of the total number of days of extension shall be based upon the currently approved progress schedule and on all data relevant to the extension. Such data will be incorporated into the schedule in the form of a revision thereto, accomplished in a timely manner. The Contractor acknowledges and agrees that actual delays (due to said changes, suspension of Work or excusable delays) in activities which, according to the schedule, do not affect the Contract time, do not have any effect upon the Contract time and therefore will not be the basis for a change therein. The Contractor acknowledges and agrees that time extensions will be granted only to the extent that excusable delays exceed the available float in the critical path activities in the Contractor's currently approved schedule.
- 8.3.4.1 Extensions in the Contract time by Change Orders are subject to extension-in-time audit by the Owner as follows:
- 8.3.4.1.1 The Contractor agrees that, even though the Owner, Contractor and Design Consultant have previously signed a Change Order containing an extension-in-time resulting from a change in or addition to the Work that said extension in the Contract time may be adjusted by an audit after the fact by the Owner. If such an audit is to be made, the Owner must undertake the audit and make a ruling within thirty (30) days after the completion of the Work under the Change Order.
- 8.3.4.1.2 The Contractor agrees that any extension of the Contract time to which it is entitled arising out of a Change Order undertaken on a force accounting (labor and materials) basis, shall be determined by an extension-in-time audit by the Owner after the Work of the Change Order is completed. Such rulings shall be made by the Owner within thirty (30) days after a request for same is made by the Contractor or Design Consultant, except said thirty (30) days will not start until the Work under the Change Order is completed.
- 8.3.4.1.3 Should a time extension be granted for Substantial Completion the date for Final Completion shall be appropriately adjusted unless specifically stated otherwise.
- 8.3.4.2 Subject to other provisions of the Contract, the Contractor may be entitled to an extension of the Contract time (but no increase in the Contract sum) for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, the Subcontractors or suppliers as follows:
- 8.3.4.2.1 Labor disputes and strikes (including strikes affecting transportation), that do, in fact, directly delay the progress of the Work on the critical path; however, an extension of Contract time on account of an individual labor strike shall not exceed the number of days of said strike;

8.3.4.2.2 Acts of nature: tornado, fire, hurricane, blizzard, earthquake, or flood that damage Work in place or stored materials or adversely impact the schedule's critical path;

8.3.4.2.3 Excessive inclement weather; however, the Contract time will not be extended due to reasonably anticipated inclement weather or for delays in the aftermath of inclement weather, reasonably anticipated or excessive. The time for performance of this Contract, as stated in the Contract Documents, includes an allowance for calendar days which may not be available for construction out-of-doors; for the purposes of this Contract, the Contractor agrees that the number of calendar days per month based on a five-year average shall be considered reasonably anticipated inclement weather and planned for in the construction schedule and the Contract Documents. Unless the Contractor can substantiate to the satisfaction of the Owner that there was greater than the reasonably anticipated inclement weather considering the time from the notice-to-proceed until the date established for Substantial Completion using data from the national weather service station identified in the Supplemental Conditions, or a weather station acceptable to the Owner and that such alleged greater than reasonably anticipated inclement weather actually delayed the Work or portions thereof which had an effect upon the Contract time, the Contractor shall not be entitled to an extension of time.

Also the Contractor agrees that the calculation of the number of excessive inclement weather days shall be the number of days in excess of the five-year average for each month, in which precipitation exceeded one tenth (.10) inch, or in which the highest temperature was 32 degrees F or less as recorded at the approved weather station. Rain days from hurricanes and tropical storms not causing damage in the county in which the project is located shall be deemed inclement weather days.

If the total accumulated number of calendar days lost to excessive inclement weather, from the notice-to-proceed until the date established for Substantial Completion, exceeds the total accumulated number to be reasonably anticipated for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of calendar days lost. No extension of time will be made for days due to excessive inclement weather occurring after the date established for Substantial Completion. No change in Contract sum will be authorized because of adjustment of Contract time due to excessive inclement weather; and

8.3.4.2.4 Delays in the issuance of the building permit required for construction of the Project, acts of the public enemy, acts of the State, Federal or local government in its sovereign capacity, and acts of another Contractor in the performance of a Contract with the Owner relating to the Project.

8.3.5 If the Contractor shall neglect, fail or refuse to complete the Work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay the Owner the amount specified in the Contract, not as a penalty but as Liquidated Damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the Work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

8.3.6 The Contractor and the Subcontractors shall not be entitled to and hereby expressly waive any extension of time resulting from any condition or cause unless said Claim for extensions of time

is made in writing to the Owner within ten (10) days of the first instance of delay for all delays, except excessive inclement weather which shall be made in writing to the Owner within forty-five (45) days after the date established for Substantial Completion. Circumstances and activities leading to such Claim shall be indicated or referenced in a daily field inspection report for the day(s) affected. In every such written Claim, the Contractor shall provide the following information:

- 8.3.6.1 Nature of the delay;
 - 8.3.6.2 Date (or anticipated date) of commencement of delay;
 - 8.3.6.3 Activities on the progress schedule affected by the delay, and/or new activities created by the delay and their relationship with existing activities;
 - 8.3.6.4 Identification of person(s) or organization(s) or event(s) responsible for the delay;
 - 8.3.6.5 Anticipated extent of the delay; and
 - 8.3.6.6 Recommended action to avoid or minimize the delay.
- 8.3.7 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Section 2.2 shall be furnished, then no Claim for delay shall be allowed on account of failure to furnish such interpretations until twenty (20) days after request is made for them, and not then unless such Claim is reasonable.
- 8.3.8 No Claim by the Contractor for an extension of time for delays will be considered unless made in strict compliance with the requirements of this Article. All Claims not filed in accordance with this paragraph shall be waived by the Contractor.

8.4 RESPONSIBILITY FOR COMPLETION

- 8.4.1 The Contractor shall be responsible for completion in accordance with Paragraph 4.12.1.
- 8.4.2 The Owner may require the Contractor to submit a recovery schedule demonstrating his program and proposed plan to make up the lag in scheduled progress and to ensure completion of the Work within the Contract Time if the Project is behind schedule by four (4) or more days. If the Owner finds the proposed plan not acceptable, he may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are not satisfactory, the Owner may require the Contractor to take any of the actions set forth in Paragraph 4.12.2 without additional cost to the Owner, to make up the lag in scheduled progress.
- 8.4.3 Failure of the Contractor to substantially comply with the requirements of this Section 8.4 may be considered grounds for a determination by the Owner, pursuant to Section 14.3, that the Contractor is failing to prosecute the Work with sufficient diligence to ensure its completion within the Contract Time.

8.5 LIQUIDATED DAMAGES FOR DELAY

- 8.5.1 Owner and Contractor agree that the damages incurred by the Owner due to the Contractor's failure to achieve Substantial Completion by the date specified in the Supplemental Conditions for Substantial Completion, including any extensions thereof, shall be in the amounts set forth in the Supplemental Conditions, for each consecutive day beyond the date of Substantial

Completion that Contractor achieves Substantial Completion, and that the damages incurred by the Owner due to the Contractor's failure to achieve Final Completion by the date specified in the Supplemental Conditions for Final Completion, including any extensions thereof, shall be in the amount set forth in the Supplemental Conditions for each consecutive day beyond the date of Final Completion that Contractor achieves Final Completion. The Liquidated Damages are a reasonable estimate by Contractor and Owner of the damages to be suffered by Owner and are not to be construed as a penalty, it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly or that it would be unreasonably expensive for Owner to calculate its damages exactly.

- 8.5.2 The amount specified for Substantial Completion is the minimum measure of damages the Owner will sustain due to delay in the completion of the Work, which shall include, but not be limited to the loss of use of the facilities, the relocation of students and services, the cost of the Owner's time and resources, damage to the Owner's reputation, and storage of furniture and other materials. The amount specified for Final Completion is a reasonable and proper measure of the damages the Owner will sustain due to the delay in the completion of remedial work. This amount includes the disruption to the school and the learning environment, the cost of the Owners time and resources, damage to the Owner's reputation, and the inability to fully use the facilities. The inability of the Owner to quantify actual damages shall not prevent the recovery of Liquidated Damages.
- 8.5.3 Notwithstanding any other provisions of these General Conditions, if there is concurrent delay in the completion of the Work, the Contractor shall be liable for Liquidated Damages as specified in the General Conditions and Supplemental Conditions during such period of concurrent delay. For the purpose of this Paragraph, concurrent delay means (a) a delay event caused in part by the Owner or its agent and in part by the Contractor or its agents, Subcontractors or Sub-subcontractors, or (b) one or more delay event caused solely by the Owner, its agents, or the Design Consultant, and one or more delay event caused in part by the Contractor, its agents, Subcontractors or Sub-subcontractors, each of which would have resulted in a delay without the other and which delays run concurrently, or at the same time. In the event that the foregoing provision making the Contractor liable for Liquidated Damages during a period of concurrent delay is found to be unenforceable, then the parties agree that in the event of a concurrent delay, the extent of the delay will be apportioned between the Owner and the Contractor, and the Contractor will be responsible for Liquidated Damages as set forth in the General Conditions and Supplemental Conditions for those portions of the delay which are apportioned to the Contractor, its agent, Subcontractors, Sub-subcontractors, or Material Suppliers.
- 8.5.4 The provisions for Liquidated Damages do not bar or limit Owner's other rights and remedies against Contractor, for damages other than for failure to achieve the Substantial Completion date or the Final Completion date as required. The amount of Liquidated Damages set forth in Section 8.5 shall not include additional legal or design professional costs that may result from the Contractor's default. If such legal or design professional costs are incurred by the Owner, the Contractor shall be liable to the Owner for those costs in addition to the Liquidated Damages amount set forth in Section 8.5.
- 8.5.5 The Liquidated Damages assessed for failure to meet Substantial Completion by the specified date and the Liquidated Damages assessed for failure to meet Final Completion by the specified date shall be assessed cumulatively.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Owner a schedule of values allocated to the various portions of the Work and supported by such data to substantiate its accuracy as the Owner may require. This schedule, unless objected to by the Owner, shall be used as a basis for the Contractor's Applications for Payment and only for this purpose. If approved by the Owner, the Contractor may include in his schedule of values a line item for mobilization which shall include a reasonable amount of mobilization for the Contractor and his Subcontractors. The Contractor shall not front-end load his schedule of values.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Prior to the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Design Consultant an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Design Consultant and the Owner may require, including but not limited to the Contractor's certification that all work for which payment is requested has been completed in full in accordance with the Contract Documents, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. If requested by the Owner, the Contractor shall also certify that he has paid all due and payable amounts for which previous Applications for Payment were issued and payments received from the Owner, by providing waivers of liens for said payments.

9.3.1.1 The Contractor shall submit with the Application for Payment a list of those minority and Historically Underutilized Businesses (HUBs) Subcontractors whose work is included in the application and the amount due each. In addition, the minority and Historically Underutilized Business (HUBs) must itself perform satisfactory work or services or provide supplies under the Contract and not act as a mere conduit.

9.3.2 The Owner will withhold retainage from Contractor on all Applications for Payment to the maximum extent and in the maximum amount allowed by law (currently codified at N.C.G.S. 143-134.1) and in accordance with that statute or applicable successor statute. In the event that N.C.G.S 143-134.1 or applicable successor statute are not in effect or do not apply at the time the Contract is executed, Owner will retain five percent (5%) of the amount of each Application for Payment from the Contractor as retainage, until Contractor achieves Final Completion, whether or not the Owner has occupied any or all of the Project before such time. However, if the Owner, at any time after fifty percent (50%) of the Work has been completed, finds that satisfactory progress is being made, he may authorize payment to the Contractor in full of each Progress Payment for work performed beyond the fifty percent (50%) stage of completion. If a reduction in retainage has been made, the Owner may increase the retainage back to original percentage at any time if the Owner concludes that the Contractor is not progressing with the Work in a timely or satisfactory manner.

- 9.3.3 Payments may be made by the Owner, at its sole discretion, on account of materials or equipment not incorporated in the work but delivered and suitably stored at the site or in a bonded warehouse by the Contactor. Payments for materials or equipment stored shall only be considered upon submission by the Contractor of satisfactory evidence (for example, releases or paid invoices from the seller) that the Contractor has acquired title to such material, that it will be utilized on the work under this Contract and that it is satisfactorily stored, protected, and insured or that other procedures satisfactory to the Owner that will protect the Owner's interests have been taken. In the event the materials are stored in a bonded warehouse that is not located in the county of the project, the Contractor shall reimburse the travel cost and hourly billing expenses incurred by the Design Consultant for travel to view and assess whether the materials meet the requirements of the Contract Documents. Materials once paid for by the Owner become the property of the Owner and may not be removed from the work site or bonded warehouse, other than to be delivered from the warehouse to the site, without the Owner's written permission. Responsibility for such stored materials and equipment shall remain with the Contractor regardless of ownership.
- 9.3.3.1 Owner will not make payment to the Contractor on account of materials or equipment not incorporated in the Work but delivered and stored at the site if the Contractor, in his schedule of values, does not include line items for such delivered and stored materials or equipment.
- 9.3.3.2 It is specifically understood and agreed that an inspection and approval of the materials by the Owner, the Design Consultant or any agency retained by any of them shall not in any way subject the Owner to pay for the said materials or any portion thereof, even though incorporated in the Work, if said materials shall in fact turn out to be unfit to be used in the Work, nor shall such inspection be considered as any waiver of objection to the Work on account of the unsoundness or imperfection of the material used.
- 9.3.4 The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.
- 9.3.5 The Contractor shall submit with the Application for Payment a notarized Contractor's Sales Tax Report of N.C. State and County sales taxes paid during the payment period with respect to building materials, supplies, fixtures, and equipment that have become a part of, or annexed to, a building or structure erected, altered or repaired for the Owner. The Sales Tax Report shall include the vendor from whom the property was purchased, the dates and number of invoices covering the purchase, the total amount of the invoices of each vendor, the North Carolina State and County sales and use tax paid thereof, and the cost of the property withdrawn from the warehouse stock and North Carolina sales or use taxes paid thereof. Items that should not be included are: scaffolding, forms for concrete, fuel for operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals.
- 9.3.6 Unless an interest rate is required by law, Owner shall not pay any interest on an amount owed to Contractor. No interest shall accrue on amounts Owner is authorized by law or by the Contract to withhold or backcharge to Contractor.

9.4 CERTIFICATION OF PAYMENT

- 9.4.1 The Design Consultant will, after receipt of the Contractor's Application for Payment either issue a Certification of Payment to the Owner, with a copy to the Contractor, for such amount as the Design Consultant determines is properly due, or notify the Contractor in writing of their reasons for withholding a Certification as provided in Paragraph 9.6.1.
- 9.4.2 The submission and approval of the progress schedule and monthly updates thereof as required by the Contract Documents shall be an integral part and basic element of the application upon which progress payment shall be made. The Contractor shall be entitled to progress payments only as determined from the currently approved and updated schedule.
- 9.4.3 The signing of a Certification of Payment will constitute a representation by the Design Consultant to the Owner, based on their observations at the site pursuant to their agreements with the Owner, and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of their knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in their Certification); and that the Contractor is entitled to payment in the amount certified. However, by signing a Certification of Payment, the Design Consultant shall not thereby be deemed to represent that it has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that it has reviewed the construction means, methods, techniques, sequences, or procedures, or that it has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

- 9.5.1 After a Certification of Payment has been issued, the Owner shall make payment in the manner and within the time provided in the Contract Documents, unless Contractor is in breach of the Contract or otherwise owes the Owner, in which case Owner may withhold an appropriate amount.
- 9.5.2 The Contractor shall promptly pay each Subcontractor (including suppliers, laborers, and material-men) performing labor or furnishing material or equipment for the Work, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's work. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payments to his Sub-subcontractors in similar manner. The Owner may at any time require proof of payment to a Subcontractor or Sub-subcontractor for work paid by the Owner. Notwithstanding any other provision of the General Conditions, no Contractor, Subcontractor, Sub-subcontractor or Material Supplier shall have any Claim against the Owner, by virtue of the Contract, under any theory, including breach of contract, or third party beneficiary. The Owner shall not be in privity of any contract with any Subcontractor, Sub-subcontractor or Material Supplier pertaining to the Work, the Project and these General Conditions. Also, neither the Contractor, or any Subcontractor or Sub-subcontractor shall have any right to assert a lien on Owner's real property or on any funds held by Owner.

- 9.5.3 The Owner may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Design Consultant on account of work done by such Subcontractor.
- 9.5.4 Neither the Owner nor the Design Consultant shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.
- 9.5.5 No Certification for a progress payment, nor any progress payment or final payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.
- 9.5.6 The Contractor agrees to keep the Work and the site of the Project free and clear of all liens related to labor and materials furnished in connection with the Work. Furthermore, pursuant to and in compliance with requirements of Paragraph 9.3.4, the Contractor waives any right he may have to file any type of lien in connection with the Work. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien is filed or there is evidence to believe that any lien may be filed at any time during the progress of the Work or within the duration of this Contract, the Owner may refuse to make any payment otherwise due the Contractor or may withhold from any payment due the Contractor a sum sufficient in the opinion of the Owner to pay all obligations and expenses necessary to satisfy such lien or the underlying claim represented by such lien. The Owner may withhold such payment unless or until the Contractor, within ten (10) days after demand thereof by the Owner, shall furnish satisfactory evidence that the indebtedness and any lien in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien to be released of record pending the resolution of any dispute between the Contractor and the person or persons filing such lien. If the Contractor shall fail to furnish such satisfactory evidence within ten (10) days of the demand thereof, the Owner may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the Owner from any sum payable to the Contractor under the Contract Documents, including but not limited to final payment and retained percentage. This Paragraph 9.5.6 shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor. Notwithstanding any other provision of the Contract, nothing in the Contract shall affect the rights of Subcontractors, Sub-subcontractors, Material Suppliers and Vendors from enforcing any lien rights they have against parties other than the Owner.

9.6 PAYMENTS WITHHELD

- 9.6.1 The Design Consultant may decline to certify payment and may withhold their Certification of Payment in whole or in part, to the extent necessary to reasonably protect the Owner, if in the Design Consultant's opinion, it is unable to make representations to the Owner as provided in Paragraph 9.4.3. If the Design Consultant is unable to make representations to the Owner as provided in Paragraph 9.4.3 and to certify payment in the amount of the Application for Payment, it will notify the Contractor as provided in Paragraph 9.4.1. If the Contractor and the Design Consultant cannot agree on a revised amount, the Design Consultant will promptly issue a Certification of Payment for the amount for which it is able to make such representations to the Owner. The Design Consultant may also decline to certify payment because of subsequently discovered evidence or subsequent observations that may nullify the whole or any part of any Certification of Payment previously issued to such extent as may be necessary in its opinion to protect the Owner from loss, because of:

1. Defective Work not remedied,

2. Third party claims filed, whether in court, in arbitration or otherwise, or reasonable evidence indicating probable filing of such claims,
3. Failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment,
4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum,
5. Damage to the Owner or another contractor,
6. Reasonable evidence that Contractor will not achieve Substantial Completion and/or Final Completion by the dates specified in the Supplemental Conditions.
7. Failure or refusal of the Contractor to carry out the Work in accordance with or to otherwise substantially or materially comply with the Contract Documents,
8. Liens filed or reasonable evidence that a lien may be filed for any portion of the Work,
9. Failure or refusal of the Contractor to properly schedule and coordinate the Work, to provide progress schedules, reports and updates, or to provide and adhere to a recovery schedule as required by the Contract Documents,
10. Failure or refusal of the Contractor to fully comply with the provisions of Section 6.2 requiring the Contractor to direct certain Claims to Separate Contractors and to defend and indemnify the Owner and/or the Design Consultant in the event Separate Contractors file certain Claims,
11. Failure or refusal of the Contractor to submit the required information on minority and Historically Underutilized Businesses (HUBs),
12. Failure or refusal of the Contractor to submit a notarized North Carolina State and County Sales Tax Report,
13. Any other breach of the Contract by Contractor which has or is likely to cause monetary damages or loss to Owner, or
14. Any other reason authorized by the Contract Documents or by law.

9.6.2 When the above grounds in Paragraph 9.6.1 are removed to the Design Consultant's and Owner's satisfaction, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

9.7.1 If the Owner does not make payment to the Contractor within the forty-five (45) calendar days after receipt of the Contractor's approved Application for Payment from the Design Consultant through no fault of the Contractor, and the Owner otherwise not being entitled under the Contract Documents or applicable law to withhold payment, then the Contractor may, upon seven (7) additional days' Notice to the Owner, stop the Work until payment of the amount owed according to the Contract Documents has been received. In such event, the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order as provided herein.

9.8 SUBSTANTIAL COMPLETION

- 9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Paragraph 8.1.3, the Contractor shall prepare for submission to the Owner a list of items which in his opinion are to be completed or corrected and shall request in writing that the Design Consultant and the Owner perform a Substantial Completion inspection. The Design Consultant and the Owner shall review the Contractor's list and shall compile a punch list of items to be corrected and completed. The failure to include any items on such list does not alter the responsibility of the Contractor to complete the Work in accordance with the Contract Documents. When the Design Consultant and the Owner on the basis of an inspection jointly determine that the Work or designated portion thereof is substantially complete, they will then prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.
- 9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Design Consultant, the Owner shall make payment, except retainage held pursuant to Paragraph 9.3.2, for such work or portion thereof, as provided in the Contract Documents unless Contractor is in breach of the Contract in which case Owner may withhold an appropriate amount.
- 9.8.3 The acceptance of Substantial Completion payment shall constitute a waiver of all Claims by the Contractor and its Subcontractors and Sub-subcontractors except those previously made in writing and identified by the Contractor as unsettled at the time the Contractor submits the Application for Payment for Substantial Completion, and except for the retainage sums due at Final Completion. The Contractor shall indemnify and hold the Owner harmless against any Claims by its Subcontractors and Sub-subcontractors that are waived because they were not made in writing and identified by the Contractor as unsettled when the Contractor submitted the Application for Payment for Substantial Completion.
- 9.8.4 The Owner shall have the option to correct or conclude any and all punch list items not completed by the Contractor to the satisfaction of the Design Consultant and the Owner within thirty (30) days from the actual date of Substantial Completion by utilizing its own forces or by hiring others. The cost of such correction of remaining punch list items by the Owner or others shall be deducted from the final payment to the Contractor. If Contractor does not complete certain punch list items within this time period, specified in Paragraph 9.8.4, all warranties and guarantees for such incomplete punch list items shall become effective upon issuance of final payment for the Project. Paragraph 9.8.4 does not limit the Liquidated Damages provisions related to failure to reach Final Completion by the date stipulated in the Contract Documents.
- 9.8.5 The issuance of the Certificate of Substantial Completion does not indicate final acceptance of the Project by the Owner, and the Contractor is not relieved of any responsibility for the Project except as specifically stated in the Certificate of Substantial Completion.
- 9.8.6 Should the Design Consultant and the Owner determine that the Work or a designated portion

thereof is not substantially complete, they shall inform the Contractor in writing stating why the Project or designated portion is not substantially complete. The Contractor shall expeditiously complete the Work and shall re-request in writing that the Design Consultant and the Owner perform a Substantial Completion inspection. Costs, if any, associated with such inspection shall be assessed to the Contractor.

9.8.7 Certificate of Substantial Completion will not be issued until the following is completed by Contractor:

1. Submit Contractor's list of work not yet complete with proposed time for completion signed by Contractor's project superintendent;
2. Submit Certificate of Occupancy;
3. Submit record drawings, maintenance manuals, final project photos, property surveys;
4. Deliver tools, spare parts, extra stock and similar items;
5. Submit warranties, bonds, maintenance agreements and final certifications;
6. Complete start-up testing of all systems and instruction of the Owner's personnel;
7. Coordinate and complete final changeover of permanent locks and transmit keys to Owner;
8. Discontinue and remove temporary facilities from the site;
9. Complete final cleaning;
10. Advise the Owner of pending insurance changeover requirements;
11. Coordinate and complete changeover of security, telephone, cable and other services; and
12. Submit pay application showing 100% complete for work claimed to be substantially complete.

9.8.8 The Contractor acknowledges that the Design Consultant and its consultants are only required to conduct up to two (2) comprehensive substantial completion inspections as part of its basic services. If more than two (2) substantial completion inspections are required through no fault of the Design Consultant, the cost of the additional inspections shall be paid by the Contractor directly to the Design Consultant at the rate of \$150 per hour.

9.9 FINAL COMPLETION AND FINAL PAYMENT

9.9.1 Upon receipt of the documentation required by Section 9.8, and of written Notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Consultant and the Owner will promptly make such inspection and, when they find the Work acceptable under the Contract Documents and the Contract fully performed, the Design Consultant shall issue a final Certification of Payment stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents. The final Certification of Payment will constitute that the conditions precedent to the Contractor's being entitled to final payment as set forth in Section 9.8 have been

fulfilled. Payment shall be made to the Contractor in the amount certified by the Design Consultant within forty-five (45) calendar days after receipt by the Owner of the final Certification of Payment except for any Work for which the Owner is entitled a credit under the Contract Documents.

9.9.1.1 The Contractor acknowledges that the Design Consultant and its consultants are only required to conduct up to two (2) comprehensive final completion inspections as part of its basic services. If more than two (2) final completion inspections are required through no fault of the Design Consultant, the cost of the additional inspections shall be paid by the Contractor directly to the Design Consultant at the rate of \$150 per hour.

9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Work is free and clear of any and all liens and the Contractor submits to the Owner:

1. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied;
2. Consent of Surety to final payment;
3. If required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner; and
4. A written certification that:
 - a. The Contractor has reviewed the requirements of the Contract Documents,
 - b. The Work has been inspected by the Contractor for compliance with all requirements of the Contract Documents,
 - c. Pursuant to this inspection, the Contractor certifies and represents that the Work complies in all respects with the requirements of the Contract Documents,
 - d. The Contractor further certifies and represents that all equipment and systems have been installed in accordance with the Contract Documents and have been tested in accordance with the Specification requirements and are operational, and
 - e. The Contractor hereby certifies and represents that the Work is complete in all respects and ready for final inspection.

9.9.3 If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any loss. If any such lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien or claims, including all costs and reasonable attorney's fees. The Owner may withhold from the final payment any sum that the Owner has reason to believe may be needed to satisfy any lien, claim or threat of lien arising from the Work. The Owner may deduct from the final payment an amount equal to any costs, expenses and attorney's fees incurred by the Owner in removing or discharging any liens or claim arising from the Work.

- 9.9.4 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting Final Completion, and the Owner so confirms, the Owner shall, upon application by the Contractor and certification by the Design Consultant, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for the portion of the Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Section 7.4, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Design Consultant prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.
- 9.9.5 The making of final payment shall constitute a waiver of all Claims by the Owner against the Contractor except those arising from:
1. Unsettled liens, and claims against the Owner or the Design Consultant, or their employees, agents, or representatives;
 2. Faulty, defective or non-conforming Work;
 3. Failure of the Work to comply with the requirements of the Contract Documents;
 4. Terms of any warranties contained in or required by the Contract Documents;
 5. Damages incurred by the Owner resulting from lawsuits brought against the Owner, the Design Consultant, or their agents, employees or representatives because of failures or actions on the part of the Contractor, his Subcontractors, Sub-subcontractors, or any of their employees, agents or representatives;
 6. Fraud or bad faith committed by the Contractor or any Subcontractor or supplier during performance of the Work but discovered by Owner after final payment; or
 7. Claims about which Owner did not have actual knowledge or which increase in scope or amount at the time of final payment.
- 9.9.6 The acceptance of final payment 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 the final Application for Payment.
- 9.9.6.1 Notwithstanding any other provision of the Contract, Owner may withhold from Contractor payment otherwise due, as a result of any losses, expenses costs or damages suffered or anticipated to be suffered by Owner as a result of Contractor's breach of any provision of the Contract, including but not limited to Liquidated Damages or backcharges against Contractor.
- 9.10 **OWNER'S RIGHT TO OCCUPY INCOMPLETE WORK**
- 9.10.1 Should the Project, or any portion thereof, be incomplete for Substantial or Final Completion at the scheduled date or dates, the Owner shall have the right to occupy any portion of the Project. In such an event, the Contractor shall not be entitled to any extra compensation on account of said occupancy by the Owner or by the Owner's use of the Project, nor shall the Contractor interfere in any way with said use of the Project. Further, in such an event, the Contractor shall not be entitled to any extra compensation on account of the Owner's occupancy and use of the

Project, nor shall the Contractor be relieved of any responsibilities of the Contract including the required times of completion. Such occupancy by the Owner shall not, in itself, constitute Substantial or Final Completion.

- 9.10.2 If the Owner exercises his rights under the foregoing and occupies the full Project, then there shall be no Liquidated Damages on account of failure on the Contractor's part to reach Substantial Completion from that date forward. This provision does not affect, however, any Liquidated Damages that would be assessed for any period of time between the contractual date of Substantial Completion and the date of any such occupancy. Further, this provision would have no effect on Liquidated Damages assessed on account of late Final Completion.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

- 10.1.1 The Owner, the Design Consultant, or their agents, employees or representatives are not responsible for the means, methods, techniques, sequences or procedures utilized by the Contractor, or for safety precautions and programs in connection with the Work. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall be responsible for any and all citations, assessments, fines penalties and delays in the performance of any work on the project incurred by reason of failure or failure on the part of its agents, employees, assignees or subcontractors to so comply with any program requirement. This requirement applies continuously throughout the Contract performance, until final payment is made and all punch list and warranty work is performed properly, and is not limited to regular working hours.

10.2 SAFETY OF PERSONS AND PROPERTY

- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:
1. All employees on the Work and all other persons who may be affected thereby;
 2. All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors, machinery, equipment and all hazards shall be guarded or eliminated in accordance with all applicable safety regulations; and
 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and overhead or underground utilities not designated for removal, relocation or replacement in the course of construction.
- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, permits, rules, regulations and lawful orders of any public authority bearing on the safety or persons or property or their protection from damage, injury or loss.
- 10.2.2.1 The Contractor shall at all times safely guard the Owner's property from injury or losses in connection with the Contract. He shall at all times safely guard and protect his own work and adjacent property as provided by law and the Contract Documents, from damage. All passageways, guard fences, lights and other facilities required for protection by applicable safety

regulations must be provided and maintained.

- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.
- 10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel, after ensuring proper approvals by any regulatory agency having jurisdiction have been received.
- 10.2.5 The Contractor shall promptly remedy at his own cost and expense all damage or loss to any property referred to in Subparagraphs 10.2.1.2 and 10.2.1.3 caused by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Subparagraphs 10.2.1.2 and 10.2.1.3, except damage or loss attributable solely to the acts or omissions of the Owner or Design Consultant or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Section 4.21. The Contractor shall perform such restoration by underpinning, repairing, rebuilding, replanting, or otherwise restoring as may be required or directed by the Owner, or shall make good such damage in a satisfactory and acceptable manner. In case of failure on the part of the Contractor to promptly restore such property or make good such damage, the Owner may, upon two (2) calendar days Notice, proceed to repair, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgment of the Owner to reimburse the owners of property so damaged, will be deducted from any monies due or to become due the Contractor under the Contract.
- 10.2.6 The Contractor is responsible for the proper packing, shipping, handling and storage (including but not limited to shipment or storage at the proper temperature and humidity) of materials to be incorporated in the Work, so as to insure the preservation of the quality and fitness of the material for proper installation and incorporation in the Work, as required by the Contract Documents. For example, but not by way of limitation, Contractor shall, when necessary, place material on wooden platforms or other hard and clean surfaces and not on the ground and/or place such material under cover in any appropriate shelter or facility. Stored materials or equipment shall be located so as to facilitate proper inspection. Material and equipment which is delivered crated shall remain crated until ready for installation. Lawns, grass plots or other private property shall not be used for storage purposes without the written permission of the Owner or lessee unless otherwise within the terms of the easements obtained by the Owner.
- 10.2.6.1 It shall be the responsibility of the Contractor in his preparation of phasing schedule of work operations after consulting with the other Prime Contractors to designate areas in which each Prime Contractor may store materials. Areas designed shall meet with the approval of the Design Consultant.
- 10.2.7 The Contractor shall give notice in writing at least forty eight (48) hours before breaking ground, to all persons, public utility companies, owners of property having structures or improvements in proximity to site of the Work, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by the Contractor's operation, in order that they may remove

any obstruction for which they are responsible and have representative on site to see that their property is properly protected. Such notice does not relieve the Contractor of responsibility for all damages, claims, or defense or indemnification of all actions against Owner resulting from performance of such work in connection with or arising out of Contract.

- 10.2.8 The Contractor shall investigate, locate, mark and protect all utilities encountered or to be encountered while performing the Work, whether indicated on the Drawings or not. The Contractor shall maintain utilities in service until moved or abandoned. The Contractor shall exercise due care when excavating around utilities and shall restore any damaged utilities to the same condition or better as existed prior to starting the Work, at no cost to the Owner. The Contractor shall maintain operating utilities or other services, even if they are shown to be abandoned on the Contract Drawings, in service until new facilities are provided, tested and ready for use.
- 10.2.9 The Contractor shall return all improvements on or about the site and adjacent property which are not shown to be altered, removed or otherwise changed to conditions which existed prior to starting the Work. The Contractor shall video record all areas or otherwise document the conditions existing at the site and in and around existing buildings prior to starting the Work. Submit documentation to the Design Consultant prior to beginning the Work.
- 10.2.10 The Contractor shall protect the Work, including but not limited to, the site, stored materials and equipment, excavations, and excavated or stockpiled soil or other material, intended for use in the Work, and shall take all necessary precautions to prevent or minimize damage to same or detrimental effect upon his performance or that of his Subcontractors, caused by or due to rain, snow, ice, run-off, floods, temperature, wind, dust, sand and flying debris; for example, but not by way of limitation, Contractor shall, when necessary, utilize temporary dikes, channels or pumping to carry-off divert or drain water, and shall as necessary tie-down or otherwise secure the Work and employ appropriate covers and screens.
- 10.2.11 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents and the protection of material, equipment and property. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner.
- 10.2.12 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.
- 10.2.13 Notification to the Contractor by the Owner or the Design Consultant of a safety violation will in no way relieve the Contractor of sole and complete responsibility for the correctness of said violation or of sole liability for the consequences of said violation.
- 10.2.14 Contractor acknowledges that if he will be performing the work on an actively operative, elementary or secondary school site, that a construction site might be an 'attractive nuisance' which might draw children to said site and contractor agrees that it will take reasonable precautions necessary to prevent children from entering the construction site or an area where materials are stored.
- 10.3 EMERGENCIES
- 10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. The Contractor shall notify the Owner of the situation and all actions taken immediately thereafter. If, in the opinion of the Contractor,

immediate action is not required, the Contractor shall notify the Owner of the emergency situation and proceed in accordance with the Owner's instructions. Provided, however, if any loss, damage, injury or death occurs that could have been prevented by the Contractor's prompt and immediate action, the Contractor shall be fully liable for all costs, damages, claims, actions, suits, attorney's fees and all other expenses arising therefrom or relating thereto.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain in companies properly licensed by the Insurance Department of the State of North Carolina and acceptable to the Owner such insurance as will protect him, the Owner, and the Owner's agents, representatives, and employees from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts (with Workmen's Compensation and Employer's Liability Insurance in amounts not less than those necessary to meet the statutory requirements of the state(s) having jurisdiction over any portion of the Work);
- .2 Claims for damages because of bodily injury, sickness or disease, or death of his employees; the Contractor will require his Subcontractors to similarly provide Workmen's Compensation Insurance for all of the latter's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and
- .6 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

11.1.2 The insurance required by Paragraph 11.1.1 shall be primary and non-contributing to any insurance possessed or procured by the Owner, and limits of liability shall be not less than those set forth in these General Conditions of the Contract or required by law, whichever is greater.

11.1.3 The insurance required by the Contract shall include contractual liability insurance applicable to the Contractor's obligations under the Contract

11.1.4 Without limiting the above during the term of the Contract, the Contractor and each Subcontractor shall, at their own expense, purchase and maintain the following insurance with companies properly licensed by the Insurance Department of the State of North Carolina and satisfactory to the Owner.

1. Worker's Compensation including Occupational Disease and Employer's Liability Insurance.
 - a. Statutory - Amount and coverage as required by State of North Carolina Worker's Compensation laws.
 - b. Employer's Liability
 - \$1,000,000 Each Accident
 - \$1,000,000 Policy Limit
 - \$1,000,000 Each Employee
2. Commercial General Liability (Occurrence Form) - The Contractor shall provide during the life of the Contract such Commercial General Liability (Occurrence Form) Insurance as shall protect him and any Subcontractor performing work under the Contract from claims for damages for Bodily Injury including accidental death, as well as from claims for Property Damage which may arise from operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by either of them. This insurance shall be on the Standard Insurance Services Office, Inc. (ISO) Commercial Liability Occurrence Form or other form reasonable acceptable to Owner. The Contractor shall procure insurance coverage for direct operations, sublet work, elevators, contractual liability and completed operations with limits not less than those stated below:
 - a. A Combined Single Limit for Bodily Injury, Property Damage and Personal Injury of:
 - Limits of Insurance
 - \$2,000,000 General Aggregate (except Products – Completed Operations) Limit
 - \$2,000,000 Products – Completed Operations Aggregate Limit
 - \$1,000,000 Personal and Advertising Injury Limit
 - \$1,000,000 Each Occurrence Limit
3. Property Damages, including Broad Form Property Damage and Explosion, Collapse, Underground property damage coverages, and blasting, where necessary;
4. Completed Operations Liability: Continuous coverage in force for one year after completion of the Work;
5. Commercial Automobile Insurance, including coverage for owned, non-owned and hired vehicles - with limits not less than those stated below:
 - a. A Combined Single Limit for Bodily Injury and Property Damage of \$1,000,000.
6. Umbrella Liability Insurance: Policy to "pay on behalf of the Insured"
 - Limits of Liability:
 - a. Contract Amount: \$1,000,000-\$2,000,000:
Requires Umbrella Liability Insurance Limit of \$1,000,000.
 - b. Contract Amount: \$2,000,000 and above:
Requires Umbrella Liability Insurance Limit of \$2,000,000.

- 11.1.5 The insurance required by Section 11.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater.
- 11.1.6 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least thirty (30) days' prior written Notice has been given to the Owner. Failure to provide such Notice shall not limit the liability of the Insurer, its agents or representatives.
- 11.1.7 All insurance policies required in this Article, except Worker's Compensation and Commercial Automobile, shall name the Owner as additional named insured for the insurance.
- 11.1.8 The Contractor shall not commence the Work under the Contract until he has obtained all the insurance required hereunder and such insurance has been approved by the Owner, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder.
- 11.1.9 The Commercial General Liability and Workers Compensation Policies provided by the Contractor shall have endorsements waiving subrogation against the Owner.

11.2 PROPERTY INSURANCE

- 11.2.1 The Contractor shall purchase and at all times maintain such insurance as will protect the Contractor, the Owner, Subcontractors and Sub-subcontractors from loss or damage to the Work or property in the course of construction, including all machinery, materials and supplies on the premises or in transit thereto and intended to become a part of the finished Work until Final Completion. This insurance shall be in the form of "Builders Risk Covered Cause of Loss Form", or equivalent form, to include but not limited to theft, collapse, earth movement, flood, and portions of the Work stored on site, off site and in transit. Any deductible provision in such insurance shall not exceed ten thousand dollars (\$10,000). Notwithstanding any such deductible provision, the Contractor shall remain solely liable for the full amount of any item covered by such insurance. Such insurance shall be in the initial Contract Sum and shall be increased at Contractor's expense in the amount of all additions to the Contract Sum. Such insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.
- 11.2.2 Any loss insured under Paragraph 11.2.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of Paragraph 11.2.4. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.
- 11.2.3 The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent their Claims are covered by insurance obtained pursuant to this Section 11.2, or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance. The Contractor shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Owner and the Contractor by Subcontractors and Sub-subcontractors. With respect to the waiver of rights of recovery, the term Owner shall be deemed to include, to the extent covered by property insurance applicable thereto, his consultants, employees, and agents and representatives. The

Contractor waives as against any Separate Contractor described in Article 6, all rights for damages caused by fire or other perils in the same manner as is provided above as against the Owner. The Owner shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Contractor by any Separate Contractor and his subcontractors and sub-subcontractors.

11.2.4 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) days after the occurrence of loss to the Owner's exercise of this power, and if such objection is made, the matter shall be decided by a court of competent jurisdiction or as the parties in interest otherwise agree. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the orders of the court or as otherwise agreed by the parties in interest.

11.2.5 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be canceled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

11.2.6 The Contractor bears the risk of loss or damage to the Work, the Project, materials stored on site or off site, and Owner's improvements and property under Contractor's control, both during construction and prior to Substantial Completion.

11.3 EFFECT OF SUBMISSION OF CERTIFICATES

11.3.1 The Owner shall be under no obligation to review any Certificates of Insurance provided by the Contractor or to check or verify the Contractor's compliance with any and all requirements regarding insurance imposed by the Contract Documents. The Contractor is fully liable for the amounts and types of insurance required herein and is not excused should any policy or certificate of insurance provided by the Contractor not comply with any and all requirements regarding insurance imposed by the Contract Documents.

11.4 FAILURE OF COMPLIANCE

11.4.1 Should the Contractor fail to provide and maintain in force any and all insurance, or insurance coverage required by the Contract Documents or by law, or should a dispute arise between Owner and any insurance company of Contractor over policy coverage or limits of liability as required herein, the Owner shall be entitled to recover from the Contractor all amounts payable, as a matter of law, to Owner or any other parties, had the required insurance or insurance coverage been in force. Said recovery shall include, but is not limited to interest for the loss of use of such amounts of money, plus all attorney's fees, costs and expenses incurred in securing such determination and any other consequential damages arising out of the failure of the Contractor or insurance company to comply with the provisions of the Contract Documents, or any policy required hereby, or any other requirements regarding insurance imposed by law. Nothing herein shall limit any damages for which Contractor is responsible as a matter of law.

11.5 OWNER'S INSURANCE

11.5.1 Property Insurance: The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

11.5.2 Commercial Public Liability Insurance: The Owner, at his option, may purchase and maintain insurance which will insure and protect him against claims involving bodily injury and property damage to the public. The Owner does not request his insurer to waive any right of subrogation against the Contractor from claims under this coverage.

11.6 LICENSED INSURANCE COMPANIES

11.6.1 All insurance companies providing the above insurance shall be licensed by the Insurance Department of the State of North Carolina and have a minimum AM Best "A" rating or similar rating from another rating agency reasonably acceptable to Owner.

ARTICLE 12

CHANGES IN THE WORK

12.1 GENERAL PROVISIONS RELATED TO CHANGES

12.1.1 A Construction Change Directive is a document issued pursuant to this Paragraph 12.1.1. The Owner may, at any time, without the agreement of the Contractor, by written order signed by the Owner and Design Consultant designated or indicated to be a Construction Change Directive, make any Changes in the Work or add to or subtract from the Work within the general scope of the Contract. A Change in the Work is defined as changes within the general scope of the Contract, including, but not limited to changes:

1. In the Specifications or Drawings;
2. In the sequence, method or manner of performance of the Work;
3. In the Owner-furnished facilities, equipment, materials, services or site; or
4. Directing acceleration in the performance of the Work.

12.1.2 A Change Order is a document executed pursuant to this Paragraph 12.1.2. The Owner and Contractor may agree to Changes in the Work, the Contract Sum, the Contract Time and any other change in the Contract by written agreement signed by Owner, Contractor and Design Consultant designated or indicated to be a Change Order. If the Contractor, subsequent to the issuance of a Construction Change Directive, agrees to its terms including any applicable adjustment to the Contract Sum and Contract Time, Contractor shall sign it and it shall become a Change Order.

12.1.3 The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the Proposal is based and to which the parties have agreed pursuant to the provisions of Article 12, and which the Contractor, its Subcontractors or Sub-subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all Changes in the Work performed pursuant to this Article 12, unless the delay is caused solely by the Owner or its agent. It is understood and agreed that the Contractor's sole and exclusive remedy in the event the delay is caused solely by the Owner or its agent shall be recovery of his direct costs as compensable hereunder and an extension of the

Contract Time, but only in accordance with the provisions of the Contract Documents. The phrase "Owner or its agent" as used in the Contract, does not include the Prime Contractors or their Subcontractors.

- 12.1.4 No Claim by the Contractor shall be allowed if asserted after final payment under this Contract. No Claim relating to or flowing from a particular change shall be allowed after execution of the Change Order relating to that change or commencement of the change by the Contractor except as specifically provided in Paragraph 12.2.4.
- 12.1.5 If any dispute should arise between the parties with respect to an increase or decrease in the Contract Sum or an expansion or contraction in the Contract Time as a result of a Change in the Work, the Contractor shall not suspend performance of a Change in the Work or the Work itself unless otherwise so ordered by the Owner in writing. The Owner shall, however, pay to the Contractor up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work will result in an increase in the Contract Sum; and the Owner shall have the right to withhold payment from the Contractor in an amount up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work will result in a decrease in the Contract Sum.
- 12.1.6 No Change in the Work shall be performed without a fully executed Change Order to the Contract a fully executed Construction Change Directive or other Modification to the Contract.
- 12.1.7 If the Contractor intends to assert a Claim under this Article, he must, within ten (10) days after receipt of a Construction Change Directive, Notify the Owner by written statement setting forth the specific nature and cost of such Claim, unless this period is extended by the Owner. The statement of Claim shall include all direct, indirect and impact costs associated with the change, as well as the Contractor's estimate of the schedule impact of the change, if any. The Contractor and its Subcontractors shall not be entitled to reimbursement for any Claims that are not submitted in strict conformance with the Contract. The Contractor shall indemnify and hold the Owner harmless against any Claims by Subcontractors that are waived because they are not submitted in strict conformance with the Contract.
- 12.2 OWNER DIRECTED CHANGES REQUIRING AN INCREASE IN CONTRACT SUM.
(For decreases in Contract Sum, refer to Section 12.6)
- 12.2.1 If the Change in the Work will result in an increase in the Contract Sum, the Owner shall have the right to require the performance thereof on a lump sum basis, a unit price basis or a time and material basis, all as hereinafter more particularly described (the right of the Owner as aforesaid shall apply with respect to each such Change in the Work).

If the Owner elects to have the Change in the Work performed on a lump sum basis, its election shall be based on a lump sum Proposal which shall be submitted by the Contractor to the Owner within ten (10) days of the Contractor's receipt of a request therefore (but the Owner's request for a lump sum Proposal shall not be deemed an election by the Owner to have the Change in the Work performed on a lump sum basis). The Contractor's Proposal shall be itemized and segregated by labor and materials for the various components of the Change in the Work (no aggregate labor total will be acceptable) and shall be accompanied by signed Proposals of any Subcontractors who will perform any portion of the Change in the Work and of any persons who will furnish materials or equipment for incorporation therein. The Proposal shall also include the Contractor's estimate of the time required to perform said changes. The Contractor shall provide any documentation that may be requested by the Owner or Design Consultant to support the change proposal, including but not limited to payroll records, insurance rates, material

quotes, and rental quotes.

The portion of the Proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of job site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they will be so involved), plus payroll costs (including premium costs of overtime time, if overtime is anticipated, Social Security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead and profit for the Contractor or any such Subcontractor, as applicable (said overhead and profit to include all supervision except foremen). Payroll costs are limited to 39% of the net pay of the worker.

The portion of the Proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales and use taxes and up to fifteen percent (15%) of said direct material costs as overhead and profit for the Contractor or any such Subcontractor (said overhead and profit to include all small tools), and may further include the Contractor's and any of its Subcontractor's reasonably anticipated rental costs in connection with the Change in the Work (either actual or discounted local published rates), plus up to eight percent (8%) thereof as overhead and profit for the Contractor or any such Subcontractors, as applicable. The Contractor shall provide an itemized breakdown of all transportation and shipping costs, including receipts documenting the expenses. Notwithstanding the above, overhead and profit shall not be applied to any sales tax paid for any purpose or to any transportation or shipping costs incurred by the Contractor or any subcontractor. If any of the items included in the lump sum Proposal are covered by unit prices contained in the Contract Documents, the Owner may, if it requires the Change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum Proposal, in which event an appropriate deduction will be made in the lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

The lump sum Proposal may include up to eight percent (8%) of the amount which the Contractor will pay to any of its Subcontractors for Changes in the Work as overhead and profit for the Contractor. The Contractor shall not be reimbursed for the costs of the Subcontractors' Payment and Performance Bonds, as such bonding is not required by the Owner.

12.2.2 In the event that the Contractor fails to submit his Proposal within the designated period, the Owner may order the Contractor to proceed with the Change to the Work and the Contractor shall so proceed. The Owner shall unilaterally determine the reasonable cost and time to perform the Work in question, which determination shall be final and binding upon the Contractor. The Contractor may dispute such action in accordance with the Article 15.

12.2.3 In the event that the parties are unable to agree as to the reasonable cost and time to perform the Change in the Work based upon the Contractor's Proposal and the Owner does not elect to have the Change in the Work performed on a time and material basis, the Owner may choose to make a determination of the reasonable cost and time to perform the Change in the Work, based upon its own estimates, the Contractor's submission or a combination thereof. A Construction Change Directive shall be issued in this case for the amounts of cost and time determined by the Owner and shall become final and binding upon the Contractor, subject to Contractor's right to dispute such action in accordance with Article 15. Owner has the right to direct by Construction Change Directive a Change in the Work, which is the subject of such Change Order. Failure of the

parties to reach agreement regarding the cost and time of the performing the Construction Change Directive, shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously.

12.2.3.1 The Owner reserves the right to reject the Contractor's Proposal for a Change in the Work and to elect to perform said Work using a Separate Contractor. Under such circumstances, all provisions of Article 6 shall be in force.

12.2.4 If the Owner elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractors, at actual cost to the entity performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendence of any nature whatsoever, including foremen, or the cost, use or rental of tools or plant), plus fifteen percent (15%) thereof as the total overhead and profit (except that said fifteen percent (15%) shall not be applied against any payroll costs, as set forth in Paragraph 12.2.1.) The Contractor shall submit to the Owner daily time and material tickets, on a daily basis to include the identification number assigned to the Change in the Work, the location and description of the Change in the Work, the classification of labor employed (and names and social security numbers), the materials used, the equipment rented (not tools) and such other evidence of cost as the Owner may require. The Owner may require authentication of all time and material tickets and invoices by persons designated by the Owner for such purpose. The failure of the Contractor to secure any required authentication shall, if the Owner elects to treat it as such, constitute a waiver by the Contractor of any Claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the Owner shall not constitute an acknowledgment by the Owner that the items thereon were reasonably required for the Change in the Work.

12.2.5 No overhead and profit will be paid by the Owner on account of a Change in the Work except as specifically provided in Section 12.2. Overhead and profit, as allowed under Section 12.2, shall be deemed to include all costs and expenses which the Contractor or any of its Subcontractors may incur in the performance of a Change in the Work and which are not otherwise specifically recoverable by them pursuant to Section 12.2.

12.3 CONTRACTOR NOTICE OF CHANGE

12.3.1 If the Contractor or any of its Subcontractors asserts that any event or occurrence has caused a Change in the Work which change causes an increase or decrease in the Contractor's or its Subcontractors cost or the time required for the performance of any part of the Work under the Contract, including Work not affected directly by the change, the Contractor shall, within ten (10) days of such event, give the Owner written Notice as herein required. Said Notice shall include the instructions or circumstances that are the basis of the Claim and the Contractor's best estimate of the cost and time involved.

12.4 MINOR CHANGES IN THE WORK

12.4.1 The Owner shall have authority to order minor Changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

12.4.2 The Contractor shall not perform any Changes in the Work unless authorized in writing by the Design Consultant or Owner.

12.5 DIFFERING SITE CONDITIONS

12.5.1 Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications or differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, or different from that shown on surveys or tests provided in the bid materials at the time the Owner solicited bids from the construction of the Project, he shall immediately give Notice to the Owner of such conditions before they are disturbed. The Owner and the Design Consultant shall thereupon promptly investigate the conditions and if they find that they materially differ from those shown on the Drawings or indicated in the Specifications, they shall at once make such changes in the Drawings and/or Specifications as they may find necessary. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. However, neither the Owner nor the Design Consultant shall be liable or responsible for additional work, costs or Changes to the Work due to material differences between actual conditions and any geotechnical, soils and other reports, surveys and analyses made available for the Contractor's review at the time the Owner solicited bids for the construction of the Project.

12.6 OWNER DIRECTED CHANGES REQUIRING A DECREASE IN CONTRACT SUM.

12.6.1 If the Change in the Work will result in a decrease in the Contract Sum, the Owner may request a quotation by the Contractor of the amount of such decrease. The following provisions shall apply:

The portion of the Proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, shall include reasonably anticipated gross wages of job site labor, including foremen, who would have been directly involved in the Work that has been deleted from the Contract, (for such time as they would have been so involved), plus payroll costs (including premium costs of overtime time, if overtime was anticipated, Social Security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and seven percent (7%) of such anticipated gross wages, but not payroll costs, as overhead and profit not incurred or earned by the Contractor or any such Subcontractor, as applicable (said overhead and profit to include all supervision except foremen).

The portion of the Proposal relating to materials shall include the reasonably anticipated direct costs which would have been incurred by the Contractor or to any of its Subcontractors of materials which would have been purchased for incorporation in the Work but which has been deleted from the Contract, plus transportation and applicable sales and use taxes which will be avoided and seven percent (7%) of said direct material costs as overhead and profit not incurred or earned by the Contractor or any such Subcontractor (said overhead and profit to include all small tools), and shall further include the Contractor's and any of its Subcontractor's reasonably anticipated rental costs which will be avoided (either actual or discounted local published rates), plus five percent (5%) thereof as overhead and profit not incurred or earned by the Contractor or any such Subcontractors, as applicable. If any of the items included in the lump sum Proposal are covered by unit prices contained in the Contract Documents, the Owner may elect to use these unit prices in determining the amount of reduction to the Contract Sum as a result of a deletion of Work from the Contract. No overhead and profit shall be applied to any unit prices for purposes of calculation such reduction in the Contract Sum.

The lump sum Proposal for Work which would have been performed by any Subcontractors shall include four percent (4%) of that amount as an estimate of the Contractor's overhead and profit that will not be earned by Contractor due to the decrease in the Contract Sum.

The Contractor's quotation shall be forwarded to the Owner within ten (10) days of the Owner's request and, if acceptable to the Owner, shall be incorporated in the Change Order. If not acceptable, the parties shall make every reasonable effort to agree as to the amount of such decrease, which may be based on a lump sum properly itemized, on unit prices stated in the Contract Documents and/or on such other basis as the parties may mutually determine. If the parties are unable to so agree, the amount of such decrease shall be the total of the estimated reduction in actual cost of the Work, as determined by the Owner in its reasonable judgment, plus overhead and profits stated above. This shall become final and binding upon the Contractor, subject to Contractor's right to dispute such action in accordance with the Article 15.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work is covered contrary to the request of the Owner or the Design Consultant or to requirements specifically expressed in the Contract Documents or to requirements of applicable construction permits, it must, if required in writing by the Owner, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Design Consultant or the Owner has not specifically requested to observe prior to being covered, either may request to see such portion of the Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by the Owner, in which event the Owner shall be responsible for the payment of such costs. If such condition was caused by a Separate Contractor, Contractor may proceed against and only against, said Separate Contractor as provided in Article 6. Any costs to the Owner pursuant to this Paragraph shall be determined in accordance with the provisions of Article 12.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly reconstruct, replace or correct portions of the Work rejected by the Design Consultant or Owner as defective or as failing to conform to the Contract Documents or as not in accordance with the guarantees and warranties specified in the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected portions of the Work, including compensation for the Design Consultant's and the Owner's additional construction management services made necessary thereby.

13.2.2 The Contractor, unless removal is waived by the Owner, shall remove from the site all portions of the Work which are defective or non-conforming, or if permitted or required, he shall correct such portions of the Work in place at his own expense promptly after receipt of Notice, and such rejected Work shall not thereafter be tendered for acceptance unless the former rejection or requirement for correction is disclosed.

- 13.2.3 If the Contractor does not proceed with the correction of such defective or non-conforming portions of the Work within a reasonable time fixed by written Notice from the Owner or Design Consultant, the Owner may either (1) by separate contract or otherwise replace or correct such portions of the Work and charge the Contractor the cost incurred by the Owner thereby and remove and store the materials or equipment at the expense of the Contractor, or (2) terminate this Contract for default as provided in Section 14.3, or both, or take any other measure allowed by law.
- 13.2.4 The Contractor shall bear the cost of making good all work of the Owner or Separate Contractors destroyed or damaged by such correction or removal.
- 13.2.5 Nothing contained in this Section 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Section 4.6 hereof. The establishment of the time period of one year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

- 13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable, or the Owner may elect to accept payment in materials or services, in lieu of a reduction in the Contract Sum. If the amount of a reduction is determined after final payment, it shall be paid to the Owner by the Contractor.

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

- 14.1.1 If the Work is stopped for a period of one hundred twenty (120) days by the Owner or under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, and through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon seven (7) additional days' written Notice to the Owner and the Design Consultant, terminate the Contract and recover from the Owner payment on a quantum merit basis, for all Work executed for which Contractor has not previously been paid, less any amounts Contractor may owe Owner under the Contract Documents and less any amounts Owner is entitled to withhold from Contractor or backcharge to the Contractor under the Contract Documents or pursuant to law. The Contractor shall not be entitled to collect and hereby expressly waives any overhead or profit on Work not performed and any damages related to that portion of the Contract which has been terminated.

14.2 TERMINATION FOR CONVENIENCE OF THE OWNER

14.2.1 The Owner may, at any time upon ten (10) days written Notice to the Contractor and to the Contractor's Surety, which Notice shall specify that portion of the Work to be terminated and the date said termination is to take effect, terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the Work for the convenience of the Owner. The Contractor's sole remedy, in the event of such termination, will be the allowable termination costs permitted by Section 14.4. Contractor shall include termination clauses identical to Article 14 in each of his subcontracts.

14.3 DEFAULT TERMINATION

14.3.1 Ten (10) days after written Notice is mailed to the Contractor and to the Contractor's Surety, the Owner may terminate (without prejudice to any right or remedy of the Owner or any subsequent buyer of any portion of the Work) the employment of the Contractor and his right to proceed either as to the whole or any portion of the Work required by the Contract Documents and may take possession of the Work and complete the Work by contract or otherwise in any one of the following circumstances:

1. If the Contractor or its Surety refuses or fails to prosecute the Work or any separable part thereof with such diligence as will ensure the Substantial and Final Completion of the Work by the dates specified in the Supplemental Conditions for Substantial and Final Completion or fails to complete the Work or remedy a default within said period;
2. If the Contractor is in material default in carrying out any provisions of the Contract;
3. If the Contractor fails to supply a sufficient number of properly skilled workers or proper equipment or materials;
4. If the Contractor fails to make prompt payment to Subcontractors or for materials or labor, unless he otherwise provides the Owner satisfactory evidence that payment is not legally due;
5. If the Contractor disregards laws, permits, ordinances, rules, regulations or orders of any public authority having jurisdiction, or fails to follow the instructions of the Owner;
6. If the Contractor substantially violates any provisions of the Contract Documents; or
7. If the Contractor refuses or fails to properly schedule, plan, coordinate and execute the Work, as specified herein, so as to perform the Work within the specified Completion Dates, or to provide scheduling or related information, revisions and updates as required by the Contract Documents.

14.3.2 The right of the Contractor to proceed shall not be so terminated under this Section 14.3 if the delays in the completion of the Work are due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor or his Subcontractors as specifically set forth in Section 8.3 hereof.

14.3.3 If, after the Contractor has been terminated for default pursuant to Section 14.3, it is determined that none of the circumstances set forth in Paragraph 14.3.1 exist, then such termination shall be considered a termination for convenience pursuant to Section 14.2. In such case, the Contractor's sole remedy will be the costs permitted by Section 14.4.

14.3.4 If the Owner so terminates the employment of the Contractor due to the Contractor's default,

the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the compensation to be paid to the Contractor hereunder shall exceed the expense of so completing the Work (including compensation for additional managerial, administrative, consultant and inspection services, attorney's fees and any damages for delay) such excess shall be paid to the Contractor.

- 14.3.5 If such expenses referenced in Paragraph 14.3.1, shall exceed the unpaid balance, the Contractor and his sureties shall be liable to the Owner for such excess. If the right of the Contractor to proceed with the Work is partially or fully terminated, the Owner may take possession of and utilize in completing the Work such materials, appliances, supplies, plant and equipment as may be on the site of the terminated portion of the Work and necessary for the completion of the Work. If the Owner does not fully terminate the right of the Contractor to proceed, the Contractor shall continue to perform the part of the Work that is not terminated.
- 14.3.6 If the Owner terminates the whole or any part of the Work pursuant to Section 14.3, the Owner may procure, upon such terms and in such manner as the Owner may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Owner for any excess costs for such similar supplies or services. The Contractor shall continue the performance of the Contract to the extent not terminated hereunder.

14.4 ALLOWABLE TERMINATION COSTS

- 14.4.1 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.2, then the Owner shall only be liable to the Contractor for those costs reimbursable to the Contractor in accordance with Paragraph 14.4.2, plus a markup of ten percent (10%) for profit and overhead on the actual fully accounted costs specified under Paragraph 14.4.2; provided however, that if there is evidence that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit or overhead shall be included or allowed hereunder for the Work performed and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss. Under no circumstances shall the Contractor be entitled to any loss profit on the Work terminated pursuant to Section 14.2.
- 14.4.1.1 After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination Claim, in the form and with certification prescribed by the Owner. Such Claim shall be submitted promptly but in no event later than three (3) months from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such three (3) month period or authorized extension thereof. However, if the Owner determines that the facts justify such action, he may receive and evaluate any such termination Claim at any time after such three (3) month period or any extension thereof. Upon failure of the Contractor to submit his termination Claim within the time allowed, the Owner may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and such termination shall be final and binding on the Contractor.
- 14.4.2 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.2, the Owner shall pay the Contractor an amount for supplies, services, or property accepted by the Owner, and which is in accordance with the Contract Documents, in an amount as if the Contract had not been terminated. In addition, in such event, the Owner shall pay to Contractor an amount representing Contractor's actual cost, excluding any overhead and profit for the items and things specified in Subparagraph 14.5.1.6 and not heretofore paid for, appropriately adjusted for any saving of freight or other charges. Under no circumstances shall the Contractor be entitled to any loss profit on the Work terminated pursuant to Section 14.2.

14.4.2.1 The Contractor agrees that neither the Owner nor the Design Consultant will be liable for payments to Contractors or Subcontractors pursuant to Section 14.4.2 unless each contract and subcontract contains termination provisions identical to those set forth in this Article 14. The Owner and the Design Consultant will not be liable to the Contractor or any of the Subcontractors for any costs associated with termination if the contract or subcontract of the party involved does not include the required termination language.

14.4.3 In arriving at any amount due the Contractor pursuant to Section 14.4, there shall be deducted the following:

1. All unliquidated advance or other payments on account theretofore made to the Contractor applicable to the terminated portion of the Contract;
2. Any Claim which the Owner may have against the Contractor;
3. Such amount as the Owner determines to be necessary to protect the Owner against loss because of outstanding or potential liens or claims; and
4. The agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired by the Contractor sold, pursuant to the provisions of Subparagraph 14.5.1.7, and not otherwise recovered by or credited to the Owner, or returned for a refund by the Contractor.
5. All other amounts the Owner is entitled to withhold from the Contractor or charge to the Contractor pursuant to the Contract or as allowed by applicable law.

14.4.4 The total sum to be paid to the Contractor under Section 14.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made or to be made for Work not terminated and as otherwise permitted by the Contract. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in Paragraph 14.4.2, the fair value, as determined by the Owner, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Subparagraph 14.5.1.7.

14.5 GENERAL TERMINATION PROVISIONS

14.5.1 After receipt of a Notice of termination from the Owner, pursuant to Section 14.2 or 14.3, and except as otherwise directed by the Owner, the Contractor shall:

1. Stop work under the Contract on the date and to the extent specified in the Notice of termination;
2. Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;
3. Terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the Notice of termination;
4. At the option of the Owner, and in lieu of terminating such orders and subcontracts, assign to the Owner in the manner, at the times and to the extent directed by the Owner in writing,

all of the rights in the such orders and subcontracts,

5. Settle all outstanding liabilities and all Claims arising out of such termination or orders and subcontracts, with the approval or ratification of the Owner in writing, to the extent he may require, which approval or ratification shall be final for all the purposes of this Article;
 6. Transfer title and deliver to the entity or entities designated by the Owner, in the manner, at the times and to the extent directed by the Owner to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the Work as had been terminated, the following:
 - (1) The fabricated or unfabricated parts, Work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated by the Notice of termination; and
 - (2) The completed or partially completed plans, drawings, information, releases, manuals and other property related to the Work and which, if the Contract had been completed, would have been required to be furnished to the Owner;
 7. Use his best efforts to return for a refund or sell, in the manner, at the times, to the extent and at the price or prices directed or authorized by the Owner, any property of the types referred to in Subparagraph 14.5.1.6; provided, however, that the Contractor:
 - (1) Shall not be required to extend credit to any buyer, and
 - (2) May acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner in writing; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under the Contract or shall otherwise be credited to the Contract Sum covered by the Contract or paid in such other manner as the Owner may direct;
 8. Complete performance of such part of the Work as shall not have been terminated by the Notice of termination;
 9. Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to the Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest; and
 10. Otherwise mitigate any damages Contractor claims to suffer as a result of a termination.
- 14.5.2 The Contractor shall, from the effective date of termination until the expiration of three (3) years after final settlement under the Contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, but without direct charge to the Owner, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under the Contract and relating to the Work terminated hereunder, or, to the extent approved by the Owner, photographs, micro-photographs or other authentic reproductions thereof.
- 14.5.3 If the termination, pursuant to Section 14.2, be partial, the Contractor may file with the Owner a Claim for an equitable adjustment of the price or prices specified in the Contract relating to

the continued portion of the Contract (the portion not terminated by the Notice of termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any Claim by the Contractor for an equitable adjustment under this Paragraph must be asserted within thirty (30) days from the effective date of the Notice of termination.

14.5.4 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under Section 14.4.

14.5.5 The Contractor shall be entitled to only those damages and that relief from termination by the Owner as specifically provided in Article 14.

ARTICLE 15

DISPUTE RESOLUTION

15.1 INITIATING CLAIMS

15.1.1 Claims must be initiated by written Notice to the Owner and to the party against whom the Claim is made with a copy to the Design Consultant. The responsibility to substantiate Claims shall rest with the party making the Claim.

15.1.2 Nothing in the Contract shall be construed as meaning that the Owner's assessment of Liquidated Damages is a Claim as defined herein, or that the Owner has the burden of proof to assess Liquidated Damages. Should the Owner assess Liquidated Damages, the burden of proving that such damages should not have been assessed shall rest upon the Contractor.

15.2 RESOLUTION OF CLAIMS AND DISPUTES BETWEEN CONTRACTOR AND OWNER

15.2.1 Claims by Contractor against Owner and by Owner against Contractor, including those alleging an error or omission by the Design Consultant shall be subject to the process set forth in this Section 15.2. Such Claims shall be referred initially to the Design Consultant for a decision. A final decision by the Design Consultant, or the failure of the Design Consultant to issue a final decision shall be required as a condition precedent to mediation or litigation of all such Claims arising prior to the date final payment is due. The Design Consultant will initially decide disputes between Owner and Contractor.

15.2.2 The Design Consultant will review Claims by Contractor and Owner against each other and within twenty (20) days of the receipt of the written Claim and take one or more of the following actions:

1. Request additional supporting data from the claimant or a response with supporting data from the other party;
2. Reject the Claim in whole or in part;
3. Approve the Claim;
4. Suggest a compromise; or
5. Advise the parties that the Design Consultant is unable to resolve the Claim if the Design Consultant lacks sufficient information to evaluate the merits of the Claim or if the Design Consultant concludes that it would be inappropriate for the Design Consultant to resolve

the Claim.

- 15.2.3 In evaluating Claims made under this Section 15.2, the Design Consultant may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who assist the Design Consultant in rendering a decision.
- 15.2.4 If the Design Consultant requests a party to provide a response to a Claim under this Section 15.2, or to furnish additional supporting data, such party shall respond, within ten (10) days after receipt of such request, and shall within such time period, either provide a response to the requested supporting data, advise the Design Consultant when the response or supporting data will be furnished, or advise the Design Consultant that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Design Consultant will either reject or approve the Claim in whole or in part.
- 15.2.5 The Design Consultant will approve or reject Claims under this Section 15.2 by written decision, which shall state the reason thereof and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Design Consultant under this Section 15.2 shall be final and binding on the parties but subject to mediation and litigation.
- 15.2.6 When a written decision of the Design Consultant under this Section 15.2 states that the decision is final but subject to mediation, then a demand for mediation of a Claim covered by such decision must be made within thirty (30) days after the date on which the party making the demand receives the final written decision. Any failure to demand mediation within said thirty (30) days' period shall result in the Design Consultant's decision becoming final and binding to all parties. Claims not resolved in mediation shall be subject to litigation if in accordance with the applicable statutes of limitation and repose.
- 15.2.7 Upon receipt of a Claim under Section 15.2 against the Contractor or at any time thereafter, the Design Consultant or the Owner may, but is not obligated to, notify the Surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Design Consultant or the Owner may, but are not obligated to, notify the Surety and request the Surety's assistance in resolving the controversy.
- 15.2.8 If the Design Consultant deems that a Claim under this Section 15.2 is valid, the Design Consultant shall require all parties to the dispute to share the cost of the Design Consultant's review equitably. If the Design Consultant deems that a Claim under this Section 15.2 is invalid, the Design Consultant shall require the complaining party to bear the cost of the Design Consultant's review. In any event, the Design Consultant may require the complaining party to submit a deposit equivalent to the Design Consultant's hourly rate multiplied by the amount of time the Design Consultant estimates, in the Design Consultant sole discretion, that will be necessary to review the Claim. The Design Consultant shall return any unused portion of this initial deposit to the complaining party following the Design Consultant's completion of the Design Consultant's review of the Claim. Nothing in these procedures shall entitle the Design Consultant to compensation for additional services from the Owner that is not authorized pursuant to the terms and conditions of the Agreement for Design Consultant Services.

15.3 TIME LIMITS ON CLAIMS

- 15.3.1 Unless a shorter time is provided in the Contract Documents, Claims by Contractor or any party except Owner must be initiated within twenty (20) days after occurrence of the event giving rise to such Claim or within twenty (20) days after the claimant first recognizes the condition

giving rise to the Claim, whichever is later. Claims against the Owner shall be initiated in strict conformance with the Contract Documents. Nothing in these procedures shall extend the period within or the manner in which Claims against the Owner must be submitted. Claims must be initiated by written Notice to the Owner and written notice to the other party and to the Design Consultant. Any Claim against the Owner that is not initiated within the applicable time period is waived. Claims by Owner may be made at any time within the applicable statute of limitations and repose.

15.4 CONTINUING CONTRACT PERFORMANCE

15.4.1 Pending final resolution of a Claim, the Contractor shall proceed diligently with the performance of the Contract, unless instructed otherwise in writing by the Owner.

15.5 MEDIATION

15.5.1 As required by N.C.G.S 143-128 (f1), any Claim as defined herein, which exceeds fifteen thousand dollars(\$15,000.00), and which concerns a party involved in the Project, including the Owner, Contractor, Design Consultant, any construction manager, Separate Contractors, or first and lower tier Subcontractors and which arise out of the Contract or the construction process, except those waived Claims shall, be subject to mediation as a condition precedent to the institution of legal proceedings by any party, except that any party may institute legal proceedings or perfect any mechanic's or materialmen's lien in order to meet any applicable statute of limitations or similar deadline prior to engaging in mediation.

15.5.2 The parties shall endeavor to resolve their Claims under this Section 15.5 by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the rules established by the Owner.

15.5.3 The parties shall share cost of the mediation equally except that if the Owner is a party to the dispute, the Owner shall pay at least one third of the cost of the mediation.

15.5.4 The mediation shall be held in a place where the Project is located, unless another location is mutually agreed upon.

15.5.5 Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

END OF GENERAL CONDITIONS

SECTION SC

SUPPLEMENTAL CONDITIONS

GENERAL CONDITIONS

Document GC, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, constitutes the General Conditions of this Contract, and is hereinafter called "General Conditions." The General Conditions are further revised and supplemented by the provisions of these Supplemental Conditions. The General Conditions and the Supplemental Conditions are applicable to all of the Work under this contract and shall apply to the Contractor and all Subcontractors and Sub-subcontractors.

SUPPLEMENTS:

The following supplements modify, change, delete, or add to the General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, subparagraph or clause thereof is modified, or deleted by these supplements, the unaltered provisions of such article, paragraph, subparagraph or clause shall remain in effect. If there is a discrepancy between the General Conditions and these Supplemental Conditions, the Supplemental Conditions shall control.

ARTICLE 1 - CONTRACT DOCUMENTS

ADD THE FOLLOWING TO 1.3.1:

1.3.1.1 The Contractor will be furnished with one set drawings and specifications for free.

ARTICLE 2 - ARCHITECT

ADD THE FOLLOWING TO PARAGRAPH 2.1:

Design Consultant:

Sud Associates, 1813 Chapel Hill Road, Durham, NC 27707

ARTICLE 4 – CONTRACTOR

ADD THE FOLLOWING AFTER THE FIRST SENTENCE OF PARAGRAPH 4.24:

The Owner's policies are available for review at: www.boardpolicyonline.com/bl/?b=orange_county_nc

ARTICLE 7 – MISCELLANEOUS PROVISIONS

ADD THE FOLLOWING TO THE END OF 7.1.1

The Contractor and Owner agree that Orange County, North Carolina shall be the proper venue for any litigation arising out of this Agreement.

ARTICLE 8 - TIME

ADD THE FOLLOWING TO PARAGRAPH 8.2:

8.2.4 The schedule below contains certain specific dates in addition to date of Notice to Proceed and Time for Completion. These dates shall be adhered to and are the last acceptable dates unless modified by mutual agreement between the Contractor and the Owner. All dates indicate midnight unless otherwise stipulated. The only exceptions to this schedule are defined in the General Conditions and Supplemental Conditions under Paragraph 8.3 DELAYS AND EXTENSIONS OF TIME.

Notice of Intent to Award – April 2024

Return of Owner Contractor Agreement by Contractor – April 2024

Notice to Proceed – (NTP) April 2024

Substantial Completion – Mid-August 2026

Complete Final Close-out – September 30, 2026

- 8.2.4.1 The Owner reserves the right to withhold the issuance of Notice to Proceed by up to forty-five (45) days. For each day that Notice to Proceed is withheld pursuant to this Subparagraph, the dates established for Substantial Completion and Final Completion shall be adjusted. The contractor shall not be entitled to additional compensation if the owner withholds the issuance of Notice to Proceed pursuant to this Subparagraph.

ADD THE FOLLOWING AS A NEW SECOND SENTENCE TO PARAGRAPH 8.3.1:

The Contractor acknowledges that the coronavirus (COVID-19) pandemic has impacted businesses across the country.

ADD THE FOLLOWING TO THE END OF THE FIRST PARAGRAPH IN 8.3.4.2.3:

The Parties agree that the weather station applicable to this Project shall be the one located at Greensboro, Piedmont Triad International Airport.

ADD THE FOLLOWING TO PARAGRAPH 8.5.1:

- 8.5.1.1 Substantial Completion Liquidated Damages shall be the sum of two-hundred fifty dollars (\$250) per calendar day, and this amount shall be assessed in accordance with Subparagraph 8.5.1 of the General Conditions. The Liquidated Conditions shall apply for each indicated time period as noted in the Construction Schedule and Phasing.
- 8.5.1.2 Final Completion Liquidated Damages shall be the sum of two-hundred fifty dollars (\$250) per calendar day, and this amount shall be assessed in accordance with Subparagraph 8.5.1 of the General Conditions.

ARTICLE 9 - PAYMENTS AND COMPLETION

ADD THE FOLLOWING TO PARAGRAPH 9.6:

- 9.6.3 Additional services and dispute resolution services by the Design Consultant shall be paid by the Contractor at the rate of one-hundred fifty dollars (\$150) per hour.

ARTICLE 15 – DISPUTE RESOLUTION

ADD THE FOLLOWING NEW PARAGRAPH 15.6:

- 15.6 The Owner's Dispute Resolution Policy required by N.C.G.S. § 143-128(f1) is contained in Policy 9120 (www.boardpolicyonline.com/bl/?b=orange_county_nc). The Dispute Resolution Policy is also included in the bid and contract documents.

END OF SUPPLEMENTAL CONDITIONS

DIVISION 01

GENERAL REQUIREMENTS

SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.2 PROJECT/WORK IDENTIFICATION:

- A. General: Project name is "Efland-Cheeks Elementary School – General Renovations” Orange County Schools, Hillsborough, North Carolina as shown on Contract Documents prepared by Sud Associates, P.A. Drawings and Specifications are dated February 26, 2024.
- B. Contract Documents: Indicate the work of the Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to, the following:
 - 1. Existing site conditions and restrictions on use of the site.
 - 2. Work performed prior to work under this Contract.
 - 3. Alterations and coordination with the existing building.
 - 4. Work to be performed concurrently by others.

1.3 SCOPE

- A. Scope: Highlights of the Scope of Work of this project is given at the end of this section.
- B. Drawings and specifications are complementary and must be so construed to determine the full scope of work.
- C. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, addenda and modifications to the contract documents issued subsequent to the initial printing of this project manual and including, but not necessarily limited to, printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces outside the contract documents.

1.4 CONTRACTOR USE OF PREMISES:

- A. General: The Contractor shall limit his use of the premises to the work indicated.
- B. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

Always keep existing driveways and entrances serving the premises clear and available to the Owner and his employees. Do not use these areas for parking or storage of materials.

Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off site.

Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such

vehicles or equipment unattended with the motor running or the ignition key in place.

- C. Contractor Use of the Existing Building: Maintain the existing building in a safe and weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

Smoking or open fires will not be permitted within the building enclosure or on the premises.

1.5 ASBESTOS:

- A. It is not expected that any asbestos containing material will be disturbed or found during the project work.
- B. The scope of work covered under this project shall not include asbestos removal or any other asbestos-related work.
- C. Prior to commencing any work, the Contractor shall thoroughly examine all parts of the buildings affected by his work for possible presence of asbestos. The Contractor shall precisely identify the locations where he suspects his work will potentially disturb the existing asbestos. The Owner shall examine these locations for the presence of asbestos. If any of these locations contain asbestos and are not already identified for asbestos removal in this project, the Owner shall arrange for the removal of a sufficient amount of the asbestos-containing material to permit installation of the work by the Contractor without disturbing the asbestos.
- D. The Owner shall be responsible for the removal of only that amount of asbestos-containing material that is initially identified by the Contractor in accordance with the procedure outlined above. Any asbestos removal required in excess of that initially identified shall be through a properly executed change order and at no cost to the Owner. Any such removal shall meet all applicable laws, rules and regulations.
- E. If a contractor encounters some material which he is not sure if it is asbestos, work must not begin until it is verified through the Owner.
- F. Also, the asbestos materials must not be disturbed in any way by the Contractor. If any is disturbed, the Contractor responsible for the disturbance will be responsible for the cost of the clean-up by an accredited asbestos abatement contractor and decontamination of all areas contaminated by the asbestos disturbance.
- G. The time required for the removal of any asbestos initially identified by the contractors is included in the specified time of completion for the contract. The time required for removing any additional asbestos identified by the contractor is not included if it is not possible for the contractor to continue work during the additional removal. However, the contractors will not be provided any additional compensation for the extension of time.

1.6 OWNER OCCUPANCY:

Intent to Award (ITA): April 2024

Award of Notice to Proceed: (NTP) April 2024

School out for Summer (SOS 2024): June 17, 2024. This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2024): August 14, 2024 (estimated). This is the last date of the summer break before teachers come back.

School out for Winter Break (SOW 2024-25): December 23, 2024

School back from Winter Break (SBW 2024-25): January 3, 2025

Spring Semester (SS 2025): January 3, 2025, thru June 11, 2025 (estimated).

School out for Summer (SOS 2025): June 11, 2025 (estimated). This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2025): August 18, 2025 (estimated). This is the last date of the summer break before school comes back in session.

School out for Winter Break (SOW 2025-26): December 22, 2025 (estimated).

School back from Winter Break (SBW 2025-26): January 5, 2026(estimated).

Spring Semester (SS 2026): January 5, 2026, thru June 11, 2026 (estimated).

School out for Summer (SOS 2026): June 11, 2026 (estimated). This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2026): August 18, 2026 (estimated). This is the last date of the summer break before school comes back in session.

- A. During periods of time when school is not in session, the contractor will be given access to the building 24 hours a day, seven days a week. When school is in session the contractor will be given access to the part of the building indicated by the phasing plan on Sheet PH-100 and the rest of the building will be occupied by the owner.
- B. It is the Contractor's responsibility to develop and present a project staffing and construction schedule that demonstrates orderly progress of construction. Contractors are alerted that there is a significant amount of work to be done and they are encouraged to take full opportunity of the permitted construction activities during each period.
- C. During construction, the contractor will be responsible for maintaining life safety, toilet facilities, HVAC, and utilities, in all areas of the building where work is not actively on going.
- D. The suggested construction to be accomplished during each of the periods to demonstrate orderly progress is summarized below. This is for informational purposes only, and the Contractor is free to make modifications as long as orderly progress to completion is maintained.

Between Award of Notice to Proceed and School Out for Summer (SOS 2024): During this period, the contractor will be given limited access to the site. During this period, the Contractor is expected to coordinate with the subcontractors and the suppliers. Schedule site visits to plan and take site information. Prepare and submit the detailed construction sequence, schedule, and shop drawings.

Refer to Sheet PH-100 of the construction document drawings for suggested phasing of the project.

- E. Project Close-out: As-built drawings and required/requested close out documentation shall be provided by September 30, 2026.
- F. Liquidated damages and other specified penalties will be assessed if all work on the project is not complete by (SBF-2026) or if the As-built drawings and required/requested close out documentation is not provided by September 30, 2026.

1.7 DISCREPANCIES IN DRAWINGS AND SPECIFICATIONS

- A. Should the Contractor find discrepancies or ambiguities in, or omissions from, the Drawings or

Specifications, or should he be in doubt as to their meaning, he shall at once notify the Engineer, who will issue an interpretation.

1.8 ALTERATIONS AND COORDINATION:

- A. General: The work of this Contract includes coordination of the entire work of the project, including preparation of general coordination drawings, diagrams and schedules, and control of site utilization, from beginning of construction activity through project closeout and warranty periods.
- B. Electrical Requirements: Except as otherwise indicated, comply with applicable provisions of The National Electrical Code (NEC) and standards by National Electrical Manufacturer's Association (NEMA), for electrical components of general work. Provide Underwriters Laboratories listed and labeled products where applicable.

1.9 COOPERATION WITH CITY GOVERNMENT

- A. The Contractor shall cooperate with the Administration of the City and at all times shall endeavor to permit normal movement of vehicle and pedestrian traffic.

1.10 SPECIAL REQUIREMENT

- A. Interruption of Utilities.
 - 1. Before the School lets out for summer, and after School is back in session for Fall, the building will be occupied by the Owner. Any interruption of utilities (electricity, water, heating, cooling, etc.) shall be minimized and undertaken through the owner with at least 72 hours advanced notice. At the Owner's convenience, work must be done at night, or over the weekend, or during holidays to minimize interruptions. No extra payment will be made for such work.
- B. Access to Buildings.
 - 1. The owner will make necessary arrangements for access to the premises. Coordinate with the Owner for all locked areas. It is the Contractor's responsibility to see that no un-authorized person gains access to construction areas. The Contractor shall coordinate with the Owner if access is required beyond established periods.
- C. Employee Conduct.
 - 1. At any time during the construction and completion of the work covered by these specifications, if the conduct of any workman of the various crafts be adjudged ungentlemanly and a nuisance to the Owner or Engineer or if any workman be considered incompetent or detrimental to the work, the Contractor shall order such parties removed immediately from the grounds.
- D. Scrap Metal Dumpster.
 - 1. The contractor will be required to put all scrap metal in a separate dumpster, which will be provided and maintained by OCS.

1.11 EXAMINATION OF PREMISES

- A. Each Bidder prior to submitting a proposal shall examine the site and all conditions thereon. All proposals will be presumed to include all such existing conditions as may affect any work of this project; and failure to familiarize himself with any such conditions will in no way relieve the successful bidder from the necessity of furnishing all materials or performing any work that may be required to complete the work in accordance with the drawings and specifications, without additional cost to the Owner. Examination of premises shall be permitted during the pre-bid conference. Additional visits shall be scheduled, by prior appointment only, with:

Mr. Patrick Florence
Director of Construction
Orange County Schools
132 East Oakdale Drive
Hillsborough, North Carolina 27278
Telephone: (919) 732-8126

1.12 CORRESPONDENCE TO THE OWNER AND ENGINEER

- A. All papers required to be delivered to the Owner shall, unless otherwise directed in writing to the Contractor, be delivered to Sud Associates, P.A., 1813 Chapel Hill Road, Durham, North Carolina 27707. Copies of correspondence to the Engineer shall be sent to the Owner, in care of Mr. Patrick Florence, Director of Construction, Orange County Schools, 132 East Oakdale Drive, Hillsborough, NC 27278.

1.13 PARKING REQUIREMENT

- A. The contractor shall consult with the Owner for permissible parking locations and at all times shall endeavor to permit normal movement of vehicle and pedestrian traffic near the job site. The Contractor shall also coordinate with the Owner for location of site trailer if one is required.

1.14 THE CONTRACT DOCUMENTS

- A. The Contract Documents consist of Notice to Bidders, Standard General Conditions of the Construction Contract, Supplementary General Conditions, all sections of Division 1, the Drawings, and Specifications, including all bulletins, addenda, or other modifications of the Drawings and Specifications incorporated into the documents prior to their execution, the Proposal Form and supporting information submitted by the Contractor, the Contract Form, the Payment and Performance Bonds, Power of Attorney, and Insurance Certificates evidencing the needed coverages. All of these items together form the Contract Documents.
- B. The contract will be awarded to the lowest responsible bidder for the entire work covered under this contract. Prior to contract award, the Contractor will be required to provide a cost breakdown in the format established by the Owner. The Contractor shall also provide any additional document requested by the Owner, any certifications (Debarment, etc.) and any documents required to comply with legal and/or administrative requirements. Summary reports of sales tax and other assessments, as requested by the Owner, shall also be provided.

1.15 COMPLIANCE WITH MINORITY BUSINESS PARTICIPATION POLICY

See additional requirements listed separately

PART 2 - PRODUCTS (Not applicable).

PART 3 - EXECUTION (Not applicable.)

ORANGE COUNTY SCHOOLS

EFLAND CHEEKS ELEMENTARY SCHOOL GENERAL RENOVATIONS

Scope of Work

Intent: It is the intention of the specifications, drawings, and contract documents, to provide renovations to Efland-Cheeks Elementary School. The work will include architectural/general construction, plumbing, mechanical, electrical, and fire alarm work. The scope includes all work indicated or implied by the drawings or specifications. It includes all items that may not be specifically shown but are required for a complete and finished job or may be required by codes or regulations. Work on this project will be covered by a single prime contract. The prime contractor shall coordinate the work of the sub-contractors. The prime contractor will be responsible for getting the general construction, plumbing, mechanical, electrical, fire alarm and other specialty work done by properly licensed sub-contractors approved by the owner. The prime contractor shall also be responsible for getting all inspections by the local authorities, including the third-party rated door inspections required by the local fire marshal. Highlights of the scope of work for each trade are summarized below. The highlights do not provide an exhaustive listing, or details of the work required.

Base Bid

Architectural/General Construction:

1. Demolition and reinstallation of flooring, ceilings, walls and doors.
2. Demolition and reinstallation of exterior windows.
3. Demolition and reconstruction of bathrooms.
4. Exterior sidewalks as required on site drawings.
5. Other architectural modifications included in the drawings and/or specifications.

Plumbing:

1. Demolition of existing plumbing fixtures and installation of new plumbing fixtures.
2. Replace three water heaters, consolidating to two water heaters. Add recirculation piping and two pumps.
3. Revise piping as required for new locations of some fixtures.
4. Replace PEX piping in return air plenum with copper piping.

Mechanical:

1. Demolition of most existing supply diffusers, some existing exhaust grilles, and some existing return grilles.
2. Provide new supply diffusers, some new exhaust grilles, and some new return grilles.
3. Demolish six exhaust fans on the roof and replace them with new ones.
4. Demolish one exhaust fan and cap the curb.
5. Remove caps from two roof curbs and provide two new exhaust fans in those locations.
6. Revise duct and diffuser layout where one room is divided into two (Media 41).
7. Provide connecting supply duct between WSHP-A1 and WSHP-A2 for use when work is being done in Area A-1.

Electrical:

1. Demolition of most of the light fixtures and provision of new replacement LED fixtures. Existing LED bulbs which are removed are to be protected from damage and turned over to the owner.
2. Provide circuits required for plumbing equipment and exhaust fans. Coordinate termination and energizing with plumbing and mechanical contractors. Maintain existing panelboards, overcurrent protection devices and update machine-written circuit directories.
3. Provide new exit signs as indicated on the drawings.

4. Provide egress lighting as indicated on the drawings.
5. Demolish old A/V equipment and cabling.
6. Demolish receptacles in walls that are being removed.
7. Provide new outlets and data drops in select locations as indicated on the drawings.
8. Provide GFCI outlets for drinking fountains.
9. Coordinate and conduct electrical inspections.

Fire Alarm:

1. Add fire alarm pull stations where indicated on the drawings.
2. Maintain, test and re-certify existing Edwards EST-2 fire alarm system.

Alternates

1. Owner Preferred Alternate OP-G1: Under Section 087000 Hardware, provide cylinders and cores by Corbin Russwin.
2. Owner Preferred Alternate OP-P1: Provide Elkay Model LZSTL8WSSK dual height filtered bottle filler refrigerated drinking fountains where called for in the drawings and Plumbing Schedule.
3. Alternate: G1: Provide all work associated with new aluminum canopies in Phase 2 & Phase 3. See drawings for details and locations.
4. Alternate: G2: ADD alternate for work of all trades associated with Phase 6 of the project.

ORANGE COUNTY SCHOOLS

EFLAND CHEEKS ELEMENTARY SCHOOL GENERAL RENOVATIONS

Overview

Construction Schedule and Phasing

February 26, 2024

Highlights of the construction scheduling and phasing for the project are summarized as:

Intent to Award (ITA): April 2024

Award of Notice to Proceed: (NTP) April 2024

School out for Summer (SOS 2024): June 17, 2024. This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2024): August 14, 2024 (estimated). This is the last date of the summer break before teachers come back.

School out for Winter Break (SOW 2024-25): December 23, 2024

School back from Winter Break (SBW 2024-25): January 3, 2025

Spring Semester (SS 2025): January 3, 2025, thru June 11, 2025 (estimated).

School out for Summer (SOS 2025): June 11, 2025 (estimated). This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2025): August 18, 2025 (estimated). This is the last date of the summer break before school comes back in session.

School out for Winter Break (SOW 2025-26): December 22, 2025 (estimated).

School back from Winter Break (SBW 2025-26): January 5, 2026(estimated).

Spring Semester (SS 2026): January 5, 2026, thru June 11, 2026 (estimated).

School out for Summer (SOS 2026): June 11, 2026 (estimated). This is the last day of school before the summer break.

School Back in Session for Fall (SBF-2026): August 18, 2025 (estimated). This is the last date of the summer break before school comes back in session.

During periods of time when school is not in session, the contractor will be given access to the building 24 hours a day, seven days a week. When school is in session the contractor will be given access to the part of the building indicated by the phasing plan on Sheet PH-100 and the rest of the building will be occupied by the owner.

It is the Contractor's responsibility to develop and present a project staffing and construction schedule that demonstrates orderly progress of construction. Contractors are alerted that there is a significant amount of work to be done and they are encouraged to take full opportunity of the permitted construction activities during each period.

During construction, the contractor will be responsible for maintaining life safety, toilet facilities, HVAC, and utilities, in all areas of the building where work is not actively on going.

The suggested construction to be accomplished during each of the periods to demonstrate orderly progress is summarized below. This is for informational purposes only, and the Contractor is free to make modifications as long as orderly progress to completion is maintained.

Between Award of Notice to Proceed and School Out for Summer (SOS 2024): During this period, the contractor will be given limited access to the site. During this period, the Contractor is expected to coordinate with the subcontractors and the suppliers. Schedule site visits to plan and take site information. Prepare and submit the detailed construction sequence, schedule, and shop drawings.

Refer to Sheet PH-100 of the construction document drawings for suggested phasing of the project.

Project Close-out:

As-built drawings and required/requested close out documentation shall be provided by September 30, 2026.

Liquidated damages and other specified penalties will be assessed if all work on the project is not complete by (SBF-2026) or if the As-built drawings and required/requested close out documentation is not provided by September 30, 2026.

END OF SECTION 01 10 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Limits: Confine constructions operations to comply with Orange County Schools security badge system.
 - 2. Orange County Schools Occupancy: Allow for Orange County Schools occupancy of site according to the Project Plan.
 - 3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Orange County Schools, Orange County Schools' employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.3 OCCUPANCY REQUIREMENTS

- A. Partial Orange County Schools Occupancy: Orange County Schools reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1.4 SPECIAL REQUIREMENTS

- A. Criminal Background Investigations of individuals working on school property (sites occupied with students and sites not occupied with students).
- B. At a minimum, the contractor shall obtain a complete North Carolina statewide criminal background investigation for all employees and subcontractors who will work on this project, covering a period for the last seven (7) years. In the event that the contractor or subcontractor is from out of state, the criminal background investigation shall be broadened to include their home state, as well as the state of North Carolina as outlined above. The company providing such information must be recognized by local law enforcement agency as qualified to do so. All costs associated with these criminal background checks is the responsibility of the contractor.

Each prime contractor will be responsible for all their employees and all of their subcontractors working under them.

A daily sign-in sheet will be presented by each prime contractor to the Owner. This list will contain the name of each person on site and the company they work for. The daily sign in log will be made available to the successful prime contractors at the Pre-Construction Meeting.

- C. Any individual with the following criminal convictions or pending charges will **NOT** be permitted on any school project or property.
 - 1. Child Molestation
 - 2. Rape
 - 3. Any Sexually Oriented Crime
 - 4. Drugs: Felony use, possession or distribution.
- D. Any individual with a prior conviction or pending charges contained in the aforementioned list, shall be banned (not allowed) from any school project or property.
- E. Each person on site must wear a plastic laminated identification badge that identifies the name of the company and the person's name. These badges are to be computer produced at a font large enough to be clearly visible. All costs associated with these criminal background checks is the responsibility of the contractor. The ID badge template will be made available to the successful prime contractors at the Pre-Construction Meeting.
- F. Orange County Schools, may, at any time, request verification of clearance for any employee or subcontractor on school property.
- G. There is a NO TOBACCO policy on all property owned by Orange County Schools. Therefore, use of any type of tobacco product is prohibited. Workers will be asked to leave the site for the balance of the day on their first offense. Workers will be asked to permanently leave the site after the first offense.

H. COVID-19 GUIDELINES FOR CONTRACTORS

- 1. Contractors are required to submit a COVID-19 Work Plan as part of their bid or prior to starting work inside Orange County Schools facilities or at outside worksites.
- 2. The COVID-19 Work Plan must address the following safety precautions:
 - a. Practice 6ft social distancing protocols at all OCS jobsites as well as inside OCS facilities.
 - b. Prohibit large work groups of 10 or more employees.
 - c. Require sick employees to stay home or go home if they start to feel ill while on the job.
 - d. Promote frequent hand washing.
 - e. Ensure frequent re-supply of soap and running water at all jobsites.
 - f. Maintain Safety Data Sheets on all disinfectants used on site.
 - g. All PPE must be selected based upon the hazard to the employee.
 - h. Employees must wear a face covering while performing work inside OCS facilities.
 - i. Provide employees with up-to-date education and training on coronavirus risk factors and protective behaviors.
 - j. Develop a wellness screening procedure to address an employee becoming ill while at work or notifying the employer they are ill while not at work.
- 3. The COVID-19 Work Plan must be reviewed and approved by the Project Manager/Risk Manager prior to the start of new projects, existing projects as well as all other service-related work requiring access to OCS facilities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Contingency allowances.
 - 3. Testing and inspecting allowances.
- C. Related Requirements:
 - 1. Division 01 Section "Unit Prices" for procedures for using unit prices.
 - 2. Division 01 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.
 - 3. Divisions 02 through 33 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include **taxes**, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- C. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.10 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.

3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

Allowance No. 1: GENERAL RENOVATION ALLOWANCE

Allowance for unforeseen conditions
 Allowance Amount Base Bid = \$60,000.00

Allowance No. 2: DOOR HARDWARE ALLOWANCE

Allowance for door hardware
 Allowance Amount Base Bid = \$280,000.00

Allowance No. 3: UNSUITABLE SOIL REPLACEMENT

Allowance for unsuitable soil replacement with ABC stone including compaction and haul off of unsuitable soil
 Allowance Amount Base Bid = 10 cubic yards

Allowance No. 4: SANITARY SEWER ALLOWANCE

Allowance for replacement of sanitary sewer piping below the floor slab that is determined to be in poor condition.
 Allowance Amount Base Bid = \$200,000.00

END OF SECTION 01 21 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 1 Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Division 1 Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 3. Division 1 Section 014000 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 GENERAL

- A. Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the scope of the work, all in accordance with the contract documents. Single Prime Proposals are to include all Unit Prices listed in this Specification Section

1.5 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
- C. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- E. 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.
- G. List of Unit Prices: A list of unit prices is included at the end of this Section. 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 LIST OF UNIT PRICES

Note: Unit Prices listed below are also listed on the Single Prime Bid Form. Unit Prices of the successful Bidders will become part of the Contract.

General Construction

	<u>Description</u>	<u>Unit</u>
A.	Unsuitable soil replacement with ABC stone including compaction and haul off of unsuitable soils	Per cubic yard

END OF SECTION 01 22 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.3 GENERAL

- A. All work under this heading is subject to all Contract Documents, and includes the furnishing of all labor, materials, equipment, accessories, etc. for the complete installation of all Alternates as outlined in this Specification Section.
- B. The owner shall retain the right to accept an alternate after construction has begun, provided it does not cause rework of construction already installed.

1.4 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 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. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.5 PROCEDURES

- A. Coordination: Modify 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. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. 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 prices are requested as listed in this section; prices shall be gross, inclusive of all incidental cost adjustments related to the work being priced. Omissions of items required for a complete installation of the alternate shall be the responsibility of the General Contractor; no adjustment will be made after acceptance of the alternate as part of the Contract Price. Single Prime Bidders shall furnish total price inclusive of all trades under the General category. The Owner reserves the right to accept or reject any or all alternate prices; the order of listing on the Bid Form does not reflect a priority for acceptance by the Owner. Note that some alternates may constitute entire sections of these specifications; accepted alternates shall be governed by all applicable provisions of the Contract Documents unless specified otherwise.
1. **Owner Preferred Alternate OP-G1:** Under Section 087000 Hardware, provide cylinders and cores by Corbin Russwin.
 2. **Owner Preferred Alternate OP-P1:** Provide Elkay Model LZSTL8WSSK dual height filtered bottle filler refrigerated drinking fountains where called for in the drawings and Plumbing Schedule.
 3. **Alternate: G1:** Provide all work associated with new aluminum canopies in Phase 2 & Phase 3. See drawings for details and locations.
 4. **Alternate: G2:** ADD alternate for work of all trades associated with Phase 6 of the project.

END OF SECTION 01 23 00

PRODUCTS AND SUBSTITUTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

- A. Definitions: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the contract documents, including such terms as, "specialties," "systems," "structure," "finishes," "accessories," "furnishings," "special construction" and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term "product" as used herein includes the terms "material," "equipment," "system" and other terms of similar intent.
 - 2. "Named Products" are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the contract documents.
 - 3. "Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work.
 - 4. "Equipment" is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.
- B. Substitutions: The Contractor's requests for changes in the products, materials, equipment and methods of construction required by the contract documents are considered requests for "substitutions," and are subject to the requirements specified herein. The following are not considered as substitutions:
 - 1. Revisions to the contract documents, where requested by the Owner or Engineer are considered as "changes" not substitutions.
 - 2. Substitutions requested during the bidding period, which have been accepted prior to the Contract Date, are included in the contract documents and are not subject to the requirements for substitutions as herein specified.
 - 3. Specified Contractor options on products and construction methods included in the contract documents are choices available to the Contractor and are not subject to the requirements for substitutions as herein specified.
 - 4. Except as otherwise provided in the contract documents, the Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders.
 - 5. Standards: Refer to Division-1 section "Definitions and Standards" for the applicability of industry standards to the products specified for the project, and for the acronyms used in the text of the specification sections.

1.3 QUALITY ASSURANCE:

- A. Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.
- B. Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected

were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract documents but must be provided by the Contractor.

1.4 SUBMITTALS:

A. Product Listing Submittal:

B. General: Prepare a product-listing schedule in a form acceptable to the Designer. Show names of the principal products required for the work, by generic name. Show proprietary product names and the name of the manufacturer for each item listed that is to be purchased and incorporated into the Work.

C. Form: Prepare the product-listing schedule with information on each item tabulated under the following scheduled column headings:

1. Generic name as used in contract documents.
2. Proprietary name, model number and similar product designation.
3. Manufacturer's and supplier's name and city-state addresses.
4. Related unit-of-work specification section number.
5. Installer's name and primary trade of workmen.
6. Projected delivery date, or time span of delivery period.

D. Submittal: Submit three (3) copies of the product-listing schedule within 20 days after the date of award of contract. Provide a written explanation for omissions of data, and for known variations from contract requirements.

1. Designer's Action: The Designer will respond to the Contractor in writing within two (2) weeks of receipt of the product-listing schedule. No response by the Designer within the 2 week time period constitutes no objection to the listed products or manufacturers, but does not constitute a waiver of the requirement that products comply with the requirements of the contract documents. The Designer's response will include the following:

- a. The Designer's listing of unacceptable product selections, if any, containing an explanation of the reasons for this action.
- b. A request for additional data necessary for the review and possible acceptance of the products and manufacturers listed.

E. Substitution Request Submittal:

1. Product Substitutions:

Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. **However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specified brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Substitution of materials, items or equipment of equal or equivalent design shall be submitted to the architect or engineer for approval or disapproval; SUCH APPROVAL OR DISAPPROVAL SHALL BE MADE BY THE ARCHITECT OR ENGINEER 5 DAYS PRIOR TO THE OPENING OF BIDS.**

2. Requests for Substitutions: Submit all requests for substitutions at least 10 days prior to the opening of bids. Submit 3 copies of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related specification section and drawing numbers, and complete documentation showing compliance with the requirements for substitutions.

Include the following information, as appropriate, with each request.

- a. Provide complete product data, drawings and descriptions of products, and fabrication and installation procedures.
 - b. Provide samples where applicable or requested.
 - c. Provide a detailed comparison of the significant qualities of the proposed substitution with those of the work originally specified. Significant qualities include elements such as size, weight, durability, performance, and visual effect where applicable.
 - d. Provide complete coordination information. Include all changes required in other elements of the work to accommodate the substitution, including work performed by the Owner and separate Contractors.
 - e. Provide a statement indicating the effect the substitution will have on the work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Time.
 - f. Provide certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal-to or better than the work required by the Contract documents, and that it will perform adequately in the application indicated.
 - g. Include in this certification, the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.
3. Designer's Action: Within one week of receipt of the Contractor's request for substitution, the Designer will request additional information or documentation as may be needed for evaluation of the request. Within 2 weeks of receipt of the request, or within one week of receipt of the requested additional information or documentation, whichever is later, the Designer will notify the Contractor of either the acceptance or rejection of the proposed substitution.
- a. Rejection will include a statement giving reasons for the rejection.

C. PRODUCT DELIVERY, STORAGE, AND HANDLING:

1. General: Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft. Control delivery schedules to minimize long-term storage at the site and to prevent overcrowding of construction spaces. In particular coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.
 - a. Deliver products to the premises in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storage, unpacking, protecting, and installing. Owner's personnel will not accept delivered materials - arrangements must be made by Contractor concerned to have Contractor's own personnel accept all deliveries of construction materials.
 - b. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - c. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCE:

- A. General: Requirements for individual products are indicated in the contract documents; compliance with these requirements is in itself a contract requirement. These requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

1. Proprietary.

2. Descriptive.
3. Performance.
4. Compliance with Reference Standards.

Compliance with codes, compliance with graphic details, allowances, and similar provisions of the contract documents also have a bearing on the selection process.

B. Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying:

1. Proprietary and Semi-proprietary Specification Requirements:
 - a. Three or More Product Names: Where three or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Exclude products that do not comply with specification requirements. In accordance with the Supplementary General Conditions submit all requests for substitutions prior to the opening of bids. Do not provide or offer to provide an unnamed product that was not approved prior to the opening of bids. Advise the Designer before proceeding where none of the named products comply with specification requirements or are feasible for use.

Where products or manufacturers are specified by name, accompanied by the term "or-equal" or similar language, comply with the contract document provisions concerning "substitutions" to obtain approval from the Designer prior to the opening of bids for the use of an unnamed product.

- a. Non-Proprietary Specification Requirements: Where the specifications name products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to the use of these products only, the Contractor may, at his option, use any available product that complies with contract requirements.
- b. Descriptive Specification Requirements: Where the specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand or trade name, provide products or assemblies that provide the characteristics indicated and otherwise comply with contract requirements.
- c. Performance Specification Requirements: Where the specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is specified for specific performances.
- d. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations. The burden of proof-of-compliance is on the Contractor.
- e. Visual Matching: Where matching an established sample is required, the final judgment of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Designer. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, comply with the provisions of the contract documents concerning "substitutions" and "change orders" for the selection of a matching product in another product category, or for non-compliance with specified requirements.
- f. Visual Selection: Except as otherwise indicated, where specified product requirements include the phrase "...as selected from the manufacturer's standard colors, patterns, textures..." or similar phrases, the Contractor has the option of selecting the product and manufacturer, provided the selection complies with other specified requirements. The Designer is subsequently responsible for selecting the color, pattern and texture from the product line selected by the Contractor.

C. Producer's Statement of Applicability: Where individual specification sections indicate products that require a

"Statement of Applicability" from the manufacturer or other producer, submit a written-certified statement from the producer stating that the producer has reviewed the proposed application of the product on the project. This statement shall state that the producer agrees with or does not object to the Designer's specification and the Contractor's selection of the product for use in the Work. The statement shall also state that the proposed application of the product on the project is suitable and proper.

2.2 SUBSTITUTIONS:

- A. Conditions: After the Bid Opening and approval of the Contractor's List of Materials submitted in accordance with the Supplementary General Conditions, the Contractor's request for a substitution will be received and considered when extensive revisions to the contract documents are not required, when the proposed changes are in keeping with the general intent of the contract documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, all as judged by the Designer; otherwise the requests will be returned without action except to record non-compliance with these requirements.
1. The Designer will consider a request for substitution where the request is directly related to an "or equal" clause or similar language in the contract documents.
 2. The Designer will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.
 3. The Designer will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 4. The Designer will consider a request for a substitution where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Designer for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.
 5. The Designer will consider a request for substitution when the specified product or method cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.
 6. The Designer will consider a request for substitution when the specified product or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.
 7. The Designer will consider a request for substitution when the specified product or method cannot receive a warranty as required by the contract documents and where the contractor certifies that the proposed substitution receive the required warranty.
- B. Work-Related Submittals: The Contractor's submittal of and the Designer's acceptance of shop drawings, product data or samples which relate to work not complying with requirements of the contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

2.3 GENERAL PRODUCT REQUIREMENTS:

- A. General: Provide products that comply with the requirements of the Contract documents and that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
1. Standard Products: Where they are available, provide standard products of types that have been produced and used in similar situations on other projects.
 2. Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published

assurances that the products and its parts are likely to be available to the Owner at a later date.

- B. Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate the nameplate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.
 - a. Name of manufacturer.
 - b. Name of product.
 - c. Model number.
 - d. Serial number.
 - e. Capacity.
 - f. Speed.
 - g. Ratings.
 - h. U.L. listed label on all electrical equipment.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

- A. General: Except as otherwise indicated in individual sections of these specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.

END OF SECTION 01 25 13

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification Sections, apply to work of this section.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION**

- A. Requests for Payment shall be submitted in three copies with original signatures, properly notarized, on AIA Documents G702 and G703, 1992 summer edition. Summary Statement of Sales and Use Tax shall be submitted on a quarterly basis in accordance with NC General Statutes.
- B. Each subcontractor shall coordinate preparation of Schedule of Values with preparation of the Construction Schedule.
- C. Submit the Schedule of Values to the Engineer and Owner at the earliest feasible date, but in no case later than 21 days before the date scheduled for submittal of the initial Application for Payment.
- D. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Round off to the nearest whole dollar; the total shall equal the contract sum.
- E. Schedule Updating: When Change Orders result in a change in the Contract Sum, add these to the Schedule of Values as a separate line item.
- F. At least 30 days prior to final inspection, the Contractor shall provide operating and maintenance information and instructions for equipment and systems provided under the Contract and as specified below.
- G. Furnish such information and instructions for each item that will require any adjustment, servicing, or attention for its proper operations. The instructions shall give the information which is necessary for the Owner to operate at maximum efficiency and perform maintenance and servicing that is normally performed by the Owner. Include a complete maintenance schedule listing all suggested maintenance procedures and the interval of time at which each procedure should be repeated. The instructions shall be written in simple, non-technical language when possible, with sufficient drawings where necessary to be readily understandable by the average layman. Possible hazards shall be particularly pointed out and include instructions cautioning against mistakes in operations that might result in damage or danger to equipment, building, or personnel.
- H. Two (2) copies of instructions shall be submitted to the Engineer for review and approval, one (1) copy of which shall be returned to Contractor approved or with instructions for changes. Upon approval by the Engineer, three (3) additional copies of instructions covering all equipment shall be furnished to Engineer.
- I. In addition to the above-mentioned instructions, the Contractor shall furnish to Engineer three (3) copies of manufacturer's literature for each item of equipment installed. Notation shall be written on literature indicating how the particular item was used and its location. This information will be used by the Owner as an aid in future servicing of equipment with sufficient detail to serve this purpose.
- J. After submission of the above-mentioned written instructions (and prior to turning equipment over to the Owner), the Contractor shall furnish competent operations Engineer or Engineers to meet with Owner for the purpose of discussing all equipment and all phases of its operation and maintenance. The amount of time to

be devoted to instructions shall be reasonable and consistent with the size of the installation and the complexity thereof. Instructions should be adequate to the extent that the Owner may proceed with normal operations in a safe and efficient manner.

END OF SECTION 01 29 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 14 00 Section "Work Restrictions" for the Work covered by Contract Documents and for work sequence.
 - 2. Division 01 32 00 Section "Construction Progress Documentation" for specific requirements for project documentation.
 - 3. Division 01 32 17 Section "Construction Scheduling" for specific requirements for project scheduling.
 - 4. Other Division 01 Sections that may be a part of these contract documents.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Orange County Schools 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 and activities of other contractors 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.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 SUBMITTALS

- A. Coordination Drawings: Contractor to prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components, or if coordination is required for installation of products and materials fabricated by separate entities, or if coordination is required for installation of a lighting system other than the basis of design system.
 - 1. Indicate relationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.
 - 3. Refer to Division 26 Section "General Requirements" for specific Coordination Drawing requirements for electrical installations.
- B. Staff Names: Within 5 working days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers.
- C. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 - 1. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Orange County Schools and Designer of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Orange County Schools and Designer, within 2 days of the meeting.
- B. Preconstruction Conference: The Designer will schedule a pre-construction conference, at a time convenient to Orange County Schools, contractors and Designer, but no later than 10 days after execution of the Agreement. The conference will be at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Orange County Schools, Designer, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All 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. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires 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 Designer and Orange County Schools, of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.

- n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.
 - s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements.
 4. 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. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Orange County Schools and Designer, 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. 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.
 - b. Review present and future needs of each entity present, including the following:
 - i. Interface requirements.
 - ii. Sequence of operations.
 - iii. Status of submittals.
 - iv. Deliveries.
 - v. Off-site fabrication.
 - vi. Access.
 - vii. Site utilization.
 - viii. Temporary facilities and controls.
 - ix. Work hours.
 - x. Hazards and risks.
 - xi. Progress cleaning.
 - xii. Quality and work standards.
 - xiii. Change Orders.
 - xiv. Documentation of information for payment requests.
 3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - 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.

- E. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of Orange County Schools, and Designer, 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 conference 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:
 - i. Interface requirements.
 - ii. Sequence of operations.
 - iii. Status of submittals.
 - iv. Deliveries.
 - v. Off-site fabrication.
 - vi. Access.
 - vii. Site utilization.
 - viii. Temporary facilities and controls.
 - ix. Work hours.
 - x. Hazards and risks.
 - xi. Progress cleaning.
 - xii. Quality and work standards.
 - xiii. Change Orders.
 3. Reporting: General Contractor to record meeting results and distribute copies within 2 working days to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- F. Designer Inspections. The design team may choose to perform inspections in conjunction with one of the scheduled meetings. Make sure all subcontractors are available for the inspection and provide needed support to facilitate the inspection.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Schedule
 - 2. Submittals Schedule
 - 3. Daily construction reports
 - 4. Material location reports
 - 5. Field condition reports
 - 6. Special reports
 - 7. Construction photographs
- B. Related Sections include the following:
 - 1. Division 01 14 00 Section "Work Restrictions" for the Work covered by Contract Documents and for work sequence
 - 2. Division 01 31 00 Section "Project Management and Coordination" for general coordination requirements by all contractors
 - 3. Division 01 32 17 Section "Construction Scheduling" for specific requirements for project scheduling
 - 4. Other Division 01 Sections that may be a part of these contract documents
- C. Construction Photographs: Submit progress photos. Photographs must be submitted with each monthly pay application.
 - 1. Format: Digitally formatted in a manner acceptable to the Owner and Designer and provided electronically.
 - 2. Identification:
 - a. Name of Project
 - b. Name of Contractor
 - c. Date photograph was taken
 - d. Description
- D. Daily Construction Reports: Submitted Daily to Owner's Representative in a format as defined by Owner.
- E. Material Location Reports: Submit one copy at weekly intervals.
- F. Field Condition Reports: Submitted to Designer and Owner's Representative in a format as defined by Owner.
- G. Special Reports: Submitted per occurrence to Designer and Owner's Representative in a format as defined by Owner.

1.3 CLOSEOUT DOCUMENTATION

- A. All closeout documentation shall be submitted in electronic format unless noted otherwise. The information is to be organized using Windows Explorer folder system as outlined below:
 - 1. Folder #1 titled "Certificates and Approvals":
 - a. Project Contact List (all participants including contractors, subcontractors, suppliers, etc.)
 - b. Letters from contractor requesting substantial and final inspections
 - c. Certificate of Occupancy by local AHJ
 - d. Required approvals from other agencies
 - e. Certificate of Substantial Completion
 - f. Certificate of Final Completion
 - g. Punchlist(s)
 - h. Architect and Contractor letters stating no asbestos materials were used
 - i. Any other documentation requested by the owner
 - 2. Folder #2 titled "Warranty Manual":
 - a. Contractors General Warranty
 - b. Manufacturer/Installer/Equipment and System Warranties
 - 3. Folder #3 titled "Submittal Documents":
 - a. All final approved shop drawing submittals organized in CSI Master format
 - b. Documentation of all manufacturer/material color and finish selections (by schedule or location)
 - 4. Folder #4 titled "O&M Manual": requirements are as outlined in the Project Manual
 - 5. Folder #5 titled "Record Drawings and Project Manual":
 - a. PDF files of all final drawings
 - b. PDF of the Project Manual
 - c. Electronic CAD files of all drawings in format acceptable to the owner
 - d. PDF of Bid Addendum
 - e. Scanned PDF set of field marked up as-built drawings
 - f. Project photographs (in sequence by date)

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Initial Submittal: Submit concurrently with preliminary network diagram. Include submittals required during the first 20 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead-time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 - b. Submittals must be logged and maintained in a format acceptable to the owner.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Phasing: Arrange list of activities on schedule by phase
- B. Work under More Than One Contract: Include a separate activity for each contract
- C. Work by Orange County Schools: Include a separate activity for each portion of the Work performed by Orange County Schools.
- D. Products Ordered in Advance: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
- E. Orange County Schools-Furnished Products: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
- F. Work Restrictions: Show the effect of the following items on the schedule:
 - 1. Coordination with existing construction
 - 2. Limitations of continued occupancies
 - 3. Uninterruptible services
 - 4. Partial occupancy before Substantial Completion – Show staff occupying the building to set up classes & stocking at least 30 days prior to the contract substantial completion date
 - 5. Use of premises restrictions
 - 6. Provisions for future construction
 - 7. Seasonal variations
 - 8. Environmental control
- G. Work Stages: Indicate important stages of construction for each major portion of the Work, including but not limited to:
 - 1. Subcontract awards
 - 2. Submittals
 - 3. Purchases
 - 4. Mockups
 - 5. Fabrication
 - 6. Sample testing
 - 7. Deliveries
 - 8. Installation
 - 9. Tests and inspections
 - 10. Adjusting
 - 11. Curing
 - 12. Startup and placement into final use and operation
- H. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - 1. Structural completion
 - 2. Permanent space enclosure
 - 3. Completion of mechanical installation
 - 4. Completion of electrical installation
 - 5. Substantial Completion
- I. Responsibilities: Identify each activity according to the responsibility for that activity. Responsibilities categorization of activities shall include
 - 1. Orange County Schools

2. Designer
3. City or County Agency having jurisdiction (AHJ)
4. General Contractor
5. Mechanical Contractor
6. Plumbing Contractor
7. HVAC Contractor
8. Electrical Contractor
9. Technology Contractor
10. Others having prime contracts

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site
 2. List of separate contractors at Project site
 3. Approximate count of personnel at Project site
 4. High and low temperatures and general weather conditions
 5. Accidents
 6. Meetings and significant decisions
 7. Unusual events (refer to special reports)
 8. Stoppages, delays, shortages, and losses
 9. Meter readings and similar recordings
 10. Emergency procedures
 11. Orders and requests of authorities having jurisdiction
 12. Change Orders received and implemented
 13. Construction Change Directives received
 14. Services connected and disconnected
 15. Equipment or system tests and startups
 16. Partial Completions and occupancies
 17. Substantial Completions authorized
- B. Material Location Reports: At weekly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately prepare a detailed report on discovery of a difference between field conditions and the Contract Documents. Submit with a request for information in a format acceptable to the owner. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Designer and Orange County Schools within one day of an occurrence. Distribute copies of report to parties affected by the occurrence in a format acceptable to the owner.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, and response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Orange County Schools in advance when these events are known or predictable.

END OF SECTION 01 32 00

CONSTRUCTION SCHEDULING (CONDENSED)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Pursuant to paragraph 4.11 of the General Conditions of this contract, the following additional scheduling requirements are a part of this Contract.

1.2 SUMMARY

- A. Work under this Section shall consist of furnishing a Construction Schedule showing in detail how the Contractor plans to execute and coordinate the Work. The Contract Schedule shall be based on and incorporate the Contract Milestone and Completion Dates as specified in the Supplemental General Conditions Section 8.2.4 and General Conditions Section 4.11.1-Progress Schedule and shall show the order in which the Contractor shall perform the Work, projected dates for the start and completion of separable portions of the work, and any other information concerning the Contractor's Work scheduling as Owner may request.
- B. The purpose of this responsibility is to sort the schedule by entities having prime agreements with Orange County Schools, Designer, agencies having jurisdiction. Establish secondary responsibilities in a separate activity definition for the purposes of sorting by subcontractors for the contractor's convenience.

PART 2 – PRODUCTS

2.1 SCHEDULING SOFTWARE

- A. The Construction Schedule shall be in the form of a computerized bar chart utilizing a scheduling software program (ie: Microsoft Project or equal) and shall consist of horizontal lines, or bars, plotted along a daily time scale.
 - 1. Each pay item designed in the Contractor's Schedule of Value shall be denominated as a separate activity and represented by a horizontal bar or bars on the chart.
 - 2. The time-scale shall indicate all required Milestone and Completion Dates as stipulated in the General Conditions and Supplemental General Conditions.
 - 3. The horizontal bar(s) shall indicate the start and finish dates as well as the total time period of performance for each pay item activity.
 - 4. The Contractor shall arrange the chart so as to show the pay item activities which are necessary to fulfill each and every Milestone and Completion Date requirement.

PART 3 – EXECUTION

3.1 COST LOADED SCHEDULE

- A. Each Work activity on the bar chart should correlate to the Application for Payment Schedule of Values and shall be broken into reasonable work segments/activities as practicable with individual start and finish dates.
- B. Work shall be segmented to demonstrate its relationship to the Milestone Dates as outlined in the General Conditions and Supplemental General Conditions of Contract as well as any intermediate milestone dates critical to the execution of the work.
- C. The segmented Work activities shall be cost loaded to show their dollar value as part of the entire pay item. Activity titles shall be self-explanatory; abbreviations shall be shown in the legend.

3.2 UPDATES AND REVISIONS

- A. The chart shall be updated to show actual progress and the effect of modifications, delays and other events. A second bar for each work item, in a contrasting color or pattern, shall be drawn parallel to the proposed schedule to show actual progress and to forecast future progress. The actual start and stop dates shall be entered, as well as the actual dates of the Milestone events. Updates are to be submitted bi-monthly to the Owner with, and as a part of, each payment request.
- B. The updated Construction Schedule submitted by Contractor shall not show a completion date later than the Contract Time, subject to any time extensions approved by the Owner; provided, however, that if the Contractor believes he is entitled to an extension of the Contract under the Contract Documents, the Contractor shall submit to the Owner, with each update, a separate schedule analysis (entitled "Requested Time Adjustment Schedule") indicating suggested adjustments in the Contract Time which should, in the opinion of the Contractor, be made by time extension, due to changes, delays or conditions occurring during the past month or previously, or which are expected or contemplated by the Contractor (whether such conditions are excusable under the Contract or are allegedly due to the Contractor or Owner fault); this separate schedule, if submitted, shall be accompanied or preceded by a formal time extension request as required by the Contract Documents and a detailed narrative justifying the time extension requested. To the extent any time extension requests are pending at the time of any update in the Construction Schedule, the "Requested Time Adjustment Schedule" shall be updated also each month, to reflect any adjustments made by the Contractor in the Construction Schedule, or any time extensions previously granted by the Owner, and to reflect actual or expected progress. The Owner shall not have any obligation to consider any time extension request unless the requirements of the Contract Documents, and specifically, but not limited to, the requirements set forth in this paragraph, are complied with; and the Owner shall not be responsible or liable to the Contractor for any constructive acceleration due to failure of the Owner to grant time extensions under the Contract Documents should the Contractor fail to substantially comply with the submission requirements and the justification requirements of this Contract for time extension requests. The Contractor's failure to perform in accordance with the Construction Schedule shall not be excused, nor be chargeable to the Owner nor the Design Consultant, because the Contractor has submitted time extension requests or the "Requested Time Adjustment Schedule".
- C. Neither the updating of the Contractor's work schedule nor the submission, updating, change or revision of any other report or schedule submitted to the Owner by the Contractor under this Contract nor review or non-objection of the Owner of any such report or schedule shall have the effect of amending or modifying, in any way, the Contract Completion Date, Milestone Dates or of modifying or limiting in any way the Contractor's obligations under this Contract.
- D. All of the Contractor's detailed calculations and documents supporting all schedules, reports, and forecasts shall be available to the owner on request.
- E. Each updated Construction Schedule submitted by the contractor to the Owner shall be accompanied by a narrative report which reflects the following:
 - 1. Description of Work accomplished since submission of previous progress schedule
 - 2. Comparison of the actual status of the Work with the Contractor's project schedule
 - 3. Status of equipment and material deliveries
 - 4. Personnel staffing schedule
 - 5. Causes of any delays
 - 6. Revision of schedules
 - 7. Action proposed to restore schedule

3.3 SCHEDULE OF OFF-SITE ACTIVITIES

- A. The contractor shall include in his Construction Schedule all procurements related activities which lead to the delivery of materials to the site in a timely manner. Upon written approval by the Owner, these activities may be submitted as a separate Off-Site Activities Schedule, properly correlated to the

Construction Schedule. The schedule of off-site activities shall include, but is not limited to, the following:

1. Dates for submittals, ordering, manufacturing or fabricating and delivery of equipment and materials
 2. Long lead items requiring more than one month between ordering and delivery to site shall be clearly noted
 3. All significant activities to be performed by the Contractor during the fabrication and erection/installation in a Contractor's plant or on a job site, including materials/equipment purchasing, delivery
 4. The Contractor's drawings and submittals to be prepared and submitted to the Owner or Design Consultant for approval
- B. The Contractor shall be solely responsible for expediting the delivery of all materials to be furnished by him so that the construction progress shall be maintained according to the current schedule for the Work as approved by the Owner.
- C. The Owner shall be advised in writing by the Contractor wherever it is anticipated or determined by the Contractor that the delivery date of any material and/or equipment furnished by the Contractor for installation will be later than the delivery dates shown on the schedules, subject to schedule updates.
- D. Submittals, equipment orders and similar items are to be treated as schedule activities.

END OF SECTION 01 32 17

PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Minimum administrative and supervisory requirements necessary for coordination of work on the project include but are not necessarily limited to the following:
 - 1. Coordination and meetings.
 - 2. Administrative and supervisory personnel.
 - 3. Limitations for use of site.
 - 4. Special reports.
 - 5. General installation provisions.
 - 6. Cleaning and protection.
 - 7. Conservation and salvage.

1.3 LIMITATIONS ON USE OF THE SITE:

- A. General: Limitations on site usage as well as specific requirements that impact site utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements, administer allocation of available space equitably among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.
- B. Burial of Waste Materials: Do not dispose of organic and hazardous materials on site, either by burial or by burning.
- C. Disposal: Owner shall identify any demolished items removed from the structures that it wants to retain. All such items shall be delivered to Owner in accordance with its instructions. The contractor will be required to put all scrap metal in a separate dumpster, which will be provided and maintained by OCS. Contractor shall remove from site all other demolished items. Remove from the structures and dispose of them by legal means. The Contractor will assume full liability for the disposal of all demolished items removed from the site.

1.4 SPECIAL REPORTS:

- A. General: Submit special reports directly to the Owner within one day of an occurrence. Submit a copy of the report to the Designer and other entities that are affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

- 3.1 **Workmanship:** Competent skillful workmen shall do all work in a finished, thoroughly substantial and craftsman like manner. This is intended to refer particularly to smaller details necessary but usually not specified or indicated on the drawings. All sub-standard work, installed by this contractor, shall be replaced by this contractor at no additional expense to the owner. If this contractor damages existing work, he shall pay the cost of replacement of the damaged work at no additional expense to the owner. The Architect or Engineer shall be the judge of workmanship and his/her opinion shall be final.
- 3.2 **Installer's Inspection of Conditions:** Require the Installer of each major unit of work to inspect the substrate to receive work and conditions under which the work is to be performed. The Installer shall report all unsatisfactory conditions in writing to the Contractor. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to the Installer.
- 3.3 **Manufacturer's Instructions:** Where installations include manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than the requirements indicated in the contract documents.
- 3.4 Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items.
- 3.5 Provide attachment and connection devices and methods for securing work. Secure work true to line and level, and within recognized industry tolerances. Allow expansion and building movement. Provide uniform joint width in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable visual-effect choices to the Owner for final decision.
- 3.6 Recheck measurements and dimensions of the work, as in integral step of starting each installation.
- 3.7 Install each unit-of-work during weather conditions and project status which will ensure the best possible results in coordination with the entire work. Isolate each unit of work from incompatible work as necessary to prevent deterioration.
- 3.8 Coordinate enclosure of the work with required inspections and tests, so as to minimize the necessity of uncovering work for that purpose.
- 3.9 **Mounting Heights:** Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting heights for the particular application indicated. Refer questionable mounting height choices to the Designer for final decision.
- 3.10 **CLEANING AND PROTECTION OF EXISTING AND NEW WORK:**
 - A. **General:** During handling and installation of work at the project site, clean and protect work in progress and adjoining work on the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion.
 - B. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - C. **Limiting Exposures of Work:** To the extent possible through reasonable control and protection methods, supervise performance of the work in such a manner and by such means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous or otherwise deleterious exposure during the construction period. Such exposures include, where applicable, but not by way of limitation the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling.
16. Bacteria.
17. Insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation, improper lubrication, unusual wear or other misuse.
21. Incompatible interface.
22. Destructive testing.
23. Misalignment.
24. Excessive weathering.
25. Unprotected storage.
26. Improper shipping or handling.
27. Theft.
28. Vandalism.

END OF SECTION 01 41 00

DEFINITIONS AND STANDARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

- B. General: This section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

- 1. The term "Regulations" is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.

- C. Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

1.3 DEFINITIONS:

- A. Owner: Board of Education, Orange County Schools, Hillsborough, North Carolina
- B. Designer or Engineer: The term "Designer" or "Engineer" refers to Sud Associates, P.A., 1813 Chapel Hill Road, Durham, NC 27707 and specifically the Design Engineer of Record as indicated by a Professional Engineering Seal affixed to the contract documents or duly appointed representative under the Engineer's responsible charge.
- C. General Explanation: Certain terms used in contract documents are defined in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the Work to the extent that they are not stated more explicitly in another element of the contract documents.
- D. General Requirements: Provisions and requirements of other Division-1 sections apply to the entire work of the Contract and, where so indicated, to other elements which are included in the project.
- E. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.
- F. Directed, Requested, etc.: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Designer," "requested by the Designer," and similar phrases. However, no such implied meaning will be interpreted to extend the Engineer's responsibility into the Contractor's area of construction supervision.
- G. Approve: Where used in conjunction with the Engineer's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the term "approved" will be held to limitations of the Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will

the Engineer's approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents or acceptance of the Work, unless otherwise provided by requirements of the contract documents.

- H. Project Site: The term "project site" means the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the drawings.
- I. "City": Hillsborough, North Carolina
- J. Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- K. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations".
- L. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use".
- M. Installer: The "installer" is "the entity" (person or firm) engaged by the Contractor, its subcontractor or sub-subcontractor for performance of a particular element of construction at the project site, including installation, erection, application and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.
- N. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests of the Work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests. Approved testing laboratories are those accredited by the NCBCCC to label electrical and mechanical equipment. The attached listing of Third Party Agencies that Label Electrical & Mechanical Equipment is for general reference only.

1.4 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

- A. General: This article is provided to help the user of these specifications more readily understand the format, language, implied requirements and similar conventions of content. None of the following explanations shall be interpreted to modify the substance of contract requirements.
- B. Production Methods: Portions of these specifications have been produced by editing master specifications; they may contain minor deviations from traditional writing formats. Such deviations are a natural result of this production technique, and no other meaning shall be implied.
- C. Specification Format: These specifications are organized based upon the Construction Specifications Institute's format. The organization of these specifications into Divisions, Sections or Trade Headings conforms generally to recognized industry practice.
- D. Specification Content: This project specification has been produced employing certain conventions in the use of language as well as conventions regarding the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

In certain circumstances, language used in specifications and other contract documents is of the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where the full context of the contract documents so indicates.

- E. Imperative Language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor, or by others when so noted.

- F. **Methods of Specifying:** Techniques or methods of specifying requirements vary throughout the text. The method used for specifying one element of the Work has no bearing on requirements for other elements of the Work.
- G. **Assignment of Specialists:** In certain circumstances, the specification requires or implies that specific elements of the Work are to be assigned to specialists who must be engaged to perform that element of the Work. Such assignments are special requirements over which the Contractor has no choice or option. They are intended to establish which party or entity involved in a specific element of the Work is considered as being sufficiently experienced in the indicated construction processes or operations to be recognized as "expert" in those processes or operations. Nevertheless, the ultimate responsibility for fulfilling all contract requirements remains with the Contractor.
 - 1. These requirements should not be interpreted to conflict with the enforcement of building codes and similar regulations governing the Work. They are also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- H. **Trades:** The use of certain titles such as "carpentry" in the specifications, is not intended to imply that the Work must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also is not intended to imply that the requirements specified apply exclusively to tradespersons of that corresponding generic name.

1.5 DRAWING SYMBOLS:

- A. **General:** Except as otherwise indicated, graphic symbols used on the drawings are those symbols recognized in the construction industry for purposes indicated.
- B. **Mechanical/Electrical Drawings:** Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Engineer for clarification before proceeding.

1.6 INDUSTRY STANDARDS:

- A. **Applicability of Standards:** Except where more explicit or stringent requirements are written into the contract documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.
 - 1. Referenced standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the Work.
 - 2. Unreferenced Standards: Except as otherwise limited by the contract documents, standards not referenced but recognized in the construction industry as having direct applicability will be enforced for performance of the Work. The decision as to whether an industry code or standard is applicable, or as to which of several standards are applicable, is the sole responsibility of the Designer.
- B. **Publication Dates:** Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
 - 1. **Updated Standards:** At the request of the Designer, Contractor or governing authority, submit a change order proposal where an applicable industry code or standard has been revised and reissued after the date of the contract documents and before the performance of the Work affected. The Designer will decide whether to issue a change order to proceed with the updated standard.

- C. **Conflicting Requirements:** Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Designer for a decision before proceeding.
1. **Minimum Quantities or Quality Levels:** In every instance the quantity or quality level shown or specified is intended to be the minimum to be provided or performed. Unless otherwise indicated, the actual Work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Designer for decision before proceeding.
- D. **Copies of Standards:** The contract documents require that each entity performing work be experienced in that part of the Work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the Work. Copies of applicable standards are not bound with the contract documents.
1. Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.
 2. Although copies of standards needed for enforcement of requirements may be required submittals, the Designer reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.
- E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other contract documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.
- F. **Federal Government Agencies:** Names and titles of federal government standard or specification producing agencies are frequently abbreviated. The following acronyms or abbreviations as referenced in the contract documents indicate names of standard or specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up-to-date as of the date of the contract documents.

CFR Code of Federal Regulations
 Available from the Government Printing Office
 North Capitol Street
 between G and H Streets NW
 Washington, DC 20402 (202) 783-3238
 (Material is usually first published in the Federal Register)

CPSC Consumer Product Safety Commission
 1111 Eighteenth Street NW
 Washington, DC 20207 (202) 634-7700

CS Commercial Standard (U.S. Department of Commerce)
 Government Printing Office
 Washington, DC 20402 (202) 377-2000

DOT Department of Transportation
 400 Seventh Street SW
 Washington, DC 20590 (202) 426-4000

EPA Environmental Protection Agency
 401 M Street SW

Washington, DC 20460 (202) 829-3535

- FCC Federal Communications Commission
1919 M Street NW
Washington, DC 20554 (202) 632-7000
- FS Federal Specification
(General Services Administration)
Specifications Unit (WFSIS)
7th and D Streets SW
Washington, DC 20406 (202) 472-2205 or 472-2140
- MIL Military Standardization Documents
(U.S. Department of Defense)
Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19120
- NBS National Bureau of Standards
(U.S. Department of Commerce)
Gaithersburg, MD 20234 (301) 921-1000
- OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
Government Printing Office
Washington, DC 20402 (202) 783-3238
- PS Product Standard of NBS
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238
- USPS U.S. Postal Service
475 L'Enfant Plaza SW
Washington, DC 20260 (202) 245-4000

1.7 SUBMITTALS:

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 16

**THIRD PARTY AGENCIES ACCREDITED BY THE NCBC TO
LABEL ELECTRICAL & MECHANICAL EQUIPMENT AS OF JANUARY 1, 2016**

Applied Research Laboratories

5371 Northwest 161st Street, Miami, Florida 33014
(305) 624-4800

Equipment Categories

6, 8, 12, 14, 15, 18, 21, 22, 24, 31, & 43

CSA International

178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3
(416) 747-2798

Equipment Categories

All

Communication Certification Laboratory NEMKO-CCL, Inc.

1940 Alexander Street, Salt Lake City, UT 84119
801-972-6146

Equipment Categories

7, 10, 11, 26, 27, & 28

Curtis-Straus

527 Great Road, Littleton, Massachusetts 01460
(978) 486-8880 x 296

Equipment Categories

7, & 26-28

FM Approvals LLC

PO Box 9102, Norwood, Massachusetts 02062
(781) 762-4300

Equipment Categories

4, 5, 9, 13, 17, 19, 24, 28, 31, 32, 39, 43, & 47-51

IAPMO EGS

5001 East Philadelphia Drive, Ontario, California 91761
(909) 472-4100

Equipment Categories

12, & 30

Intertek Testing Services ITS-ETL

3933 US Route 11, Cortland, New York 13045-2014
(607) 753-6711

Equipment Categories

All except 21

Intertek Testing Services ITS-Warnock

3933 US Route 11, Cortland, New York 13045-2014
(607) 753-6711

Equipment Categories

17, 18, 21, 24, & 25

MET Laboratories

2200 Gateway Centre Blvd., Suite 215, Morrisville, NC 27560
(919) 481-9319

Equipment Categories

7, 10 - 16, 18, 22, 23, 26 - 31, 37 - 40, 43, 44, 47, 48, & 50

National Technical Systems (NTS)

533 Main Street, Acton, MA 01720
(978) 263-2933

Equipment Categories

26, 27, & 28

NSF International

789 North Dixboro Road, Ann Arbor, Michigan 48105-9723
(734) 769-8010

Equipment Categories

11-16, 26-31, 40, 43, & 48

Omni-Test Laboratories

13327 NE Airport Way, Portland, Oregon 97230
(503) 643-3788

Equipment Categories

17, 18, & 21

PFS Corporation

1507 Matt Pass, Cottage Grove, Wisconsin 53527
(608) 839-1013

Equipment Categories

17, 19, 20, 21, & Replacement Blowers & coils

QPS Evaluation Services, Inc.

81 Kelfield Street, Unit 8, Toronto, Ontario, Canada M9W 5A3
(416) 241-8857 x 422

Equipment Categories

6-12, 14-16, 22, 23, 26-29, 31, 36, 39, 40, 43, 46-48, 50, & 51

RADCO

3220 East 59th Street, Long Beach, California 90805
(310) 272-7231

Equipment Categories

17, 18, & Replacement blowers & coils

Salus Engineering International

3004 Scott Boulevard, Santa Clara, California 95054
(408) 235-8831

Equipment Categories

16, 28, 37, 43, & 50

SGS Consumer Testing Services

620 Old Peachtree Road, Suite 100, Suwanee, GA 30024
(770) 570-1800

Equipment Categories

1-5, 9-16, 22, 26-31, 33, 35-41, 43, 47-48, & 50-51

TUV SUD America

10 Centennial Drive, Peabody, MA 01960
(978) 573-2530

Equipment Categories

4-8, 10-20, 22, 23, 26-29, 31, 35, 36, 38, 39, 43, 46-48, & 50

TUV Rheinland of North America

762 Park Avenue, Youngsville, North Carolina 27596
(919) 554-3668

Equipment Categories

7-9, 11-14, 16, 26-28, 31, 40, 43, 47, & 48

Underwriters Laboratories, Inc.

12 Laboratory Drive, RTP, North Carolina 27709
(919) 549-1400

Equipment Categories

All

EQUIPMENT CATEGORIES

1. Conductors for General Wiring
2. Flexible Cords
3. Wires and Cables for Special Applications
4. Materials and Components for Special Applications
5. Alarm Signal and Detecting System Components
6. CATV and Radio Distribution System Components
7. Communication System Components
8. Radio and Television Components
9. Energy Management System Components and Controllers
10. Sound Recording and Reproduction Equipment
11. Fixed Office Appliances and Business Equipment
12. Electrical Appliances
13. Electric Space Heating Equipment and Accessories
14. Air Conditioning Equipment and Accessories
15. Heat Pump Equipment and Accessories
16. Refrigeration Equipment and Accessories
17. Gas Fired Heating Equipment and Accessories
18. Gas Fired Appliances
19. Oil Fired Heating Equipment and Accessories
20. Oil Fired Appliances
21. Solid Fuel Heating Equipment
22. Fans and Ventilators
23. Filtering Equipment
24. Duct Materials Including Dampers
25. Chimneys and Vents
26. Electrical Data Processing Equipment
27. Medical, Dental, and X-Ray Equipment
28. Laboratory Equipment, Electrical Measuring, and Testing Equipment
29. Food Preparation Machines
30. Swimming Pool and Spa Equipment
31. Miscellaneous Fixed Equipment - Amusement Machines, Animal Care, Appliances
Battery Chargers, Cleaning Machines, etc.
32. Fire Extinguishing Equipment
33. Circuit Breakers
34. Fuses
35. Wiring Devices, Attachment Plugs and Toggle Switches
36. Switches and Switching Devices - Other than Toggle
37. Panelboards
38. Switchboards
39. Transformers
40. Electrical Signs and Accessories
41. Ground-Fault Circuit Interrupters
42. Ground-Fault Sensing and Relaying Equipment
43. Industrial Control Equipment - Motor Controllers, Industrial Control Panels,
Motor Control Centers, Motorized Valves, Solenoids, etc.
44. Transient Voltage Surge Suppressors and Filters
45. Lightning Protection System Components and Lightning Protection Devices
46. Metering Enclosures and Meter Sockets
47. Emergency Lighting and Power Equipment System Components
48. Lighting Fixtures, Lamp Holders, and Accessories
49. Auxiliary Gutters, Junction, Pull and Outlet Boxes, and Cabinets and Cutout Boxes
50. Electrical Equipment for Hazardous Locations
51. Grounding and Bonding Equipment
52. Wire Connectors, Lugs, and Terminal Fittings
53. Insulating Tape and Closures

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

- A. General: This section specifies procedural requirements for non-administrative submittals including shop drawings, product data, samples and other miscellaneous work-related submittals. Shop drawings, product data, samples and other work-related submittals are required to amplify, expand and coordinate the information contained in the Contract Documents.
 - 1. ALL SUBMITTALS SHALL BE ACCOMPANIED BY THE MANUFACTURER'S MODEL NUMBER, PRODUCT DESCRIPTION, PARTS LIST, OPERATING INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, DIAGNOSTIC AND TROUBLE SHOOTING DATA AND COMPLETE REPAIR MANUAL. SUBMITTALS WILL NOT BE PROCESSED UNTIL ALL THIS DATA IS RECEIVED AND APPROVED BY THE DESIGNER.
 - 2. Refer to other Division-1 sections and other contract documents for specifications on administrative, non-work related submittals. Such submittals include, but are not limited to the following items:
 - a. Permits.
 - b. Payment applications.
 - c. Performance and payment bonds.
 - d. Insurance certificates.
 - e. Inspection and test reports.
 - f. Schedule of values.
 - g. Progress reports.
 - h. Listing of subcontractors.
- B. Shop drawings are technical drawings and data that have been specially prepared for this project, including but not limited to the following items:
 - 1. Fabrication and installation drawings.
 - 2. Setting diagrams.
 - 3. Shopwork manufacturing instructions.
 - 4. Templates.
 - 5. Patterns.
 - 6. Coordination drawings (for use on-site).
 - 7. Schedules.
 - 8. Design mix formulas.
 - 9. Contractor's engineering calculations.
 - 10. Standard information prepared without specific reference to a project is not considered to be shop drawings.
- C. Product data includes standard printed information on manufactured products that has not been specially-prepared for this project, including but not limited to the following items:
 - 1. Manufacturer's product specifications and installation Instructions.
 - 2. Standard color charts.
 - 3. Catalog cuts.

4. Roughing-in diagram and templates.
5. Standard wiring diagrams.
6. Printed performance curves.
7. Operational range diagrams.
8. Mill reports.
9. Standard product operating and maintenance manuals.

D. Samples are physical examples of work, including but not limited to the following items:

1. Partial sections of manufactured or fabricated work.
2. Small cuts or containers of materials.
3. Complete units of repetitively-used materials.
4. Swatches showing color, texture and pattern.
5. Color range sets.
6. Units of work to be used for independent inspection and testing.

E. Miscellaneous submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

1. Specially-prepared and standard printed warranties.
2. Maintenance agreements.
3. Workmanship bonds.
4. Survey data and reports.
5. Project photographs.
6. Testing and certification reports.
7. Record drawings.
8. Field measurement data.
9. Operating and maintenance manuals.
10. Keys and other security protection devices.
11. Maintenance tools and spare parts.
12. Overrun stock.

1.3 SUBMITTAL PROCEDURES:

A. General: Refer to the General Conditions for basic procedures for submittal handling:

B. Coordination: Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity.

1. Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the Designer's need to review a related submittal. The Designer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

C. Coordination of Submittal Times: Prepare and transmit each submittal to the Designer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Designer's need to review submittals concurrently for coordination.

1. Review Time: Allow sufficient time so that the installation will not be delayed as a result of the time required to properly process submittals, including time for resubmittal, if necessary. Advise the Designer on each submittal, as to whether processing time is critical to the progress of the work, and if the work would be expedited if processing time could be shortened.

- a. Allow two weeks for the Designer's initial processing of each submittal. Allow a longer time period where processing must be delayed for coordination with subsequent submittals. The Designer will advise the Contractor promptly when it is determined that a submittal being processed must be

- delayed for coordination.
- b. Allow one week for reprocessing each submittal.
- c. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Designer sufficiently in advance of the work.

D. Submittal Preparation: Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of action taken.

1. Project name.
2. Date.
3. Name and address of Designer.
4. Name and address of Contractor.
5. Name and address of subcontractor.
6. Name and address of supplier.
7. Name of manufacturer.
8. Number and title of appropriate specification section.
9. Drawing number and detail references, as appropriate.
10. Similar definitive information as necessary.

Provide a space on the label for the Contractor's review and approval markings, and a space for the Designer's "Action" marking.

E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Designer, and to other destinations as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender "without action."

F. Transmittal Form: Prepare a draft of a transmittal form and submit it to the Designer for acceptance. Provide on the form places for the following information.

1. Project name.
2. Date.
3. To:
4. From:
5. Names of subcontractor, manufacturer and supplier.
6. References.
7. Category and type of submittal.
8. Submittal purpose and description.
9. Submittal and transmittal distribution record.
10. Signature of transmitter.
11. Contractor's certification stating that the information submitted complies with the requirements of the Contract Documents, with a place for the Contractor's signature.

Record relevant information and requests for data on the transmittal form. On the transmittal form, or on a separate sheet attached to the form, record deviations from the requirements of the Contract Documents, if any, including minor variations and limitations.

1.4 SPECIFIC SUBMITTAL REQUIREMENTS:

A. General: Specific submittal requirements for individual units of work are specified in the applicable specification section. Except as otherwise indicated in the individual specification sections, comply with the requirements specified herein for each type of submittal.

Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals.

B. Shop Drawings: Information required on shop drawings includes, dimensions, identification of specific

products and materials which are included in the work, compliance with specified standards and notations of coordination requirements with other work. Provide special notation of dimensions that have been established by field measurement. Highlight, encircle or otherwise indicate deviations from the contract documents on the shop drawings.

1. Coordination Drawings: Provide coordination drawings where required for the integration of the work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination drawings are considered shop drawings and must be definitive in nature.
 2. Do not permit shop drawing copies without an appropriate final "Action" marking by the Designer to be used in connection with the work.
- C. Preparation: Submit newly prepared information, drawn to accurate scale on sheets not less than 8-1/2" x 11"; except for actual pattern or template type drawings, the maximum sheet size shall not exceed 24" x 36". Indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Provide a space not less than 20 sq. in. beside the title block for marking the record of the review process and the Designer's "Action" marking.
1. Do not reproduce contract documents or copy standard printed information as the basis of shop drawings. Shop drawings which are submitted to the Designer without Contractor's signed and dated "Approval" stamp permanently affixed will be returned without action.
- D. Final Submittal: Submittals of shop drawings and manufacturer's data, etc. shall be provided to the Designer electronically in PDF format. The Designer will review the submittals and return them electronically. The exception would be color samples or other material that cannot be adequately represented electronically, and these should be submitted as five (5) hard copies. The Designer will review them and return three (3) copies.
- E. Product Data: General information required specifically as product data includes manufacturers standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, and the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product or system with other work.
- F. Preparation: Collect required product data into a single submittal for each unit of work or system. Mark each copy to show which choices and options are applicable to the project. Where product data has been printed to include information on several similar products, some of which are not required for use on the project, or are not included in this submittal, mark the copies to show clearly that such information is not applicable.
1. Where product data must be specially prepared for required products, materials or systems, because standard printed data is not suitable for use, submit data as "shop drawings" and not as "product data".
- G. Submittals: Product data submittal is required for information and record and to determine that the products, materials and systems comply with the provisions of the contract documents. Therefore, the initial submittal is also the final submittal, except where the Designer observes that there is non-compliance with the provisions of the contract documents and returns the submittal promptly to the Contractor marked with the appropriate "Action".
- H. Provide a preliminary single-copy submittal where required, for selection of options by the Designer.
1. Initial Submittal: Except as otherwise indicated in individual sections of these specifications, electronically submit each required product data submittal. The Designer will return the submittal electronically marked with "Action" and corrections or modifications as required.
 2. Do not submit product data or allow its use on the project, until compliance with the requirements of the contract documents has been confirmed by the Contractor.
 3. Final Distribution: Furnish copies of product data to subcontractors, suppliers, fabricators,

- manufacturers, installers, governing authorities and others as required for proper performance of the work. Show distribution on transmittal forms.
4. Installation Copy: Do not proceed with installation of materials, products and systems until a copy of product data applicable to the installation is in the possession of the installer. Do not permit the use of unmarked copies of product data in connection with the performance of the work.
- I. Samples: Submit samples for the Designer's visual review of general generic kind, color, pattern, and texture, and for a final check of the coordination of these characteristics with other related elements of the work. Samples are also submitted for quality control comparison of these characteristics between the final samples submittal and the actual work as it is delivered and installed.
 1. Refer to individual work sections of these specifications for additional sample requirements, which may be intended for examination or testing of additional characteristics. Compliance with other required characteristics is the exclusive responsibility of the Contractor; such compliance is not considered in the Designer's review and "Action" indication on sample submittals.
 2. Documentation required specifically for sample submittals includes a generic description of the sample, the sample source or the product name or manufacturer, compliance with governing regulations and recognized standards. In addition, indicate limitations in terms of availability, sizes, delivery time, and similar limiting characteristics.
 - J. Preparation: Where possible provide samples that are physically identical with the proposed material or product to be incorporated in the work; provide full scale, fully fabricated samples cured and finished in the manner specified. Where variations in color, pattern, or texture are inherent in the material or product represented by the sample, submit multiple units of the sample (not less than 3 units), which show the approximate limits of variations. Where samples are specified for the Designer's selection of color, texture or pattern, submit a full set of available choices for the material or product. Mount, display, or package samples in the manner specified to facilitate the review of indicated qualities. Prepare samples to match the Designer's sample where so indicated.
 - K. Submittal: At the Contractor's option, and depending upon the nature of the anticipated response from the Designer, the initial submittal of samples may be either a preliminary submittal or a final submittal.
 1. Preliminary submittal, of a single set of samples, is required where requirements indicate the Designer's selection of color, pattern, texture or similar characteristics from a manufacturer's range of standard choices is necessary. Preliminary submittals will be reviewed and returned with the Designer's "Action" marking.
 2. Final Submittals: Submit two (2) sets of samples in the final submittal, one set will be returned.
 3. Distribution of Samples: Maintain the final submittal sets of samples, as returned by the Designer, at the project site, available for quality control comparisons throughout the course of performing the work. In addition, final submittal sets may be used to obtain final acceptance of the work associated with each set. Prepare and distribute additional sets of samples to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities, and others as required for proper performance of the work. Show final distribution on transmittal forms.
 - L. Miscellaneous Submittals:
 1. Inspection and Test Reports: Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.
 2. Warranties: Refer to section "Products and Substitutions" for specific general requirements on warranties, product bonds, workmanship bonds and maintenance agreements. In addition to copies desired for the Contractor's use, furnish 2 executed copies of such warranties, bonds or agreements. Provide 2 additional copies where required for maintenance manuals.
 3. Standards: Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for

Designer's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish additional copies of the standard to fabricators, installers and others involved in the performance of the work.

4. Closeout Submittals: Refer to individual sections of these specifications for specific submittal requirements of project closeout information, materials, tools, and similar items.
5. Record Documents: Furnish set of original documents as maintained on the project site. Along with original marked-up record drawings provide 2 photographic copies of marked-up drawings.
6. Operating Maintenance, Repair and Diagnostic Manuals: Furnish 4 sets.
7. Materials and Tools: Refer to individual sections of these specifications for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

M. General Distribution: Provide additional distribution of submittals to subcontractors, suppliers, fabricators, installers, governing authorities, and others as necessary for the proper performance of the work. Include such additional copies of submittals in the transmittal to the Designer where the submittals are required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.5 DESIGNER'S ACTION:

A. General: Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the Designer will review each submittal, mark with appropriate "Action", and where possible return within 2 weeks of receipt. Where the submittal must be held for coordination the Designer will so advise the Contractor without delay.

1. Action Stamp: Submittals returned to the Contractor with the Engineer's "REVIEWED" or "REVIEWED WITH NOTATION" stamp need not be resubmitted for approval; however, any notes or corrections indicated by the Engineer on the "REVIEWED WITH NOTATIONS" submittals shall be complied with in the selection, fabrication, and installation. Two copies of corrected shop drawings marked "REVIEWED WITH NOTATIONS" shall be submitted to the Engineer for record.
2. If submittals are stamped for resubmittal, corrections shall be made on the original submittals; and the new submittals shall be submitted for review.
3. Review of samples, cuts and shop drawings, and matter submitted for approval, shall not be construed as relieving the Contractor of compliance with the Specifications, even if such approval is made in writing, unless the attention of the Engineer is called to the noncomplying features by letter accompanying the submitted matter.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 65 00

CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

- A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.
 - 1. "Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
 - 2. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".
- B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.
 - 1. Unless otherwise specified requirements of this section apply to Mechanical and Electrical work. Refer to Division 22 and 23 sections for additional requirements and limitations on cutting and patching of Mechanical and Electrical work.

1.3 QUALITY ASSURANCE:

- A. Requirements for Structural Work: Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio.
- B. Before cutting and patching the following categories of work, obtain the Designer's approval to proceed with cutting and patching as described in the procedural proposal for cutting and patching.
 - 1. Structural steel.
 - 2. Miscellaneous structural metals, including lintels, equipment supports, stair systems and similar categories of work.
 - 3. Structural concrete.
 - 4. Miscellaneous structural metals, including lintels, equipment supports, Stair systems and similar categories of work.
 - 5. Foundation construction.
 - 6. Bearing and retaining walls.
 - 7. Structural decking.
 - 8. Exterior wall construction.
 - 9. Piping, ductwork, vessels and equipment.
- C. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased safety.

- D. Visual Requirements: Do not cut and patch work exposed on the building's exterior or in its occupied spaces, in a manner that would, in the Designer's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Designer to be cut and patched in a visually unsatisfactory manner.

1.4 SUBMITTALS:

- A. Procedural Proposal for Cutting and Patching: Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:
 - 1. Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.
 - 2. List products to be used and firms that will perform work.
 - 3. Give dates when work is expected to be performed.
 - 4. List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted.
 - 5. Where cutting and patching of structural work involves the addition of reinforcement, submit details and engineering calculations to show how that reinforcement is integrated with original structure to satisfy requirements.
 - 6. Approval by the Designer to proceed with cutting and patching work does not waive the Designer's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: Except as otherwise indicated, or as directed by the Designer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.

3.2 PREPARATION:

- A. Temporary Support: To prevent failure provide temporary support of work to be cut.
- B. Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- C. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

- A. General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Designer, proceed with cutting and patching at the earliest feasible time and complete work without delay.
- B. Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.
 - 1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.
 - 2. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.
- C. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of work.
 - 2. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

3.4 CLEANING:

- A. Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

CLOSE-OUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of Orange County School's personnel.
 6. Final cleaning.
- B. Specific requirements of each contract are also indicated in individual Specification Sections, All Bid Documents and on Drawings.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. GC or Project Expediter to prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Orange County Schools of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Orange County Schools unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Orange County Schools. Label with manufacturer's name and model number where applicable.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer, Owner, Owner's Rep or Program / Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, Owner, Owner's Rep or Program / Construction Manager, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Final Completion must be achieved within 30 calendar days of Substantial Completion.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer, Owner, Owner's Rep or Program / Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will accept for review, a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies 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.
- B. Organize list of spaces in sequential order.
1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 2. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Page number.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Engineer, Owner, Owner's Rep or Program / Construction Manager reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
1. 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 prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.

- c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
 6. Provide a spreadsheet inventory list of all filters, sizes, locations, etc. prior to Substantial Completion.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy 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. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
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 Drawings, and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: 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.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 working days of completion of designated portions of the Work that are completed and occupied or used by Orange County Schools during construction period.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Utilize the format of the attached Warranty and Closeout index at the end of section 01 78 36 Warranties.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy duty dividers with pre-numbered plastic-coated tabs for each separate warranty. Provide a typed description of the product or installation on the index (see example at the end of this

section). Include the spec section number, name of the product, and the name, address, and telephone number of the Installer on the Contractor and Supplier List at the front of the warranty binder.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor. Use the spine & cover sheet examples at the end of this section as templates.
4. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

D. Provide letter certifying that no materials containing asbestos or lead have been used in the construction of this project.

E. Provide 1 hard copy, and 1 electronic copy in Portable Document Format (PDF), of all closeout documents to Engineer for distribution to Owner. This includes O & M Manuals, Project Documents, As-Built Drawings, Approvals, Certificates, and all warranty information. PDF is to be verified as fully searchable and Indexed by spec section number, or by plan section and page number for drawings, and the index shall be fully linked with the document pages.

1.8 O & M BINDERS

A. Bind O & M Data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Utilize the format of the attached O & M index at the end of this section.

B. Provide heavy duty dividers with pre-numbered plastic-coated tabs for each separate Maintenance Manual. Provide a typed description of the product or installation on the index (see example at the end of this section). Include the spec section number, name of the product, and the name, address, and telephone number of the Installer on the Contractor and Supplier List at the front of the O & M binder.

C. Identify each binder on the front and spine with the typed or printed title "Operations & Maintenance," Project title or name, and name of the Contractor. Use the spine & cover sheet examples at the end of this section as templates.

D. Provide additional copies of each required warranty, as necessary, for inclusion in each related section of O & M Binder.

1.9 O & M MANUALS DIGITAL

A. Assemble one (1) digital set of operations and maintenance data indicating the operation and maintenance of each piece of equipment... Include operation and maintenance data required in individual Specification Sections and as follows:

1. Maintenance Data:

- a. Manufacturers information, including list of spare parts
- b. Name, address, and telephone number of Installer or supplier.
- c. Maintenance procedures.
- d. Maintenance and service schedules for preventive and routine maintenance.
- e. Maintenance record forms.
- f. Sources of spare parts and maintenance materials.
- g. Copies of maintenance service agreements.
- h. Copies of warranties and bonds

B. Organize operation and maintenance manuals per Section 1.10 Closeout Document Organization.

C. Operation and Maintenance manuals must have operation and maintenance instructions. Submittals are not acceptable replacements for operation and maintenance instructions. If submittals are submitted

instead of O&M information the manuals will not be reviewed and will be rejected. Operation and Maintenance manuals **must also contain** copies of approved **Submittal Product Data and Shop Drawings**

D. Please make sure the following conditions are adhered to:

1. All warranties must be made out to the owner, (i.e. Orange County Schools) and contain the project name and address.
2. All warranties must have proof of authenticity. Contractor and installer warranties must be signed originals specifying project, owner and warranty period commencing from the date of substantial completion. The document can state “from substantial completion” or give the actual Engineer certified date. Either of the following is considered acceptable for manufacturers’ warranties: An original manufacturer warranty with name of project, owner and date of substantial completion, a manufacturer warranty accompanied by an original letter from the manufacturer bearing original or electronic signatures of manufacturer, certifying the authenticity of the manufacturer’s standard warranty naming project, school, and date of substantial completion; a manufacturer’s warranty accompanied by a manufacturer’s agent original signed letter certifying the authenticity and naming project, owner and date of substantial completion. A manufacturer’s agent certification will only be considered acceptable if it is accompanied by a signed letter from the manufacturer verifying the agent has Power of Attorney or specific authority to authenticate the manufacturer’s warranty as “project specific”.
3. Check that warranties include labor where specified.
4. The Prime contractor’s corporate seal (if a corporation) is required on section 00 65 23 warranty.
5. The commencement date for all warranties is the date of substantial completion. This date shall be listed on the warranty or shall say “from the date of declared substantial completion”. A manufacturer’s warranty on equipment shall always cover the gap from early start up to the date of substantial completion. This is a part of the contract and a cost of the work.
6. Warranties cannot contain conditional clauses (such as “this warranty is not or shall not become effective until the contractor has been paid in full”).
7. **A separate training letter and associated sign in sheet are required for each owner training session.** A list of required training sessions will be included in the warranty closeout document binder.
8. Stock Materials shall be transported to the OCS Maintenance Department at 123 East Oakdale Drive, Hillsborough, NC, or other location designated by Orange County Schools. A copy of the signed transmittal showing delivery of stock materials took place is to be included in the warranty closeout binder.

1.10 CLOSEOUT DOCUMENTATION ORGANIZATION

A. Instructions for Closeout Binders

1. OCS will provide a Pdf or Microsoft Word and Excel files to the contractor for each project with the format information for the three ringed **Warranty Binders and O & M Binders**. The Prime contractor(s) will prepare (1) identical Warranty/Closeout binders and (1) identical sets of O&M binders with original documents in each binder.

There will be **a minimum of 1 binder total** (1 each for Warranty / Closeout and 1 each for O&M with original documents) submit one (1) to the Engineer for review and forwarded to GCS if acceptable. A second copy of the binders is to be kept by the contractor as a back-up set, in case the originals are lost in transit between offices.

A table of contents and corresponding numbered divider tabs will be included and MUST be utilized to identify and separate the contents. If the table of contents and numbered tabs are not utilized, the manuals will not be reviewed and will be rejected.

2. The Warranty and O&M table of contents was taken directly from the Specifications, if any of the items listed do not apply (have been deleted/changed by change order **insert an “exception sheet” behind the corresponding numbered tab** (samples attached) with the following information:
 - a. Item that was changed, deleted or not required with a signature block for the contractor.

Note: DO NOT leave a blank space behind a tab. If the information is located somewhere else put a copy of it behind the appropriate tab or put a sheet behind the tab stating exactly where the information is located (i.e. “Product data is included on the shop drawing.”).

3. Operation and Maintenance manuals must have operation and maintenance instructions. Submittals are not acceptable replacements for operation and maintenance instructions. If submittals are submitted instead of O&M information the manuals will not be reviewed and will be rejected. Operation and Maintenance manuals **must also contain** copies of approved **Submittal Product Data and Shop Drawings. Shop Drawings should be numbered with the appropriate spec section number, compiled in spec section order and submitted as a rolled up drawing set with the O & M manuals. Small format shop drawings (i.e. 11 X 17 and smaller) should be 3-hole punched and placed in the O&M binder behind the appropriate tab.**

Where multiple O & M Binders are required to complete a single set, indicate the Volume # of the set # (IE. Volume 1 of 2), and the Tab #s included in each binder (IE. Tabs 1 thru 25).

The Engineer is to ensure that there are no blank tabs in the binders before forwarding them to GCS.

4. Provide following information on the cover and spine of each manual:

Name of School or Project

Name of the Manual, i.e., **Warranty & Closeout Manual** or **O&M Manual**.

Contractor’s Name

Contract Type i.e. **General Prime Contract (if multi-prime project) or Single Prime Contract**

Name of Architect/Engineer

Date of substantial completion

Volume _____ of _____

Tabs _____ Thru _____

B. Instructions for Digital Closeouts

All closeout documentation shall be submitted in electronic format unless noted otherwise. The information is to be organized using Window Explorer folder system as outlined below:

1. Folder #1 titled “ Certificates and Approvals”
 - a. Project Contact List (all participants including contractors, subcontractors, suppliers, etc.)
 - b. Letters from contractor requesting substantial and final inspections
 - c. Certificate of Occupancy by local AHJ
 - d. Required approvals from other agencies
 - e. Certificate of Substantial Completion
 - f. Certificate of Final Completion

- g. Punchlist(s)
 - h. Contractor letter stating no asbestos-containing materials were used in the construction of the project.
 - i. Any other documentation requested by the owner.
2. Folder #2 titled "Warranty Manual"
 - a. Contractor's General Warranty
 - b. Manufacturers / Installer / Equipment and System Warranties
 3. Folder #3 titled "Submittal Documents"
 - a. All final approved shop drawings submittals organized in CSI Masterformat
 - b. Documentation of all manufacturer / material color and finish selections (by schedule or location)
 4. Folder #4 titled "O&M Manual": Requirements are outlined in the Project Manual
 5. Folder #5 titled "Record Drawings and Project Manual"
 - a. PDF files of all final drawings
 - b. PDF of Project Manual
 - c. Electronic CAD files of all drawings in format acceptable to the Owner
 - d. PDF of Bid Addendum
 - e. Scanned PDF set of field marked up as-built drawings.

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. General: Provide final cleaning. Final Cleaning is the responsibility of the General Contractor. 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 the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project 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. Pressure wash all concrete and paved surfaces affected by this project.
 - d. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - e. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - f. Remove debris and surface dust from limited access spaces, including roofs, chimney, mezzanines and similar spaces.
 - g. Sweep concrete floors broom clean with sweeping compound.

- h. Clean transparent materials, including glass in doors and windows. Replace chipped or broken glass and other materials.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - j. Remove any paint from "UL" and similar labels, including mechanical and electrical nameplates.
 - k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar drippings, and other foreign substances.
 - l. Replace parts subject to unusual operating conditions.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned out bulbs, and those noticeably dimmed by hours of use.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Orange County Schools' property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
- D. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of any rodents, insects, and other pests. Exterminator to provide a written report to Owner prior to Substantial Completion being awarded.
- E. The following quantities of extra materials are part of the project base bid and shall be turned over to the owner at the end of the project. Additional items listed in various specification sections are also required to be turned over to the owner at the end of the project.

Spare Parts

Extra Stock Materials –To Owner at Project Completion -Not Applicable on this project

Guidelines	Title	EXTRA STOCK

END OF SECTION 01 77 00

PART 1 – GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties:

- 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

- A. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
 - 2. Division 1 Section "Closeout Procedures" specifies contract closeout procedures.
 - 3. Divisions 2 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

- E. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- G. Submit written warranties in Portable Document Format (PDF) to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer. Note that the warranty period does not commence until Certificate of Substantial Completion has been issued for the project.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within 15 days of completion of that designated portion of the Work.
- H. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Engineer, for approval prior to final execution.
 - 1. Refer to Divisions 2 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
 - 2. Provide 1 hard copy, and 1 electronic copy in Portable Document Format (PDF), of all closeout documents to Engineer for distribution to Owner. This includes O & M Manuals, Project Documents, As-Built Drawings, Approvals, Certificates, and all warranty information. PDF is to be verified as fully searchable and Indexed by spec section number, or by plan section and page number for drawings, and the index shall be fully linked with the document pages.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 78 36

DIVISION 02

EXISTING CONDITIONS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to the work covered by this Section.

1-02: Work Included: This section includes the labor, material, equipment and related services necessary to remove from this site existing interior construction as shown on drawings and as listed below:

a) Interior Demolition:

Areas to be demolished include, but are not limited to:

- Walls, doors, flooring, windows and other items as indicated on drawings.
- PME demolition as indicated on drawings.

b) Exterior Demolition:

- Exterior windows and doors
- Exterior downspouts
- PME demolition as indicated on drawings.

1-03: Standards: Except as modified by governing codes and these specifications, comply with all applicable provisions and recommendations of ANSI A10.2, Safety Code for Building Construction.

1-04: Utility Companies: Notify A/E of work required by Utility Companies not designated on plans. Work by Utilities shall include disconnecting, removal and reinstallation of respective piping or conduit to point of metering, service entrance or designated valve unless indicated on plans. No work shall be done to any existing lines without Utility Company knowledge and approval.

PART 2: PROTECTION**2-01: "North Carolina One Call Center"**

Prior to commencing any work, notify "North Carolina 811" (1.800.632.4949 or www.nc811.org) for establishment of all known underground utility lines. Maintain all site markings in good condition, except in case of removal.

2-02: Discovery of Hazardous or Contaminated Material: Make explorations and probes as necessary to ascertain any required protective measures before proceeding with demolition and removal. Should any toxic or contaminated material be discovered, immediately notify Durham Public Schools and the Architect/Engineer. If material in liquid form is disturbed, take precautions to contain material with earthen dike or berm in order to prevent run-off into adjacent waterways, sewer easements, storm water systems and public streets. If any underground storage tank or container is encountered, stop work immediately in vicinity and notify the County of Durham Engineering Department.

2-03: Provide, erect and maintain barriers, warning signs and other items as required for proper protection of workmen engaged in demolition operations, the general public and adjacent construction.

2-04: Take necessary precautions to prevent mud and debris from being deposited on corridors, sidewalks or parking areas. Maintain all temporary entrance-ways into the site in good condition until more permanent paving and drainage systems are in place.

2-05: Provide temporary fire protection measures in accordance with Durham County Fire Marshal requirements.

PART 3: WORKMANSHIP

3-01: Demolition and hauling work shall be performed to the extent shown on drawings. Perform required work, particularly work involving removal of subsurface items, with extreme care.

PART 4: CONSTRUCTION WASTE MANAGEMENT

4-01: The General Contractor will establish a construction waste management plan of all construction and demolition. The project goal is to send 50% of non-hazardous construction and demolition to be diverted from disposal at the landfill or incinerators.

END OF SECTION

DIVISION 03

CONCRETE REQUIREMENTS

ARCHITECTURAL CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1-01: General: The General Conditions of the Contract and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes the labor, materials, equipment, and related services necessary to furnish and install cast-in-place concrete as shown on drawings and specified herein. Concrete for walks, and other paving, is included in this section. Concrete used at exterior paving and sidewalks shall be “white” concrete made using white cement, sand and aggregate. See landscape requirements for specific requirements for “white” concrete. Note requirements for Special Testing related to footing and foundations at this project. Special testing if required by the building inspection official, shall be by the Owner’s consultant.

1-03: Substitutions: For purposes of establishing the type and quality of materials required for work included in this section, manufacturer’s names, types, patterns, etc., are used. Equal products of other manufacturers must be accompanied by supporting technical literature, samples, and performance data for comparative evaluation.

1-04: Quality Assurance

1) “Specifications for Structural Concrete for Buildings (ACI 301)”, latest edition. ACI Standard 301 is hereby made a part of this specification to same extent as if bound herein. ACI 301 shall be amended, supplemented or deleted as required by this project. The Contractor shall keep a copy of ACI 301 in field office at all times. This standard may be obtained from the American Concrete Institute, P.O. Box 9094, Farmington Hills, Michigan 48333-9094.

2) CRSI “Manual of Standard Practice”.

3) ACI 318 Building Code Requirements for Reinforced Concrete.

4) ACI 315 Details and Detailing of Concrete Reinforcement..

5) ACI 302.1R - Guide for Concrete Floor and Slab Construction.

6) ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

7) ACI 305 - Hot Weather Concreting.

8) ACI 306 - Cold Weather Concreting.

9) ACI 347 - Recommended Practice for Concrete Formwork.

10) “Building Official” as referred to in ACI publications shall be the Owner or Owner’s Representative.

11) Secure Engineer’s approval prior to placing concrete for all sub-grades, footings, forms, reinforcing, framed floors and construction joints.

12) The testing lab will perform sampling, testing and reporting during concrete placement, as follows:

a. Sampling: ASTM C 172.

b. Slump: ASTM C 143, one test for each load of point of discharge (at end of pump hose).

c. Air Content: ASTM C 231 for normal weight concrete; ASTM C 173 for lightweight concrete, one for each set of compressive strength specimens.

d. Compressive Strength: ASTM C 39, one set for each 50 cu. yds. or fraction thereof of each class of concrete; 2 specimens tested at 7 days, 2 specimens tested at 28 days, and two retained for later testing if required.

13) Non-complying test results will initially be reported by phone to the Owner, Architect, Contractor and concrete producer on the same day test are made. All results will be communicated in written reports.

14) Concrete work not in compliance with requirements of the contract documents will be rejected, removed and replaced immediately.

1-05: Submittals

1) Submit 6 copies minimum of shop drawings to A/E for approval before fabrication and installation.

2) Submit 6 copies of concrete mix design proportions: Proportion mixes by either laboratory trial batch or field experience method, complying with ACI 211.1. Submittals without proper documentation will be rejected. Submit written report to Architect/Engineer and Owner of each proposed concrete mix at least 15 days

prior to start of work. Do not begin concrete production until mixes have been reviewed and are acceptable to Architect/Engineer. Propose separate design mix for pumped concrete.

3) Submit 6 copies of reinforcement shop drawings for fabrication, bending and placement of concrete reinforcement. Show bar schedules, spacing and arrangement. Show all openings, depressions and slope-to-drain elevations.

1-06: Delivery, Storage and Handling: Deliver steel reinforcement to job site bundled, tagged and marked. Use metal tags indicating bar size, lengths and other data concerning placement. Store steel reinforcement at job site in a manner to prevent damage and accumulation of dirt and excessive rust. Deliver transit mixed concrete from approved batching and mixing plant in accordance with ASTM C94.

PART 2: PRODUCTS (SEE PART 3: EXECUTION)

PART 3: EXECUTION (ACI 301 Supplemental Requirements)

CHAPTER 1: GENERAL

(1.7) Submit 6 copies minimum of shop drawings in accordance with Para. 1-05 of these specifications.

CHAPTER 2: MATERIALS FOR CONCRETE

(2.1.1) Portland Cement: ASTM C 150, Type I, or Type II all by the same manufacturer.

(2.2.1) All chemical admixtures must be approved by Architect/Engineer. The following admixtures are approved; any substitutions must be submitted for approval in accordance with Para. 1-03.

(2.2.1.1) Air-entraining admixtures, ASTM C260: MB-VR by Master Builder's Company; Darex AEA; Protex AES; or equal products submitted under Para. 1-03.

(2.2.1.2) Water-reducing, retarding and accelerating admixtures, ASTM C494: Pozzolith by Master Builders Co.; WRDA by W.R. Grace & Co.; Protex PDA; or equal products submitted under Para. 1-03.

(2.4.1) Aggregates: ASTM C 33 for normal weight and ASTM C 330 for lightweight. Lightweight concrete, is to have a maximum unit weight of 115 lbs. per cu. ft. Local aggregates not complying with ASTM C 33 but which have been shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Architect.

Aggregates used at exterior paving and sidewalks called for to be "white" concrete shall be made using white cement, sand and aggregate. Samples of mix and "white" concrete shall be submitted for review and approval.

CHAPTER 3: PROPORTIONING

(3.2) Design mix to provide concrete and grout with the following properties:

a. Building foundations, frame, slabs and site items; regular weight (145 pcf) 3000 psi 28-day compressive strength.

b. Slab on metal deck; Lightweight (115 pcf) 3000 psi 28-day compressive strength.

(3.2.1) Concrete strength and type (regular or lightweight) shall be as shown on structural drawings. Type III Cement (high early strength) shall not be used.

(3.4.1) Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content with the following limits.

Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:

4% for maximum 2" aggregate.

6% for maximum 3/4" aggregate.

7% for maximum 1/2" aggregate.

Other Concrete: 2% to 4% air

(3.4.2) Water Cement Ratio: Concrete exposed to weather less than 0.50 and concrete subject to deicers less than 0.45. White cement for use in exterior walks and/or slabs labeled "white" concrete shall have a higher ratio of white cement sim. to white cement manufactured by AALBORG Portland.

(3.5) Slump limits: Proportion and design mixes to result in concrete slump at the point of placement as follows:

a. Reinforced Foundation Systems: Not less than 3” and not more than 5”.

b. All Other Concrete: Not less than 2” and not more than 4”.

(3.7.1) The use of calcium chloride will not be permitted.

(3.8.2) Proportioning of regular stone concrete shall be by Method 1, subject to the exclusions stated herein; all others to be by Method 2. Mix design for all classes of concrete to be used shall be prepared by an independent testing laboratory for the approval of Architect. The cost of services for the preparation of design mix shall be paid by Contractor.

CHAPTER 4: FORM WORK

(4.1.3) Where soil conditions permit excavation and placing of concrete to accurate dimensions without cave-ins or deformation of supporting soil, forms may be omitted as approved by Engineer.

CHAPTER 5: REINFORCEMENT

(5.2.1) Reinforcing bars shall conform to ASTM A 615, Grade 60, deformed. Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications. Wood, brick and concrete masonry unit supports may not be used except that concrete bricks may be used in footings only.

(5.5.4) Welded wire fabric in structural slabs shall conform to ASTM A 185 and shall be considered load carrying reinforcement. Provide welded wire fabric in sheets, not rolls.

CHAPTER 6: JOINTS AND EMBEDDED ITEMS

(6.1.4) All construction joints where shown on drawings shall be bonded.

(6.2.2) Pre-molded expansion joint filler shall be 1/2” thick unless otherwise indicated on drawings, and shall be Type 2. Filler shall be full width and depth of abutting sections, allow for filling top 1/2” of all joints with polyuria joint filler as detailed in 11.5.1. If this requires removal of top 1/2” of expansion joint filler this shall not constitute a change to the contract. Where in contact with joint sealers, filler shall be compatible with joint sealer.

(6.4.3) Aluminum conduit or aluminum accessories shall not be embedded in concrete. Where galvanized or PVC conduit is embedded in composite floor deck, minimum distance between conduit and shear connector shall be 3”. Submit proposed routing of conduit for approval.

(6.4.4) Samples of embedded items shall be submitted for the Architect/Engineer’s approval. Inserts and accessories required by other prime contractors will be supplied by those contractors.

(6.5) Approval of the Architect/Engineer shall be obtained before placing sleeves through structural members unless shown on drawings.

CHAPTER 7: PRODUCTION OF CONCRETE

(7.1) Ready-mixed concrete shall be mixed and transported in accordance with “Specifications for Ready-Mixed Concrete”, ASTM C94.

CHAPTER 8: PLACING

(8.1.2) No concrete shall be placed prior to approval of sub-grades, footing bottoms, forms, reinforcing and joints.

(8.4.3) No concrete shall be placed when the temperature is below 40 degrees F., and falling or when freezing temperatures are expected within 24 hours, unless written permission is obtained from the Architect/Engineer. Approval shall be for the agreed procedure only. When concreting is permitted in cold weather, ACI 306 shall be followed with the following stipulations:

1. Do not use calcium chloride, accelerators or other antifreeze admixtures.

2. Do not use Type III cement.

3. A minimum of one field test sample shall be taken for each 50 cu. yds. of concrete or portion hereof, placed each day. Three extra cylinders, in addition to laboratory-cured cylinders shall be cast and cured under the same field conditions as the concrete in the structure. These shall be used as directed to determine whether freezing occurs and to check strength of ASTM C-31 and ASTM C-39.

CHAPTER 9: UNDER SLAB VAPOR BARRIER

A. Laminated and reinforced vapor retarder shall meet or exceed ASTM E1745 Classes A,B, & C and shall be “Premium Moistop Ultra 15 Underslab “ as distributed by Fortifiber Building Systems (1-800-773-4777) , Perinator 15 mil by W.R. Meadows, or Stego-Wrap 15 mil by Stego Industries, San Jaun Capistrano, CA.

B. Installation of Under-slab Vapor Barrier: Apply vapor barrier to top of crushed stone fill in widest practicable widths; lap joints not less than 6 inches. Where penetrations occur through the barrier, at edge laps, at damaged areas contractor shall seal with manufacturer's seam tape, boots with sealant or seam tape to the object penetrating as required by manufacturer in their printed literature.

CHAPTER 10: FINISHING OF FORMED SURFACES

(10.2.1) Rough Form Finish: All concrete surface not exposed to public view.

(10.3.1) Smooth Rubbed Finish: All concrete surfaces exposed to public view, unless otherwise noted on drawings or specified herein.

CHAPTER 11: SLABS

(11.5.1) Joint sealer shall be 100% solids polyurea joint filler. Depth: Min. 1/4" or equal to width up to 1/2", greater than 1/2" depth equal 1/2" width. Color: Stock color nearest color of concrete. Fill joints to overflowing and there are no gaps. Shave joints with sharpe edge scrapers as soon as joint filler has cured. Joints shall be even with surrounding concrete floor.

(11.7) Finishes for slabs:

1. Trowel Finish (Tolerance Class A):

a. All exposed floors and floors to receive resilient tile or carpet. Review wood flooring spec for tolerances required for wood flooring system.

2. Sealed Concrete Floors:

1. Location – As called out on drawings "Sealed Concrete"

2. Material and Manufacturer:

"Masterseal" as manufactured by Master Builders, Sonneborn Kure-N-Seal, Sikagard, W.R Meadows, or approved equal product;

3. Installation:

a) First Coat - Surface must be sound and properly finished. Surface is application-ready when it is damp but not wet and can no longer be marred by walking. Level any spots gouged out, remove all dirt, dust, droppage, oil grease, asphalt and any other foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry so that surface is no more than damp, and never wet. Coat shall be applied at full strength.

b) Second Coat - For floor areas designated for sealer type finish, a second coat shall be required to seal and dustproof. Coat shall be applied at full strength. Restore surface soundness by patching, grouting, filling crack and holes, etc. Surface must be free of any dust, dirt, oil, grease, rubber mars, and any other foreign matter prior to the application of the second coat. Follow procedures as stated above to cleanse and prepare surface. Second coat shall be applied when all trades are completed and structure is ready for occupancy.

c) Install per manufacturers printed specifications. Submit 5 copies of these specifications for approval before proceeding. Manufacturer shall provide a trained technician to advise the Contractor on proper methods of application. Check for compatibility with adhesives used for installing resilient tile and direct-glue-down carpet. Upon completion, Contractor and manufacturer shall submit to Architect/Engineer statement of compliance with manufacturer's installation requirements.

3. Broom or Belt Finish: All exterior walks, platforms, and aprons.

4. Floated Finish: All concrete surfaces to receive ceramic tile.

CHAPTER 12: CURING AND PROTECTION

(12.1) Liquid curing compounds shall not be used on surfaces to which any type of topping, finish or sealing material is to be bonded. Curing compound shall not interfere with bond adhesives for resilient tile, carpet, or with ceramic tile setting materials.

(12.2) Approved curing methods are as follows:

1. Water curing by covering the entire surface of concrete with water. The curing water should not be more than twenty (20) degrees F cooler than the concrete.

2. Water curing by fog spraying or sprinkling to provide a continuous film of water over the entire surface of concrete.
3. Water curing by means of covering the entire surface with absorbent materials which shall be kept moist. Absorbent materials can be burlap, cotton mats, rugs, or other approved materials.
4. Curing by means of covering the entire surface with waterproof sheet materials to reduce the loss of mixing water from the concrete.
 - a. Materials can be polyethylene sheeting, waterproof paper, or polyethylene coated burlap.
 - b. On slabs the sheets should extend over the edges at least twice the slab thickness.
 - c. During cold weather black polyethylene sheeting should be used.
 - d. During hot weather white polyethylene sheeting should be used.
 - e. Do not use polyethylene on slab surfaces that will be exposed.
5. Curing by means of spraying or rolling a liquid membrane forming curing compound according to manufacturer's recommendations over the entire surface.

(12.3) Formed surfaces shall be cured by moist curing with forms in place for the full curing period.

(12.4) Minimum period of curing for all methods is seven (7) days unless a shorter period is approved by the Architect / Engineer.

CHAPTER 13: TESTING

In addition to field samples required, 6 standard cylinders (see set 1-04 on page 03300-1), 2 to be tested at 7 days and 2 to be tested at 28 days, and 2 to be retained for later testing if required, are required. A minimum of one field test sample shall be taken for each 50 cu. yds. of concrete or portion thereof placed each day. Testing Laboratory selected by Architect/Engineer and paid for by Owner shall provide both field and laboratory services and bear full responsibility for sampling and handling of concrete specimens.

CHAPTER 14: ACCEPTANCE OF STRUCTURE

(18.1) Should there be cause to suspect that air content does not meet specifications, tests shall be performed on the hardened concrete in accordance with ASTM C457 if directed by Architect.

(18.5) Fill for Concrete Masonry Units

Fill for bond beams, lintels, and at other locations shown or noted in connection with concrete masonry units, shall be as called for on structural drawings.

END OF SECTION

DIVISION 04

MASONRY

MASONRY MORTAR

PART 1: GENERAL

1-01: Other Documents: The General Conditions of the Contract and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes the labor, materials, equipment, and related services necessary to furnish mortar for clay and concrete masonry units as called for on the drawings and specified herein.

1-03: Storage of Materials: Portland cement, lime, and/or prepackaged mortar mixes shall be delivered to the site and stored in unbroken bags or other approved unopened containers. These materials shall be stored in dry, weather-tight sheds or enclosures with elevated floors, which will prevent the inclusion of foreign materials and damage by water or dampness. Masonry sand shall be delivered and stockpiled in a manner to prevent inclusion of foreign materials and to avoid erosion.

1-04: Tests: The Owner and Architect reserve the right to require a representative sample of the job sand tested in accordance with requirements of Paragraph 2-01, b. Tests will be performed by an independent testing laboratory selected by the Architect. Costs of tests will be paid by the Owner.

PART 2: PRODUCTS**2-01: Materials:**

- a) Cement shall be Portland Cement Type I or II, meeting Standard Specifications for Portland Cement ASTM C-150-89.
- b) Sand shall meet the requirements of Standard Specifications for Aggregate for Masonry Mortar ASTM C-144-89.
- c) Hydrated Lime shall meet the requirements of the Standard Specification for Hydrated Lime for Masonry Purposes ASTM C-207-88 Type S.
- d) Hydraulic hydrated lime shall meet the requirements of the Standard Specification for Hydraulic Hydrated Lime for Structural Purposes ASTM C-141-89.
- e) Water shall be potable.
- f) Admixture workability and air entraining admixtures may be utilized and shall conform to ASTM C-260-86.
- g) Water repellent equal to "Acme-Shield" by Adams Products Co. shall be added to mortar while mixing in accordance with manufacturer's specifications and installation procedures for all exterior applications.
- h) Special additives for glass block masonry shall be in accordance with the glass block manufacturer.
- i) Mortar color for use with brick masonry unit masonry, field or accent color and glass block masonry (if required) shall be equal to "Color Match System W -33" using with white cement and white sand as required for color match.

2-02: Prepackaged Mortar Mixes:

The mortar mix shall be in accordance with the following specifications:

- a) Type S Mortar Mix. The mortar mix shall have a compressive strength of 1800 psi maximum at 28 days when tested in accordance with ASTM C-270-89.
- b) The mortar mix shall contain Portland cement, hydrated lime, plasticizing admixtures, and/or hydraulic hydrated lime. Mortar mixes, which contain other materials, including ground limestone, ground slag or other cementitious and non-cementitious materials, are not acceptable.
- c) Bag Label. Each bag of mortar mix shall have a printed label thereon which shall show the contents. Contents shall be described by the percent by volume of Portland Cement ASTM C-150. Hydrated Lime ASTM C-207, Hydraulic Hydrated Lime ASTM C-141, and Admixtures ASTM C-260. Instructions for mixing the mortar mix shall be clearly printed on the container. These instructions shall be by volumetric measurement and shall be limited to the method of mixing in proper proportions of sand to 1 bag of the prepackage mortar with water to produce a flow of the proper consistency.

d) The mortar mix shall be composed only of Portland Cement, hydrated lime and/or hydraulic hydrated lime and workability admixtures within the following limits:

- 1) Maximum of 65% Portland Cement
- 2) Minimum of 33% hydrated lime and/or hydraulic hydrated lime.
- 3) Maximum of 2% admixtures.

See above for color requirements

The lime component shall have calcium plus magnesium oxide minimum content of 65.0% and shall have an unhydrated oxide content (as received basis) of 8% maximum.

e) Air Content - The air content of the prepackaged mortar mix shall be limited to 16% maximum when tested in accordance with ASTM C-91-91, Paragraph 18 through 22.

f) Autoclave Expansion - Autoclave expansion of the mortar mix shall not exceed 1.0% when determined in accordance with ASTM Method C-150.

g) Freeze-thaw resistance - The mortar mix shall comply with the following requirements when subjected to 50 cycles of the freeze-thaw test:

Loss of compressive strength - 35% maximum.

Loss in dry weight - 1.0% maximum.

The test specimen shall be made in accordance with ASTM C-91, Paragraph 18, 19, and 20 and be tested in accordance with ASTM C-91 paragraphs 23 and 24, and ASTM C-67, Paragraph 8.

2-03: Measurement and Mixing:

a) The method of measuring materials shall be by volume and shall be such that the specified proportions of the mortar materials can be controlled and accurately maintained. A measuring device to make consistent volume measurements shall be used throughout the project. Measurement of sand by shovel shall not be permitted.

b) Mortar mixer shall be paddle-type mechanical mixer. It shall be of such design and size to accommodate the mix without over-loading, and be adequately powered to vigorously mix ingredients.

c) The mortar mixer shall be charged in this order: add approximately 1/2 of water required, 1/2 sand, cement and lime (or prepackaged mortar mix), remaining amount of sand, and then sufficient water to bring the mix to desired consistency. Mortar shall be mixed for a minimum of five minutes after all materials have been charged into mixer, with all batches being mixed to the same consistency.

d) Mortars that have stiffened because of evaporation of water may be re-tempered by adding water as frequently as needed to restore required consistency. Mortars shall be used and placed in their final position within 2 hours after mixing. When the temperature is over 80 degrees F., the mortar shall be used within 1-1/2 hours after mixing. Mortar not used within these time periods shall be discarded.

PART 3: EXECUTION

Installation of mortar is specified in Section 042200, Unit Masonry, covering workmanship requirements for brick, concrete and glass masonry units.

END OF SECTION

MASONRY ACCESSORIES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes the labor, materials, equipment, and related services necessary to furnish wall reinforcing, related accessories and specialties as called for by the drawings and specified herein. Installation is specified in Section 042200, Unit Masonry.

1-03: Substitutions: For purposes of establishing the type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Accessories produced by AA Wire Products Co., Dur-O-Wall, Hohmann & Barnard, which meet specification requirements will be acceptable. Equal products of other manufacturers approved by the Architect will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data required in order to make valid comparisons of products involved.

PART 2: PRODUCTS

2-01: General: Materials and finishes for masonry reinforcement are listed below, under the individual items.

2-02: Horizontal Joint Reinforcement: Joint reinforcement shall be fabricated from knurled or otherwise deformed wire conforming to ASTM A82-90a requirements for cold drawn steel wire. Cross-ties shall be flush welded to permit full mortar cover. Finish shall be hot dipped galvanized after fabrication in accordance with ASTM A153-B2-87 requirements for 1.5 oz/psf coating. Prefabricated assemblies for corner and tee intersections shall be of same material, construction and finish to tie in with adjoining reinforcing. Single wythe masonry wall reinforcing shall consist of 2 parallel side rods with cross rods at 15" min. centers. Side rods shall be No. 8 gauge; cross rods, No. 9 gauge. Width of reinforcing shall be 2" less than width of masonry wall. Reinforcing shall be equal to AA Wire Products BLOCK-LOK AA500, Durawall D/A 320 Ladur (D/A 370S - Seismic at Cavity Walls), Hohmann & Barnard - # 220 (# 265 at Cavity Walls)

Veneer Reinforcing shall be seismic rated single strand reinforcing system and shall be placed less than 1.5 "from face of veneer masonry wall. Reinforcing shall be equal to, Wirebond RJ-711 Adj Veneer Anchor, Hohmann & Barnard - "T-Loc Tie" or sim. products by AA Wire Products Co., Dur-O-Wall. Reinforcing shall have 9 ga. galvanized continuous horizontal wire reinforcing.

2-03: Paint: Coating for surfaces where galvanizing is destroyed by field welding shall be zinc rich one coat organic type primer.

2-04: Masonry cavity flashing and weep protection fabric shall be equal to "Mortar Net" high-density polyethylene mesh equal to "Polytite", as manufactured by Mortar Net USA, LTD. or approved equal products.

2-05: Weeps shall be equal to "Cell Vent" by Mortar Net.

- a. Unit shall be made of polypropylene and meet ASTM D2240, D790B, D638 and D1238B.
- b. Unit shall be full head height.
- c. Unit shall com in (7+) manufacturer's colors.

PART 3: EXECUTION

Installation of reinforcement assemblies, anchors and wall ties shall be as shown on drawings and as specified in the related masonry and concrete sections.

END OF SECTION

BRICK UNIT MASONRY

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes the labor, material, equipment, and related services necessary to furnish and install brick unit masonry work for new construction, at areas requiring underpinning, and related accessories and specialties called for by the drawings and specified herein:

Mortar - Section 040513

Masonry Accessories - Section 040523

Joint Sealant - Section 079000

1-03: Testing: Before installation of any masonry work, the Contractor shall provide 3 copies of an independent testing lab report outlining the physical properties of the masonry units proposed for use on this project. Testing report shall be paid for by the unit masonry manufacturer.

1-04: Sample Panel: Before the installation of any masonry work a sample panel shall be built. Panel shall be not less than 5'-0" x 4'-0" x 8" thick. It shall show the proposed color range, texture scoring, bond, mortar color, coursing, thickness and tooling of joints and workmanship for masonry materials. No masonry work shall be done until the Architect has approved the sample panel. The approved panel shall become the standard of comparison for all masonry work built of the materials that the approved panel includes. The panel shall not be altered, moved or destroyed until masonry work is completed.

1-05: Storage of Materials: Brick shall be delivered and stored at job site on pallets or timbers, above grade. Brick which are chipped, cracked, broken, marred or improperly sized shall not be used where exposed to view. Brick which are muddy or which have coatings of foreign materials that might reduce bond with mortar, or cause staining, shall not be used in any part of the work.

1-06: Protection from Weather: No bricklaying shall be performed unless the temperature of the surrounding air is 40 degrees F. and rising. The use of "antifreeze" or accelerating admixtures is not permitted. Provide temporary protection of completed portions of masonry to insure a minimum 48 hours curing at a minimum 40 degrees F.

1-07: Coordination with Other Trades: Provisions shall be made to permit the installation of the work of other trades with a minimum of cutting and patching. Items specified under other divisions shall be built in, as necessary, as the work progresses.

PART 2: PRODUCTS

2-01: Brick: Brick shall comply with the requirements of ASTM C216-90a, Grade SW. Color and texture of new brick shall match as closely as possible masonry used on the walls of the existing buildings and will be selected by Owner and Architect from field samples.

Main School Building: Unit dimensions of brick units shall match existing. Assume 3-5/8"(d) x 2-5/16"(h) x 7-5/8"(l).

All Brick types shall have a minimum compressive strength of 3000 psi and a rate of water absorption less than 30 grams per 30 square inches. For bidding purposes, the contractor is to use an allowance, as listed below including all special shapes. The allowance is to cover the cost of the brick plus tax.

BRICK - Allowance \$500 / thousand

Note special shapes to be included as indicated on drawings. No additional costs will be charged to the Owner for special shape fabrication or assembly.

PART 3: EXECUTION

3-01: General: Masonry work shall be coordinated with the work of other trades so that connecting work and built-in work may be properly installed.

Mechanical and electrical items shall not be enclosed until they have been inspected by local authorities.

Required chases and recesses shall be built in as the work progresses, so that structural stability and weather resistance are maintained, and cutting and patching are reduced to a minimum. Cutting of brick shall be carefully performed using carborundum saw blade for a cleaner cut; no cut brick shall be installed with dimensions less than 3" in length, full height and 1/2 depth. There shall be not less than 8" of masonry between chases and the jambs of openings.

3-02: Brick Masonry Workmanship:

a) Wetting of Brick

Brick shall be thoroughly wetted as necessary to reduce the rate of absorption of water at time of laying to not more than 0.7 of an ounce (20 grams per minute) per brick when placed on its flat side in 1/4" of water for one minute.

b) Laying Brick

1) Brick shall be laid in running bond, (unless otherwise indicated on drawings).

2) Brick Laying Technique - All joints between brick shall be completely filled with mortar. Brick shall be laid in a full, lightly furrowed bed of mortar with the head joints completely filled by placing sufficient mortar on the end of the brick so that when the brick is shoved into place, the head joint will be filled. Buttering of face edge and then slushing will not be permitted. All joints, both interior and exterior shall be cut flush.

3) Disturbed Units - Where brick are disturbed or must be moved after the mortar has begun to lose its moisture, the brick and all adjacent mortar shall be removed and reset completely.

4) Tooling - All joints shall be tooled to a uniform concave shape, head joints first and then the bed joints. All joints shall be tooled at approximately the same degree of moisture content and firmness to achieve a uniform color and texture.

5) Construction Tolerances

a) Variation from Plumb: For lines and surfaces of columns, walls and arises to not exceed 1/4" in 10 feet, nor 1/2" in 40 feet or more, except for external corners, expansion joints, and other conspicuous lines, do not exceed 1/4" in any story or 20 feet maximum, nor 1/2" in 40 feet or more.

b) Variation from Level: For grades shown for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines do not exceed 1/4" in any bay of 20 feet maximum, nor 3/4" in 40 feet or more.

c) Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions do not exceed 1/2" in any bay of 20 feet maximum, nor 3/4" in 40 feet or more.

d) Pointing of Masonry: At the completion of the masonry work, all holes in the exposed masonry shall be pointed. Defective joints shall be cut out and tuck pointed solidly with mortar. Pointing and tuck pointing shall be done with a pre-hydrated mortar.

e) Brick Masonry Cleaning: While laying the brick, good workmanship and job housekeeping practices shall be used so as to minimize the need for cleaning the brick. The bricklaying technique shall be such that mortar does not run down the face of the wall, or smear the mortar onto the brick face. After the joints are tooled, cut off mortar tailings with the trowel and brush excess mortar burrs and dust from the face of brick. If after using the above outlined techniques, additional cleaning of the walls is found necessary, allow the walls to cure one month prior to initiating further cleaning processes.

f) Extended Cleaning (after 1 month): Saturate the wall with clean water. The wall shall be thoroughly saturated prior to and at the time the cleaning solution is applied. Clean the wall only with an approved cleaning solution applied with a brush, starting at the top of the wall. Approved cleaning solutions are as follows: Sure-Klean 600, Vanatrol, Superior 800 or approved equal. Approved cleaners shall be composed primarily of detergents, wetting agents, buffering agents, and a maximum of 10% murateic acid. The use of cleaning agents shall first be approved in writing by the manufacturer of the brick being cleaned, and by the Architect.

The concentration, method of application of the cleaning solution, and method of scraping shall be as outlined on the container by the manufacturer. High pressure water and sandblasting shall not be used for cleaning, except with the recommendation of the brick manufacturer, and the written approval of the Architect. Immediately after

cleaning a small area, the wall shall be rinsed thoroughly with water. Protect adjacent surfaces and materials during brick cleaning operations.

END OF SECTION

CONCRETE UNIT MASONRY

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes the labor, material, equipment and related services necessary to furnish and install concrete unit masonry work, with related accessories and specialties called for by the drawings and specified herein:

Mortar - Section 040513

Masonry Accessories - Section 040523

Joint Sealant - Section 079000

1-03: Testing: Before the installation of any masonry work, the Prime Contractor shall provide 3 copies of an independent testing lab report outlining the physical properties of the masonry units proposed for use on this project. Testing report shall be paid for by the unit masonry manufacturer.

1-04: Storage of Materials: Concrete masonry units shall be stored under covers which will permit circulation of air but will protect them against wetting or surface contamination prior to use.

1-05: Protection from Weather: No bricklaying shall be performed unless the temperature of the surrounding air is 40 degrees F. and rising. The use of "antifreeze" or accelerating admixtures is not permitted. Provide temporary protection of completed portions of masonry to insure a minimum 48 hours curing at a minimum 40 degrees F. Facing materials shall be protected against staining. Tops of walls shall be kept covered with non staining waterproof coverings when work is not in progress; covering shall extend down a depth of at least three courses of brickwork on both faces of walls and shall be rigidly and substantially anchored in place.

1-06: Coordination with Other Trades: Provisions shall be made to permit the installation of the work of other trades with a minimum of cutting and patching. Items specified under other divisions shall be built in, as necessary, as the work progresses.

1-07: Recycling Materials: Contractor and supplier shall recycle all broken and unused or damaged cmu masonry units if practicable for reuse at the manufacturer's plant. Manufacturer shall supply contractor and his masonry subcontractor suitable containers that can be filled with masonry materials and returned by supplier/manufacturer

PART 2: PRODUCTS**2-01: Concrete Masonry Units:**

a) General

Concrete masonry units shall be of modular sizes. Thickness shall be as noted on drawings. Units shall be made of Type 1 Portland cement complying with the requirements of ASTM C 150-89, and an approved lightweight aggregate. The aggregate shall comply with the requirements of ASTM C 331-89 and ASTM C33-90 blended to form an even, fine to medium texture as per Architect's sample, with the exception that cinders will not be acceptable. Shapes shall be furnished as indicated on the drawings and as required to provide proper bonding. Units shall be steam cured and stored at the manufacturer's yard under cover for a period of not less than 20 days before they are delivered to the job site.

The concrete masonry unit manufacturer shall have the necessary facilities to make periodic and frequent tests to determine the moisture content of units; these facilities shall be made available to the Architect, or his representative, should he desire to conduct his own tests. After delivery to the site, the units shall be protected

from the weather before and after installation in the building, in order to hold the moisture content as low as possible.

b) Typical Units

Concrete masonry units for general use shall comply with requirements of ASTM C90-90 for Type I moisture-controlled, Grade N. Unit weight of concrete used in the production of masonry shapes shall not exceed 85 min. - 105 max. pounds per cubic foot when tested in accordance with ASTM C140-90. Special shape for diagonal corners shall be fabricated from standard 8x8x16 unit.

c) Concrete Building Brick

Concrete building brick shall comply with requirements ASTM C55-85, for Type I, Grade N.

d) Classification D-2 (2-Hour)

Concrete masonry units for use at boiler room and other locations noted on drawing shall comply with fire rating requirements of UL Assembly U902 for 2-hour construction. Products must be obtained from a supplier certified by UL who can submit required certificate stating compliance with production and performance requirements.

Note that the mortar for this assembly shall comply with UL requirements.

e) Approved Concrete Masonry Unit Suppliers shall include the following:

Adams Products, Inc., Durham, N.C. (919-383-2521).

Southeastern Materials, Albermarle, N.C. (1-800-222-4181).

Johnson Concrete Co., Inc., Willow Springs, N.C. (1-800-476-5858).

Boston Concrete Products, South Boston, VA.

PART 3: EXECUTION

3-01: General: Masonry work shall be coordinated with the work of other trades so that connecting work and built-in work may be properly installed. Mechanical and electrical items shall not be installed. Mechanical and electrical items shall not be enclosed until they have been inspected by local authorities. Required chases and recesses shall be built in as the work progresses, so that structural stability and weather resistance are maintained, and cutting and patching are reduced to a minimum. There shall be not less than 8" of masonry between chases and the jambs of openings. No horizontal chase or horizontal projection of a diagonal chase shall exceed 4 feet in length. Masonry directly over chases 16" in width or wider shall be supported on lintels as indicated on structural drawings. Mortar boards which are left on scaffolds shall be cleaned of mortar at end of each day's work. When work is resumed, the top surfaces of work shall be cleaned of loose mortar. Typical exterior walls shall consist of a facing wythe of brick, an air space, and a back-up of concrete masonry units where indicated on drawings. Facing wythe shall be tied to CMU with reinforcing ties specified in Section 040523; ties shall be placed not farther apart than 16" vertically or horizontally. Cavity air spaces and metal ties shall be kept free of mortar droppings by placing wood strips with attached wire pulls on metal ties; strips shall be removed and cleaned as brick laying reaches each row of ties. Weep holes, as indicated on drawings, shall be provided in facing wythes directly above wall flashing and elsewhere as shown.

Weep holes shall be spaced 24" on centers horizontally with raked head joint approximately 1-1/2" ht. Control joint spacing shall not exceed 30 feet o.c, unless indicated otherwise on the drawings. Control joints in unit masonry shall be 3/8 inch wide by 3/8 inch deep unless other wise indicated and shall be raked and left ready for backing rod and sealant. Masonry reinforcement shall be continuous through the control joint. Thru-wall flashing shall be built in as shown and as specified in Division 7. Walls and corners built in higher levels than adjacent walls shall have courses raked back without tothing.

Lay out all vertical courses on story poles before starting and maintain thickness of joints. Lay out face courses before starting and keep the bond plumb within a limit of 4 times the variation in length of brick in approved sample wall.

3-02: Concrete Masonry Unit Workmanship:

a) General

Cutting to accommodate the work of other trades and to fit units between structural elements, openings, etc., shall be done with a motor-driven carborundum or diamond saw; cuts shall be square and at right angles to faces; CMU at angled walls not utilizing special shapes shall be cut cleanly at angle. Wherever possible, minimum length of cut units shall be one-half unit. Work shall be laid with particular care to provide plumb and true surfaces, uniform and level coursing, and proper alignment of vertical joints. Concrete masonry unit faces shall be kept

free of mortar as the wall is laid; if they are not, they shall be cleaned as required to provide surfaces satisfactory to the Architect.

b) Installation of Concrete Masonry Units

Concrete masonry units shall be laid in running bond matching adjoining masonry and accurately aligned. Units shall be bedded solidly in full beds of mortar on face shells and webs; vertical joints shall be filled with mortar to full depths of face shells, on each face of wall. Joints shall be accurately aligned. Joints found to be too thin as produced by manufacturer shall be swat to standard 3/8" mortar joint width to align with remainder of joints. Joints shall, after initial set occurs, be compacted with a jointing tool to form a raked joint matching the scoring on faces of units where scored units occur. Joints at areas of running bond coursing shall be tooled with standard concave joint.

c) Masonry Reinforcing

Joint reinforcing shall be installed in all exterior walls and in masonry partitions. Unless indicated otherwise, it shall be placed not farther apart than 16" o.c. vertically. Reinforcing shall be continuous. Laps shall be not less than 6" at splices and laps shall contain at least one cross wire of each piece of reinforcement. Prefabricated corner and tee reinforcing shall be placed in the same joints as main reinforcing. Masonry shall be anchored to precast concrete members and to structural steel members as indicated. Anchors shall be spaced not more than 16" apart vertically on columns; they shall alternate with continuous joint reinforcing to avoid interference which would prevent maintenance of uniform horizontal joint thickness. Galvanized surfaces that have been destroyed by field welding shall be given a full coat of the zinc rich paint specified in Section 040523, Masonry Accessories. Control joint materials shall be installed in as long lengths as practicable. Butt joints shall be tight. Joints shall be straight, with uniform relationships between faces of joint material and faces of masonry.

3-03: Pointing and Cleaning of New Concrete Unit Masonry:

a) Defects in masonry surfaces shall be repaired. Any holes in mortar joints shall be filled. Defective joints shall be cut out, filled solidly, and tooled to match adjacent work.

b) Upon completion of masonry work, concrete masonry units shall be free of surface mortar, stains, and other defects, which might prevent acceptable application of materials specified in Division 9.

3-04: Pointing and Cleaning of Existing Concrete Unit Masonry.

a) Any existing defects in existing masonry shall be repaired.

b) Any damage to existing masonry caused by the removal of wall mounted items shall be patched and tooled to flush with existing masonry.

c) Any existing glues, caulking and bonding substances left from the removal of existing wall mounted items shall be removed completely for application of materials in Division 9.

END OF SECTION

DIVISION 05

METALS

STRUCTURAL STEEL

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install steel beams, columns, angles, tube frames, bearing plates, anchor bolts, assembly bolts, threaded rods and other items of structural steel shown on or reasonably implied from drawings and specified herein. Deformed reinforcing bars welded to items of structural steel shall be furnished with shapes to which they are attached. Field Painting is specified in Section 099000.

1-03: Standards Included by Reference: Standards listed below are incorporated by reference into this specification, with modifications as listed hereinafter. Industry standards and ASTM specification designations refer to the latest edition as of the date of request for proposals on the project:

(1) American Institute of Steel Construction:

“Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings”.

“Specification for Architecturally Exposed Structural Steel”

(2) American Welding Society: Structural Welding Code, D1.1

(3) American Society of Testing Materials:

A 36 - Structural Steel

A 53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless

A 108 - Steel BARS, Carbon, Cold-Finished, Standard Quality

A 153 - Zinc Coated (Hot Dip) on Iron and Steel Hardware

A 307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

A 325 - High-Strength Bolts for Structural Steel Joist

A 490 - Heated Treated Structural Steel Bolts, 150 KSI Minimum Tensile Strength

A 449, Test Method F606 for Axial Tensioning of Studs.

A 500 - Cold-Former Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

A 501 - Hot-Former Welded and Seamless Carbon Steel Structural Tubing

A 572 - High- Strength Low-Allow Columbium-Vanadium Steels of Structural Quality

A 992 - Structural Steel for Wide Flange Shape

(4) “Code of Standard Practice for Steel Buildings and Bridges”

(5) “ Manual of Steel Construction”

1-04: Shop Drawings: Submit 6 sets minimum of shop drawings to Architect/Engineer for approval. Manufacturing or fabricating of any material prior to the approval of shop drawings will be at the risk of the Contractor. Shop drawings returned “Make Corrections Noted” need not be resubmitted prior to fabrication, unless they are so noted, but four sets of corrected shop drawings shall be furnished to the Architect/Engineer for records. Approval of shop drawings will be for design only. The Contractor shall be responsible for dimensions, quantities, and coordination with other trades. Approval does not authorize change to contract requirements unless stated in a separate letter or change order.

PART 2: PRODUCTS

2-01: Delivery and Storage: Material handling methods shall be such that main members and attachments will not be bent or distorted. Storage methods shall keep steel free from conditions that would aggravate corrosion or distortion. Severely rusted materials shall be cleaned to provide surfaces acceptable to the Architect.

2-02: Structural Steel: All wide flange steel shall conform to requirements of ASTM A 992 Grade 50. Steel tubes shall be ASTM A 501, Grade 46. Angles, channel plates, and rods shall conform to ASTM A 36.

2-03: Reinforcing Steel: Reinforcing bars welded to structural steel shapes shall conform to requirements of ASTM A615-90 & ASTM A615M-90, for Grade 60, weldable quality.

2-04: Bolts: High-strength bolts shall conform to requirements of ASTM A325, unless otherwise noted on the drawings, machine bolts, ASTM A307.

2-05: Welding Electrodes: Manual arc welding electrodes shall conform to requirements of AWS A5.1 or A5.5, for Class E70 Series. Bare electrodes and granular flux for submerged arc welding shall be Grade SAW-2, AISC Specifications.

2-06: Connections:

a) General - Fabricator shall be responsible for design of connections for which details are not indicated on the drawings. Connections not shown and detailed on the drawings shall be designed as simple shear connections for the loads given on the drawings. Where loads are not given, design for the full load given in the AISC allowable load tables for the given section, span, and strength specification, proportioned for one-half the load at each end of the span.

b) Bolted Connections - Connections using high strength bolts are designed for bearing-type action unless otherwise noted on drawings. See drawings for connections requiring special provisions for slip-critical type connections complying with AISC Specifications. Unless noted otherwise on the drawings, all field connections shall be bolted with 3/4" diameter A325 bolts.

c) Welded Connections - All welding in shop and field shall be by operators who have been qualified previously by tests in accordance with the American Welding Society "Standard Qualification Procedure" to perform the type of work required, and who have been continuously engaged in this type of welding since qualifications with a lapse of no more than 3 months. Evidence of certification of field welders shall be submitted by the Contractor; welders shall be approved by the Architect/Engineer before start of erection. All butt welds are for full penetration unless otherwise noted on drawings. Provide back-up plates, extension bars, or run-off plates if required. Return all fillet welds twice the nominal size where possible. Preheat high strength steel to 100 degrees F., if air or steel temperature is below 50 degrees F. Handle, store, and dry low hydrogen electrodes according to manufacturer's recommendations.

d) One-sided Connection - One-sided connections shall not be used, except by special permission and written approval of the Architect/Engineer.

2-07: Fabrication:

a) Workmanship - Fabrication shall conform to requirements of AISC Specifications; see Paragraph 1-03.

b) Shop Connections - Shop connections shall be welded or bolted, as required by notes and details on drawings.

c) Finish:

1) Un-Primed Steel - all steel scheduled to receive fireproofing.

2) Primed Steel - all other locations

Refer to drawings for areas of steel to receive fireproofing; clean all steel by hand wire-brushing, or equivalent method, and solvents. Shop coat shall conform to requirements for SSPC-15-68T, Type 1 (red oxide) of the Steel Structures Painting Council "One-Coat Shop Paint System No.7.0) with Red or Brown Primer", with the following exceptions:

1) Shop Coat shall have a dry film thickness of 2.0 mils.

2) Field Painting is specified in Section 099000.

PART 3: EXECUTION

3-01: Methods of Erection: Erection methods shall conform to requirements of AISC Specifications. Methods of erecting and bracing structural members shall be the Prime Contractor's responsibility; he shall furnish and install the necessary guys, struts, shims, braces, etc., required. Erection methods, procedures, and materials shall comply with applicable safety regulations of all agencies having jurisdiction over the project.

3-02: Field Connections: Connections not shown otherwise on the drawings shall be made with 3/4" bolts complying with requirements of ASTM A325.

3-03: Field Fabrication: Field Fabrication required for correction of misfits or to provide for the work of other trades shall be done only as approved by Architect/Engineer. No holes shall be burned or reamed without specific approval for each joint.

3-04: Cooperation - Cooperation shall be as required by AISC "Code of Standard Practice".

3-05: Field Quality Control:

1. The Owner **shall** employ an independent testing agency to conduct and interpret tests and state in their reports whether the tested work complies with the requirements, and specifically state any deviations therefrom. The Contractor is to correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any noncompliance of the original work, and as may be necessary to show compliance of corrected work.

2. Inspect in accordance with AISC specifications including visual inspection of all bolted connections and torque wrench verification of nut-tightening of 10% of all bolted connections at random.

3. Perform visual inspection of all welded connections and perform radiographic tests on 100 percent of moment connections and 100 percent of tension (hanging) connections during erection of structural steel.

END OF SECTION

COLD-FORMED METAL FRAMING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install metal studs, channels, plates and angles for stud wall assemblies, soffits and fascias, with related accessories and specialties, called for on the drawings and specified herein.

1-03: Examination of Adjacent Work: Framing Subcontractor must examine areas to receive metal stud systems and report defects to Architect and Prime Contractor prior to installing material. Installation of metal components shall be considered as acceptance of surfaces to which system is attached.

1-04: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that request for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation. Manufacturers approved for use include:

UNIMAST INC.	Schiller Park, IL.	847-928-3400
DIETRICH INC.	Rock Hill, SC	803-324-4144
DALE INDUSTRIES	Dearborn, MI	313-846-9400

PART 2: PRODUCTS

2-01: Soffits: Studs for exterior and interior soffit supports shall be 18 gauge galvanized steel equal to UNIMAST SN studs. Widths shall be as noted on drawings.

2-02: Partitions: Studs shall be channel type, roll-formed from galvanized steel not lighter than 18 gauge, equal to UNIMAST ST studs. Runners shall be formed of 20 gauge, galvanized steel into channel shapes to receive stud widths as noted on drawings. Runner legs shall be 2" tall.

2-03: Fasteners: Secure studs to runners with fasteners equal to USG Type S-12 Pan Head; length shall be not less than 3/8". Fasteners for attaching studs to structural steel members shall be equal to Teks/4 self-drilling fasteners, not lighter than #12 diameter x lengths to suit field conditions. Fasteners for all other framing conditions shall be equal to USG Type S-12 Pan Head x length to suit field conditions for proper thread penetration. Fasteners shall be capable of withstanding 193 pounds single shear and 200 pounds bearing load without exceeding allowable design stress after installation.

PART 3: EXECUTION

3-01: Qualification of Mechanics: Work specified in this section shall be performed by mechanics experienced and skilled in erection of metal stud system components.

3-02: Installation: Cut components accurately to proper angles to fit tightly against abutting members. Framing members shall be held firmly in position until properly fastened. Track members shall be secured to concrete with powder-driven fasteners and to structural steel with self-tapping screws or by approved welding methods. Space members typically at 16" centers elsewhere. Locate fasteners 2" from ends and at 16" centers elsewhere. Locate studs accurately, seated squarely in track with stud web and flange abutting track web, plumbed or aligned, and securely attached to flanges or webs of both upper and lower tracks. Splices in studs will not be permitted.

3-03: Stud Partition Erection: Locate runners and align accurately in accordance with details and partition layouts. Attach runners to concrete with powder-driven fasteners capable of withstanding 193 pounds single

shear and 200 pounds bearing force when driven into structural head or base without exceeding allowable design stress in runner or structural support. Locate fasteners 2” from each end and at 24” on centers elsewhere. Attach runners to metal deck, structural framing or other structural elements using manufacture approved fasteners for application.

3-04: Blocking and Reinforcement: Position studs plumb and vertical in runners; space 16” on centers. Provide additional studs and supplementary back-up framing members where required to support shelving, equipment or accessories, at door openings, corners, etc.

Secure studs supporting shelving, equipment or accessories adjacent to openings, at partition intersections, and at corners, to floor and ceiling runner flanges with USG Pan Head screws. Headers over openings shall be cut-to-length sections of runners with web bent at each end and secured to support with 2 minimum pan head screws. Jack studs shall be placed at vertical panel joints extending from headers to ceiling runners. Provide bracing to structure, reinforcing, and back-up members for attachment of equipment and accessories as shown on drawings for a rigid assembly.

3-05: Cutouts: Effective cross section of studs shall not be damaged by any trade. Sizes of cutouts in studs shall be carefully sized to permit passage of conduit or other mechanical equipment; reinforce studs as required or directed by Architect/Engineer.

END OF SECTION

METAL FABRICATIONS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install miscellaneous metal work with related accessories and specialties as called for by the drawings and specified herein. Note that Prime Contractor shall warrant the installation of metal stair nosing for a period of two years following acceptance of the Work. Failure in installing nosing or using inferior anchors shall require the Prime Contractor to replace metal nosing and associated concrete stairs if required by the Owner.

1-03: Substitutions: For purposes of establishing type and quality of materials required in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation within 10 days prior to receipt of Bids.

Manufacturers of construction casting approved for use include:

CONSTRUCTION CASTING CO.	Atlanta GA	404-355-9575
NEENAH FOUNDRY CO.	Philadelphia PA	414-725-3041
McKINLEY IRON WORKS	Fort Worth TX	800-433-2303

1-04: Shop Drawings: Submit 5 copies of shop drawings for Architect/Engineer review before fabrication is begun. Drawings shall indicate fabrication, assembly and erection details; sizes of members; fastenings, supports, and anchors; clearances and connections to other materials or to work of other trades.

1-05: Shop Painting: Items of steel and of cast iron which are not noted otherwise shall be cleaned and shop painted as per requirements listed in Section 051000. After shop coat has been applied, members shall be protected against contamination of coating by wind-blown or other foreign materials until paint is dry. Items shall not be handled or loaded for shipment until after paint has dried for at least 24 hours. Material with painted surfaces shall be delivered, stored, and erected in a manner, which will require a minimum of field preparation for subsequent painting. Field painting is specified in Section 099000.

Items indicated on drawings as galvanized and for exterior use shall be hot dip galvanized. Any field welds or cuts shall be cold galvanized prior to final completion of assembly.

PART 2: PRODUCTS

2-01: General Workmanship: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown on shop drawings using conventional methods of fabrication and support. Use type of materials shown or specified for various components of work. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown.

Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Weld corners and seams continuously, complying with AWS recommendations. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flathead (countersunk) screws or bolts. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use and in addition observing restrictions shown for attachment to other materials.

2-02: Materials and Components:

1) Metal Surfaces, General

For fabrication of miscellaneous metal work, which will be exposed to view, use only materials, which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

2) Structural steel shapes, bars, and plates; ASTM a36/a36M-91

3) Steel pipe: ASTM A53-90b, Type F, standard weight (Schedule 40), black finish unless galvanizing is required under description of individual item.

4) Expansion bolts shall have metal shields, expanded sleeves forced against cone-shaped nuts by tightening bolts; fiber or plastic devices will not be acceptable.

5) Cast iron shall be gray iron conforming to ASTM A48-90, Class 30 minimum.

2-03: Construction Castings: Construction castings shall be of types, patterns, and manufacture called for on drawings. Castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious or objectionable defects. They shall be smooth, wet cleaned by shot blasting or by other approved methods, and coated with high-grade bituminous asphalt paint. Castings shall be provided, but not limited to listing below:

C.I. storm water catch basins

C.I. curb inlets

C.I. yard drain clean outs

C.I. trench grates

2-05: Miscellaneous Items: Items are as detailed on the drawings:

1) Bent plates and misc. framing.

2) Misc. angles for partition bracing, opening frames, overhead and roll/coil doors and equipment support.

3) HC parking, directional signs and traffic bollards

4) Misc. components for ticket booth and marquee structural elements

5) Gates at openings between buildings unless otherwise indicated on site drawings and trash enclosures.

PART 3: EXECUTION

Items included in this section shall be installed by mechanics skilled and experienced in the erection of architectural and miscellaneous metal fabrications. Finished work shall be plumb or level as conditions require, in proper alignment, and properly secured to supporting members. Exposed surfaces shall be clean and free from defects, which might detract from durability or appearance, or which might prevent the satisfactory application of field finishes specified in Section 099000.

END OF SECTION

DIVISION 06

WOOD, PLASTICS AND COMPOSITES REQUIREMENTS

PRESSURE TREATED LUMBER

PART 1: GENERAL

1-01: Work Included: This section includes the treatment of wood to prevent decay. Species and grades of materials to be treated are specified in Section 061000: Rough Carpentry.

1-02: Materials to be treated:

- a. Sole plates for shoring, walls and partitions.
- b. Furring attached to concrete or masonry for attachment of gypsum wallboard.
- c. Nailers and blocking required for attachment or support of roofing and flashing materials, and roof accessories.

PART 2: PRODUCTS

2-01: Decay Treatment: Members to be treated with preservative to prevent decay shall be treated with Wolman E (CBA, Type A), Minimum net retention of 0.20 pounds per cubic foot; or, with Osmose NW 100, minimum net retention of 0.25 pounds per cubic foot. After treatment, members listed shall be air seasoned or kiln dried to a maximum moisture content of 15 percent. They shall be stored at the job site under a water-proof and weatherproof covering, and shall be elevated off the floor or ground a minimum of 12 inches.

PART 3: TREATMENT

Members listed shall be treated at an approved processing plant and shall be identified with type of treatment and processor's name.

Materials to be treated shall be cut to finish sizes and shapes in so far as practicable; unavoidable field cuts shall be heavily brush coated with a concentrated solution of the preservative specified. After treatment, members listed shall be air seasoned or kiln dried to a maximum moisture content of 15 percent.

END OF SECTION

ROUGH CARPENTRY

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install grounds, shoring, nailers, joists, studs, bracing, blocking, sheathing, etc. It also includes provision of temporary closures for doors and glazed openings as required for protection from weather and maintenance of proper temperature and humidity; and nails, screws, bolts, nuts, washers, and other fastening devices necessary for assembly and attachment of wood to wood, or wood to other materials, required to achieve results and effects specified and detailed. Pressure treatment to prevent decay, specified in Section 060573, is required of all lumber in contact with masonry or concrete, sills within 18 inches of grade, roof and curb blocking and other locations subject to moisture contact.

1-03: Quality Control: Each piece of lumber shall comply with American Softwood Lumber Standard PS 20-70 and with specific grading requirements of Southern Pine Inspection Bureau. Each piece of lumber shall be identified as to grade species by grade mark of recognized agency or organization certified by Board of Review, American Lumber Standards Committee, Washington, D.C.

1-04: Substitutions: For purposes of establishing type and quality of materials used in this section, manufacturers names and brand names are used. Equal products of other manufacturers may be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use include the following:

- Georgia-Pacific Corp., (800) 243-8160
- Koppers Company, Inc., Pittsburgh PA, (800) 556-7737
- Weyerhaeuser Co., Tacoma WA, (206) 924-2345

PART 2: PRODUCTS**2-01: Framing (minimum grades):**

- a) Sills - UTILITY
- b) Joists, Rafters, Headers - NO. 2
- c) Plates, Caps, Bucks, NO. 3
- d) Studs - STUD
- e) Furring (1" nom.) - NO. 3
- f) Sheathing - APA RATED SHEATHING, Exposure 1.

Dimension Lumber

All framing lumber shall be dry Southern Pine No. 2, selected and grade-marked in accordance with the latest edition of "Standard Grading Rules for Southern Pine Lumber" published by the Southern Pine Inspection Bureau.

2-02: Wall and Roof Sheathing: Wall sheathing shall be 1/2" Structural 1 (APA rated 32/16).

Roof sheathing shall be 5/8" Structural 1 (APA rated 32/16) unless matching existing roof sheathing that varies in dimension, and then thickness shall match existing to remain.

Roof sheathing where indicated as noncom shall be APA rated noncombustible sheathing to be 5/8" veneer core.

2-03: Connectors: Metal connector and accessories shall be manufactured then hot dipped galvanized, types and sizes as listed on drawings.

2-04: Siding, trim and fascia panels: All ceiling panels, trim, fascia, siding and soffit panels identified on the drawings shall to be fiber cement products equal to James Hardie Co. "Harditrim Smooth, Hardisoffit Non-vented

Smooth", & Hardiplank Select Cedarmill 8 1/4" horz. siding with physical properties as listed below: Equal products of Georgia Pacific and Certainteed Corp. are also acceptable.

Flame spread	0	ASTM E84
Smoke index	5	ASTM E84
Width (siding panels)	48 3/4"	
Length (siding panels)	8, 9 & 10'	
Thickness (siding panels)	5/16"	
Thickness (soffit panels)	1/4"	
Thickness (Trim & fascia)	3/4" x width indicated	
Thickness (Hardiplank)	5/16"	
Thermal Conductivity	6.62	per 5/16" thickness
Thermal Resistance	0.15	per 5/16" thickness
Permeability	1.54	per 5/16" thickness

PART 3: EXECUTION

3-01: General: Rough carpentry items shall be laid out as called for by the drawings, cut and fitted as necessitated by conditions encountered. All work shall be plumbed, leveled, and braced with sufficient nails, spikes, bolts, etc., to ensure rigidity.

3-02: Defective Material: Any piece of wood or other carpentry material defective to prevent it from serving its intended purpose (including but not limited to crooked, warped, bowed, checked, gouged or other defects) within limits of grade specified will be rejected and shall be replaced with an acceptable piece.

3-03: Wood Blocking and Nailers

- 1) Provide wood blocking, stripping, and shimming necessary to maintain lines and to support finishes called for by drawings.
- 2) Provide wood blocking, nailers and grounds as necessary to receive engaging woodwork, cabinets and other finished items, and for support of plumbing fixtures, accessories in toilets, and other similar items.
- 3) Secure wood blocking, nailers, grounds, etc., called for by drawings and by job conditions in place with approved types and sizes of nails, ties, bolts, inserts, etc., spaced so as to provide rigid support.
- 4) All concealed wood blocking shall be noncombustible treated as required by code.

3-04: Siding Installation: All panels and trim to be installed with galvanized nails in full compliance with the manufacturer's instructions and the NC Code.

3-05: Sheathing: Secure sheathing with screw fasteners spaced on edges, ends and intermediate as recommended by APA.

END OF SECTION

DIVISION 07

THERMAL & MOISTURE PROTECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and apply vertical waterproofing on below grade walls and building areas continuing below grade, as indicated on drawings and specified herein. Primary applications shall be at turn down foundation walls at boiler / Electrical areas and elevator pit walls.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids.

1-04: Manufacturer: Provide waterproofing and drainage materials from a single manufacturer with not less than 10 years experience in manufacturing sheet membrane waterproofing.

1-05: Installer: A firm which has specialized in installation of membrane waterproofing similar to that required for this project, with not less than 5 years of successful experience; and is acceptable to manufacturer of the primary membrane waterproofing materials.

1-06: System Performance: Provide sheet waterproofing products that have been produced and installed to establish and maintain watertight continuous seals.

1-07: Pre installation Conference: Prior to installation of waterproofing and associated work, meet at project site with Installer of the sheet membrane waterproofing and subsurface drainage material, the General Contractor, Architect, Manufacturer's field advisor, and installers of any work requiring coordination with waterproofing work. Review material selections and procedures to be followed in performing work. Notify Architect at least 48 hours prior to meeting.

1-08: Product Data: Submit specifications, installation instructions and general recommendations by manufacturers of the membrane waterproofing and subsurface drainage materials. Also submit manufacturer's certificate of compliance with published properties and independent test data to certify compliance to property values listed under "materials" below.

1-09: Substrate: Proceed with work only after drains, piping and other projections through substrate have been completed, and when substrate cleaning has been completed. Installer must examine substrate and conditions under which waterproofing work is to be performed, and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

1-10: Weather: Proceed with waterproofing and associated work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

1-11: Warranty: Submit a written warranty, executed by manufacturer and installer, agreeing to repair or replace sheet membrane waterproofing that fails in materials or workmanship within Ten (10) years from the date of substantial completion. Warranty shall be in addition to and not a limitation of other rights Owner may have against the Contractor under the Contract Documents.

PART 2: PRODUCTS

2-01: Waterproofing System

a. Rubberized Asphalt Sheet Waterproofing: Provide a self-adhering membrane of rubberized asphalt integrally bonded to polyethylene sheeting, formed into uniform flexible sheets of not less than 60 mils thick, complying with the following:

Tensile Strength:	325 psi min; ASTM D 412.
Ultimate Elongation:	300 percent min; ASTM D 412.
Pliability Temperature:	Minus 25 deg.. F (minus 32 deg.. C); ASTM D 146.
Hydrostatic Head Resistance:	231 feet min.
Water Absorption:	Not more than 0.5 percent weight gain after 48 hours of immersion at 70 deg.. F (21 deg.. C); ASTM D570.

Products: Subject to compliance with requirements above, following manufacturers are approved for use.

Bituthene 4000; W.R. Grace & Co.

Polyguard 650; Polyguard Products, Inc.

Mel-Riol; W.R. Meadows, Inc.

Tamko, Inc.

b. Adhesives and Joint Tape: Provide types of adhesive compound and tapes recommended by waterproofing sheet manufacturer for bonding to substrate (if required), for waterproof sealing of seams in membrane, and for waterproof sealing of joints between membrane and flashing, adjoining surfaces, and projections through membrane.

c. Primers: Provide non-solvent based surface treatment (conditioner) as recommended by manufacturer of sheet membrane for applications required.

d. Prefabricated Subsurface Drainage Material: Provide a composite drainage material consisting of a lightweight, 3-dimensional high impact polymer core and filter fabric which is securely bonded to the dimples of the molded core to maintain a rigid surface which prevents the intrusion of the fabric into toe flow channel when backfilled. The fabric is to extend a minimum of 3" with adjacent panels and the foundation drainage pipe. Furnish in 4' wide rolls, 25' and 50' in length, as required to meet job conditions and minimize end laps. Provide one of the following products:

Hydroduct 2 - W.R. Grace & Co.

Miradrain 6200 - Mirafi Inc.

Amerdrain 520 - American Wick Drain, Inc.

PART 3: EXECUTION

3-01: Installation:

a. Surface Preparation: Surfaces shall be clean, dry, smooth, free of dirt, oil and grease, tar and cement laitance, as well as other extraneous materials protruding from wall surface, such as reinforcing steel and wire. New concrete shall have a minimum of seven (7) days cure, unless otherwise stated in the manufacturer's printed data.

b. Void and Joints: Shall be filled with sealant and coated with non-flowing type material to a width of not less than one (1") on either side of the void, joint or routed shrinkage crack.

c. Apply surface treatment to concrete and masonry surfaces at a rate recommended by manufacturer of primary waterproofing materials. Treat only area that will be covered by waterproof membrane in same working day; retreat areas not covered by waterproof membrane within 24 hours.

d. Comply with manufacturer's instructions for handling and installation of waterproofing materials.

e. Coordinate installation of waterproofing materials and associated work so as to provide a complete system complying with combined recommendations of manufacturers and installer involved in the work. Schedule installation so as to minimize period of exposure before being covered by other work.

f. Extend waterproofing to provide a complete membrane over the area indicated to be waterproofed. Reinforce corners and finish off edges and ends in accordance with manufacturer's recommendations. Flash all pipes, conduits and other penetrations through waterproofing using prefabricated accessories.

g. Drainage Material: On vertical surfaces, install drainage material against entire waterproofed area in accordance with manufacturers instructions. Foundation drains, graded smooth river gravel and earth backfill are to be installed under Division 31 of these specifications.

h. Cleaning/Protection: After completion, remove any masking materials and stains from exposed surfaces caused by waterproofing installation. Provide for protection of completed membrane during installation of other materials or processes over membrane and throughout remainder of construction period.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and apply dampproofing on surfaces over which masonry facings will be applied (the outer face of the interior wythe of concrete masonry units exposed to wall cavities). Under-slab vapor barrier and “Building Wrap” are included in this section.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer’s names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids.

PART 2: PRODUCTS

2-01: Under-slab Vapor Barrier: Laminated and reinforced vapor retarder shall meet or exceed ASTM E1745 Classes A, B, &C and shall be “Premium Moistop Ultra 15 Underslab “ as distributed by Fortifiber Building Systems (1-800-773-4777) , Perinator 15 mil by W.R. Meadows, or Stego-Wrap 15 mil by Stego Industries, San Jaun Capistrano, CA.

2-02: Wall Treatment – Masonry: Dampproofing shall be fiberglass-reinforced and fibrated asphalt-emulsion for application by trowel to a “green” or slightly damp wall. It shall be Sonneborn’s “Hydrocide 700 Mastic”, complying with requirements of ASTM-C-2822-69 and Federal Specification SS-C-0153 C Type 1. Equal products of Karnak, Fort Lauderdale FL and W.R. Meadows, Elgin IL are also acceptable.

PART 3: EXECUTION

3-01: Installation of Under-slab Vapor Barrier: Apply vapor barrier to top of crushed stone fill in widest practicable widths; lap joints not less than 6 inches. Where penetrations occur through the barrier, at edge laps, at damaged areas contractor shall seal with manufacturer’s seam tape, boots with sealant or seam tape to the object penetrating as required by manufacturer in their printed literature.

3-02: Masonry Wall Surface Preparation: Surfaces to be treated shall be free of oil, dirt, grease, and other loose materials. Dry surfaces shall be dampened with water before applying mastic, and shall be kept damp ahead of application. Mastic shall not be applied at temperatures below 40°F.

In event of rain while application is in progress, and until coating on wall has set, provide protection to keep rain from damaging application. Dampproofing shall be applied by trowel in accordance with manufacturer’s printed instructions; a copy of these instructions shall be furnished to Architect before application begins. Mastic shall fill all cracks, crevices and grooves; coating shall be continuous and free from breaks and pinholes. Thickness of plastic film shall be not less than 1/16”, which manufacturer states can be obtained using a coverage of approximately 5 gallons per 100 square feet.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions, Supplementary Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and install thermal and sound insulation as indicated on drawings and specified herein.

1-03: Substitutions: For purpose of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids.

Products approved for use on this project include:

Rigid Insulation:

Dow Plastics Midland, MI
Amoco Foam Products Co. Smyrna, GA
Owens-Corning, Toledo, OH

Batt Insulation:

Celotex Building Products Division, Tampa, FL
Certaineed, Valley Forge, PA
Owens-Corning, Toledo, OH

Spray Foam Insulation:

Icynene, Mississauga, ON, Canada

1-04: Delivery and Storage of Materials: Materials shall be delivered in their original unopened packages and shall be stored under cover which will provide protection from damage and from exposure to elements and ultraviolet rays. Remove damaged, deteriorated, or wet materials from site. Installation and concealment of plastic foam insulation shall be completed as rapidly as possible in each area of work. Handle all material carefully to prevent undue stress and delamination or cracking of face sheets.

PART 2: PRODUCTS**2-01: Rigid Perimeter and Cavity Wall Insulation:**

a) Insulation at perimeter slab edge and at masonry cavity walls locations as shown on drawings shall be extruded polystyrene foam in rigid sheets equal to Dow's STYROFOAM SM Brand plastic foam, as listed below.

Thermal resistance:	R-Value /inch 75F mean temp.5.0	ASTMC518
Water absorption:	0.1 % max.	ASTMC272
Water vapor permeance:	0.4-1.1	ASTME96
Flame spread:	5	ASTME84
Smoke developed	165	ASTME84

b) Thickness:

Boards at slab perimeter shall be 2" thick x 48" wide, min. 25 psi compressive resistance
Boards at cavity walls shall be 2" thick x 16" wide, min. 15 psi compressive resistance

2-02: Batt Insulation:

a) Insulation shall consist of spun glass fibers into blankets designed for installation in wall assemblies which utilize metal studs. Insulation shall conform to requirements of ASTM E84 for flame spread of 25, fuel contribution of 50, and smoke development of 50.

b) Interior Partitions – Sound Insulation

Blankets shall be unfaced type, 6” thick (nom.) in 6” metal stud partitions and 4” thick (nom.) in 4” metal stud partitions.

2-03: Adhesives:

a) For adhering rigid insulation to masonry, plywood or gypsum board: Dow’s General Purpose Mastic No. 11. See paragraph 3-01 below.

b) For adhering batt insulation to gypsum sheathing board where required: Kentucky Adhesive Co., Inc. KAC J-545-F.

2-04: Spray-On Insulation for use at exterior walls and fascia assemblies or other areas detailed shall be equal to Icynene, Inc. low density, open-cell modified polyisocyanurate meeting the following criteria:

- a) Thermal Resistance (R-Value/inch) 3.6 hr./sq.ft./degree F/BTU (ASTM C518).
- b) Air Permeance: 0.00491/M2/second for 5.25 inches of material.
- c) Water Vapor Transmission 10 perms for 5 inches of material (ASTM E96).
- d) STC 37 (wood stud wall) (ASTM E9).
- e) Corrosion: No significant corrosion with steel under 85% relative humidity and 118°F.
- f) No bacterial or fungal growth.
- g) Flame spread and smoke developed rating <20/<400.
- h) No shrinkage following exposure to water.

PART 3: EXECUTION

3-01: Installation of Batt Insulation in Vertical Wall Application

Batt Insulation in stud walls shall be adhered to back of gypsum board with adhesive specified. Adhesive shall be applied in accordance with manufacturer’s recommendations for quantity and methods. Installation shall contain no gaps, thin spots, or breaks except where necessary for passage of mechanical or electrical services. Units in walls shall be fitted snugly between studs, against each other, and against runners and other adjoining construction members, to provide greatest possible resistance to passage of heat. Blankets in exterior walls shall be attached to sheathing with 9/16” staples having divergent points, placed at each corner.

3-02: Vapor barrier of 6 mil. polyethylene shall be installed with approved tapes and fasteners over entire interior of exterior wall of frame construction. Vapor barrier joints shall be taped with poly-tape.

3-03: Installation of all insulation shall be in accord with manufactures’ written instructions. Vapor barrier/interior finish shall be installed towards heater space. Required supporting members shall be used at horizontal and vertical surfaces to prevent excessive “sag” of roll insulation. All joints shall be sealed using approved tape, to be supplied with insulation.

3-04: Rigid masonry cavity wall insulation shall be installed horizontally beginning at bottom of cavity, slightly above lower portion of thru wall flashing, and secured to cured dampproofing masonry wall with adhesive specifically recommended by manufacture of insulation. Stagger joints between courses and place to maximize contact bedding with tight ends and butt edges. Boards shall be extended over expansion joints, unbonded on one side of joint.

3-05: Spray-On Insulation shall be installed by mechanics skilled in such applications and having five years (5) experience installing foam insulation. Material shall be applied in accordance with

manufacturers printed instructions at a spray density rate required by manufacturer to a thickness indicated on the drawings. Touch up material as required prior to completion of project.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install caulking and sealants between masonry or concrete and other materials; around door frames and frames for glazed openings; between metal and metal; between wallboard trim and adjacent materials; at flashings, at thresholds; at casework and around back splashes; and other locations called for by drawings, specified herein, or required for weather protection.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids.

1-04: Submittals: General Contractor shall submit to Architect 6 copies of product data sheets and manufacturer's installation instructions. If 2 or more different sealants are to be in physical contact with each other, obtain from manufacturer confirmation that its product is compatible with proposed and adjacent products, including any other products, which may be used by subcontractors. Primer literature shall be included with submittal documents unless manufacturer's sealant submittal specifically eliminates need for primer. If stain type primer is required for sealant selected, such information shall be specifically included on submittal documents calling attention to need for such staining type primer and noting planned precautions to prevent exposed stain residue. Submit 5 copies of manufacturer's standard color charts; upon request, cured samples of each color chosen shall be submitted for verification of actual color to be installed.

1-05: Quality Assurance: Subcontractors shall have minimum 5 years experience installing sealants. Applicator shall be responsible for verifying that sealants used are compatible with joint substrates. The General Contractor may be required to install sealant in mockups prepared by other trades in order to demonstrate appearance and workmanship technique. Such mockups should be done by those personnel who will be assigned to the project, using materials and techniques, which will be used on the project. Joint width/depth ratios shall be in accordance with manufacturer's recommendations. Manufacturer of sealant shall have been in business of manufacturing specified types of sealant for not less than 10 years.

1-06: Product Delivery and Storage: Deliver products from manufacturer in original unopened container clearly identifying each product specified relating to product literature submitted.

1-07: Guarantee: Sealant joints shall be guaranteed against adhesive and cohesive failure of sealant and against water penetration through sealed joint for 5 years.

PART 2: PRODUCTS**2-01: Interior Sealant:**

a) General Joints - One-component acrylic latex caulking (75% recovery minimum per ASTM C734-82); ASTM C834-76; maximum joint movement of 7.5%±.

b) Wet Area Joints - One-component, non-sag, mildew resistant paintable silicone sealant; ASTM C920-79, Type S, Class 25, Grade NS; Shore A Hardness of 25-30.

2-02: Primer: Primer shall be used in accordance with manufacturer's instructions, with all primers being applied prior to installation of any backer rod or bond breaker tape. Manufacturer shall be consulted for all surfaces not specifically covered in submittal application instructions. If a stain type primer is used, apply material in a manner that will prevent exposed stain residue related to application procedures.

2-03: Backer Rod: Backer Rod material shall be open or closed cell polyethylene or polyurethane as recommended by sealant manufacturer.

2-04: Bond Breaker Tape: An acceptable polyethylene or similar type bond breaker tape shall be used to prevent 3-sided adhesion in locations where backer rod cannot be used.

PART 3: EXECUTION

3-01: Inspection: Substrate surface shall be inspected to ensure that no bond breaker materials contaminate the surface to which sealant is to adhere and to ensure that unsound substrates are repaired. Installation of sealant shall be evidence of acceptance of substrate by Contractor and Subcontractor. Joint dimensions shall be verified prior to installation of sealant to ensure that all dimensions are within tolerance established in manufacturer's literature. Unacceptable variations shall be resolved by Architect and Contractor prior to installing any material.

3-02: Joint Preparation: Surfaces shall be clean and dry; free of oil, grease, loose materials, frost, etc. Clean white cloths or lint-less paper towels shall be used for cleaning; cloths or towels shall be changed frequently during cleaning operation. Cleaning agents or solvents shall not be allowed to dry without wiping. Joints shall be primed as required in accordance with sealant manufacturer's instructions. Surfaces adjacent to joints being sealed shall be masked with tape prior to priming. Tape shall be removed prior to initial set-up of sealant. Back-up materials shall be installed in accordance with recommendations of sealant manufacturers. Extruded foam backup material shall be installed with care to avoid puncturing the surface skin, or stretching the material longitudinally. Foam backer rods shall be installed by rolling and compressing the material using blunt instruments into joints to a uniform depth. The material shall be compressed to approximately 67% of its original width (diameter) for closed cell and 50% for open cell and so installed that sealant will be a minimum of 1/4" deep and a maximum of 1/2" deep, unless otherwise required by manufacturer. Joints which are more than 1/4" wide shall have a sealant depth as listed below:

- 1) For concrete and masonry:
 - a) Joint width 1/4"; depth 1/4"
 - b) Joint width 1/4"; to 1/2"; depth same as width
 - c) Joint width 1/2" to 1"; depth 1/2"
- 2) For metal, glass, other nonporous surfaces:
 - a) Joint width 1/4"; depth 1/4"
 - b) Joint width 1/4" to 1/2"; depth 1/4"
 - c) Joint width 1/2" to 1"; depth 1/2" width

Interior joints more than 3/4" deep shall be packed with closed-cell foam to within 3/4" of finish surface before sealant is installed.

3-03: Weather Conditions: Sealants shall be applied when temperatures are between 40 and 90 degrees F., and when joints are in a normal (not contracted or expanded) condition. At very low temperatures, faster drying solvents and quick drying, non-moisture sensitive primers shall be used. Sealants shall not be applied at times when expected closure of the joint in warm weather will exceed 25 percent. Sealant manufacturer's specific recommendations regarding use of product in cold or hot weather shall be followed together with proper precautions regarding temperatures for storage and mixing.

3-04: Mixing: Manufacturer's instructions for methods of mixing, speed, and time shall be followed

3-05: Application: Position of back up material shall be checked before application of sealant; required corrections shall be made. Sealant shall be applied with sufficient pressure to insure complete filling of joints. Joints shall be tooled to provide proper joint contour, to eliminate air pockets, and to provide maximum contact at joint interfaces. Tooling equipment may be of metal, wood or plastic. Tooling solutions to facilitate slip shall be clean water or other solutions specifically recommended by sealant manufacturer. Adjacent surfaces which are soiled shall be cleaned as sealant work progresses; excess material shall be removed before it has cured. Upon completion, joints shall be smoothly and neatly finished, and shall be watertight.

END OF SECTION

DIVISION 08

OPENINGS

METAL DOORS AND FRAMES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this Section.

1-02: Scope of Work: This section includes labor, materials, equipment, and related services necessary to furnish and install the following:

- Hollow metal doors (swinging, flush, glazed, louvered).
- Hollow metal frames (for single doors, doors w/transoms and/or sidelights, and for multiple or combination openings).
- Labeled hollow metal doors and frames.
- Hollow metal panels.
- Hollow metal fillers, closures, or covers.

1-03: Shop Drawings: Submit 6 copies minimum of shop drawings showing elevations and details of each door and frame type; location in the building for each item; conditions at openings with various wall thickness and materials; typical and special details of construction; methods of assembling section; type of shop primer with dry mil thickness; locations and installation requirements for hardware; size, shape, and thickness of materials. Materials shall not be delivered to site until drawings have been reviewed by Architect. Doors and frames shall be manufactured by same manufacturer.

1-04: Storage: Doors and frames shall be stored at the site under cover, above grade, in a manner which will prevent physical injury or damage due to moisture. Care shall be taken to avoid creating a humidity chamber by not properly venting the area covered.

1-05: Substitutions: For purposes of establishing type and quality of materials required for work in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use shall include:

- Steelcraft, Cincinnati, Ohio., 800.930.8585.
- Windsor Republic Doors & Frames, McKenzie, TN 800.733.3667
- Curries Co., Mason City, Iowa 641.423.1334.

1-06: Hardware Locations: Unless dimensioned otherwise on drawings, the location of hardware on doors and frames shall be as follows:

- Hinges:
 - Top - 9+/-" to max 11 3/4" from bottom of frame head to centerline of hinge.
 - Bottom - 10 3/8" to 13" from bottom of frame to center line of hinge.
 - Intermediate - centered between top and bottom hinges, equally spaced.
- Unit and Integral Type of Locks and Latches - 39-40" from bottom of frame to centerline of knob, lever, or strike.
- Deadlocks - 48" from bottom of frame to centerline of cylinder.
- Panic Hardware - 39-40" from bottom of frame to centerline of crossbar.
- Door Pulls - 42" from bottom of frame to center of grip.
- Push-Pull Bars - 42" from bottom of frame to centerline of bar.
- Arm Pulls - 41 1/4" from bottom of frame to centerline of lower base
- Push Plates - 41 1/4" from bottom of frame to centerline of plate.
- Roller Latches - 38" from bottom of frame to centerline.

1-07: Clearances: Provide edge clearances as follows:
Between doors and frame, at head and jams - 1/8".

At door sills without thresholds - 3/8" max. above fin. fl.

At door sills with thresholds - 3/4" max. above fin. fl.

Between meeting edges of pairs of doors - 1/8".

Note that "finished floor" is defined as the top surface of the floor except that when resilient flooring or carpet is used - when it then becomes the top of the concrete slab. Where the carpet exceeds 1/2" in depth, allow 1/4" clearance max. above the top of the carpet.

PART 2: PRODUCTS

2-01: Hollow Metal Frames:

a) Material:

1) Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A366-68, not less than 14 gauge, and shall have a zinc coating of not less than 0.60 oz. per sq.ft.

2) Frames for interior openings shall be made of either commercial grade cold-rolled steel conforming to ASTM A366-68 or commercial grade hot-rolled and pickled steel conforming to ASTM A569-66T. Metal thickness shall be not less than 16 gauge for frames in openings 48" or less in width, and not less than 14 gauge for frames in openings over 48" in width.

b) Design and Construction:

1) All frames shall be custom-made welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knocked down frames will not be acceptable.

2) All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warpage or buckling. Moulded members shall be clean cut, straight and uniform in profile throughout their lengths.

3) Jamb depths, trim, profile and backbends shall be as scheduled by the Architect and as shown on approved shop drawings.

4) Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded, and stops butted. The use of gussets will not be permitted.

5) Minimum depth of stops shall be 5/8". Cut-off (sanitary or hospital type) stops, where scheduled, shall be capped at 90 degrees at heights shown on approved shop drawings, and all jamb joints below cut-off stops shall be ground and filled smooth, making them imperceptible. Do not cut off stops on frames for soundproof, light-proof or lead-lined doors.

6) When shipping limitations so dictate, fabricate frames for large openings in sections designed for splicing in the field by others.

7) Frames for multiple or special openings shall have mullion and/or rail members fabricated from closed tubular shapes having no visible seams or joints.

All joints between faces of abutting members shall be securely welded and finished smooth.

8) Hardware Reinforcements:

a) Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping shall be done by General Contractor.

b) Minimum thickness of hardware reinforcing plates shall be as follows:

Hinge & pivot	-	7 gauge, 1-1/4" x 10".
Strike	-	12 gauge.
Flush bolt	-	12 gauge.
Closer	-	12 gauge.
Surface-mounted	-	12 gauge.
Hold-open arms	-	12 gauge.
Surface panic	-	12 gauge.

9) Floor Anchors:

a) Securely weld floor anchors inside each jamb for anchorage to floor.

b) Where scheduled or specified, provide adjustable floor anchors capable of not less than 2" height adjustment.

c) Minimum thickness of floor anchors shall be 14 gauge.

10) Jamb Anchors

a) Frames to be installed in masonry walls shall be provided with adjustable jamb anchors of the T-Strap type, not less than 16 gauge.

The number of anchors provided on each jamb shall be as follows:

Frames up to 90" high - 3 anchors.

Frames 90" to 96" high - 4 anchors.

Frames over 96" high - 1 anchor for each 24" or fraction thereof

b) Frames to be installed in stud partitions shall be provided with steel anchors of suitable design, not less than 18 gauge thickness, securely welded inside each jamb as follows:

Frames up to 90" high - 4 anchors.

Frames 90" to 96" high - 5 anchors.

Frames over 96" high - 5 anchors + 1 additional for each 24" or fraction thereof over 96".

c) **Frames to be anchored** to previously placed concrete, masonry or structural steel shall be provided with anchors of suitable design and quantity as shown on approved shop drawings. Fasteners for such anchors shall be provided by General Contractor.

11) Frames to be installed in masonry wall openings more than 48" in width shall have any angle or channel stiffener welded into the head. Such stiffeners shall not be less than 12 gauge steel and not longer than the opening width, and shall not be used as lintels or load-bearing members.

12) Dust cover boxes for mortar guards of not thinner than 26 gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.

13) Provide all frames with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

14) Loose glazing stops of cold-rolled steel, not less than 20 gauge thickness, shall be butted at corner joints and secured to the frame with countersunk cadmium or zinc-plated screws. Secure glazing stops to interior side of frame or the locked room side for interior frames.

d) **Finish:** After fabrication, remove all tool marks and surface imperfections, and dress smooth exposed faces of all welded joints. Chemically treat frames to insure maximum paint adhesion and coat all accessible surfaces with a rust-inhibitive primer which should be fully cured before shipment.

2-02: Hollow Metal Doors:

a) **Materials:** Doors shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A366-68, free of scale, pitting or other surface defects. Face sheets for interior shall be not less than 16 gauge; face sheets for exterior doors shall be not less than 14 gauge and shall have a zinc coating of not less than 0.60 ounces per square foot.

b) Design and Construction:

1) All doors shall be custom made, of the sizes and types shown on approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces of vertical edges. Minimum door thickness shall be 1-3/4".

2) All doors shall be rigid and neat in appearance, free from warpage and buckle. Corner bends shall be true and straight, bent to the minimum radius for the gauge metal being used.

3) Face sheets shall be stiffened by continuous vertical formed sections of steel spanning the interior space between door faces. These stiffeners shall be not less than 22 gauge, spaced not more than 6" apart and be securely fastened to face sheets by spot welds not more than 5" o.c. Spaces between stiffeners shall be sound-deadened and insulated the full height of the door with an inorganic non-combustible material.

4) Door faces shall be joined at their vertical edges by a continuous weld extended the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

5) Top and bottom edges of doors shall be closed with a continuous recessed steel channel not less than 16 gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attaching weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of any entrapped moisture.

6) Edge profiles shall be provided on both vertical edges of doors as follows:

- Single-acting swing doors - bevelled 1/8" in 2".
- Double-acting swing doors - rounded on 2-1/8" radius.
- 7) All hardware supplied for single-acting doors shall be designed for bevelled edges as specified.
- 8) Hardware Reinforcement

a) Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated and approved hardware only. Where surface-mounted hardware (or hardware requiring adjustment in the field such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by General Contractor.

b) Minimum gauges for hardware reinforcing plates shall be as follows:

- Hinge & Pivot reinforcements - 7 gauge.
- Reinforcements for lock face, flush bolts, concealed holders, concealed or surface-mounted closers - 12 gauge.
- Reinforcement for all other surface-mounted hardware - 16 gauge.

9) Glass Mouldings & Stops

a) Where specified or scheduled, doors shall be provided with hollow metal mouldings to secure glazing by others in accordance with glass opening sizes shown on approved shop drawings.

b) Fixed mouldings shall be securely welded to the door on the security side.

c) Loose stops shall be not less than 20 gauge steel with butt corner joints, secured to the framed opening by cadmium or zinc-coated countersunk fasteners. Snap-on attachments will not be permitted.

c) **Finish:** After fabrication all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free in irregularities. Doors shall then be chemically treated to insure maximum plant adhesion and shall be coated on all exposed surfaces with a rust inhibitive primer which is fully cured before shipment.

2-03: Hollow Metal Panels Hollow metal panels shall be made of the same materials, constructed and finished in the same way as specified for hollow metal doors.

2-04: Labeled Doors and Frames

- a) Labeled doors and frames shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect. Such doors and frames shall be constructed as tested and approved by Underwriters' Laboratories using the most current standards.
- b) If any door or frame specified to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or other reason, the Architect shall be notified before fabrication of that item begins.
- c) Fire doors or frames that do not qualify for labeling will be furnished non-labeled. However, if material specified as fire-rated and labeled can be obtained from any source, no consideration will be given to those manufacturers who are not authorized to fabricate and label such items.

PART 3: EXECUTION

3-01: Site Storage and Protection:

a) The General Contractor shall be responsible for seeing that any scratches or disfigurement caused by shipping or handling are promptly cleaned and touched up with a rust-inhibitive primer, and that materials are properly stored above ground on timbers or pallets in a dry location, and covered to protect them from damage.

b) Doors shall have their wrappings or coverings removed upon delivery at the building site and shall be stored, preferably inside, in a vertical position, spaced by blocking to permit air circulation around them.

3-02: Prior to installing frames, the General Contractor shall check frames and correct for rack, twist and out-of-square. Set frames plumb and level, in alignment until permanently built into the wall.

3-03: Frames shall be secured to structure as indicated or noted. Floor knees shall be attached to concrete with two powder-actuated fasteners at each jamb. Masonry anchors shall be built-in, and frames filled with mortar as wall is laid up. Frames in dry wall areas shall be filled with grout. Frames shall be installed plumb, square, and in proper alignment with adjacent wall surfaces. Protection shall be provided against physical damage and

surface contamination which might prevent acceptable application of field applied finish specified in Section 099000.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install wood doors as called for by drawings (Door Schedule) and as specified herein. See the following sections for related work:

- Section 062000 Finish Carpentry
- Section 081100 Steel Doors & Frames
- Section 087000 Finish Hardware
- Section 088000 Glass & Glazing
- Section 099000 Painting

1-03: Submittals: Submit 6 sets shop drawings scheduled to show door elevations, construction, swing, label, undercut and applicable hardware locations. Show dimensions and detail openings for glass lites, louvers and grilles. Submit actual veneer samples of doors to be factory finished with the standard finishes available, or a color sample will be furnished by the Architect to manufacturer for duplication.

1-04: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of bids. Products approved for use include:

- ALGOMA HARDWOOD, INC., Algoma WI, 800.558.8032
- WEYERHAEUSER, INC., Jackson MS, 601.981.9611
- VT INDUSTRIES, Holstein Iowa, (Type 5002) 712.368.4381

1-05: Delivery, Storage and Handling: No doors shall be delivered to the building until weatherproof storage space is available. Store doors in an area having controlled temperature and humidity range 30-60%. Stack doors flat and off the floor, supported to prevent warpage. Protect doors from damage and direct exposure to sunlight. Wrap factory finished doors individually in polybags to protect finish from damage. Damaged doors shall be repaired or replaced at no cost to Owner.

1-06: Quality Standards:

- 1) Production of wood doors shall conform with requirements of:
 - AWI, Sections 1300 & 1500.
 - NWWDA, IS-1 Series.
 - NEMA
 - NFPA

All doors shall be the product of the same manufacturer to insure uniformity of quality and appearance throughout the project. All wood doors shall be and have a "FSC Certified Wood Products" certificate. Certificate shall be delivered to the General Contractor with a copy to the Architect.

- 2) Labeled wood doors for this project shall be "B" Label 2 - hour (120 minute), 1 hour (60 minutes), or 1/3 hour (20 minutes as listed on drawings. Underwriters Laboratories or Warnock Hersey Rating for Fire Doors. All doors in rated partitions shall be labeled. Closure hardware is required in rated partitions.

Discrepancies between architectural drawings and procedures and limitations set forth by testing agencies shall be brought to the Architect's attention at the submission of shop drawings. Provide each fire-rated door with a label permanently attached to either the hinge stile or top rail, showing testing agency approval for classification scheduled.

- 3) Non-labeled wood doors shall meet construction requirements for 1/3 hour (20 minute) UL or Warnock Hersey Rating for Fire Doors.
- 4) One door may be randomly selected by the Architect for destruction testing to ascertain if the manufacturer has complied with specifications, if quantities warrant.

1-07: Moisture Content: Wood used in door construction shall be thoroughly seasoned, kiln-dried, with moisture content not less than 5% and not greater than 8%.

1-08: Warranty: All work in this section shall be warranted from the date of Certificate of Compliance against defects in material and workmanship, including the following:

- Delamination in any degree.
- Warp or twist of 1/4" or more in any 3.5' x 7.0' section of door.
- Telegraphing of any part of core assembly through face to cause surface variation of 0.01" or more in a 3" span.
- Any defect which may in any way impair or affect performance of door for the intended purpose. Replacement under this warranty shall include hanging, installation of hardware and finishing.

Periods of warranty after date of installation:

- | | | |
|----------------------------------|---|----------------------|
| - Interior solid or mineral core | - | Life of installation |
| - Exterior solid core | - | 5 year |
| - Interior hollow core | - | 5 year. |

Doors must be stored, finished, hung and maintained per manufacturer's recommendations set forth in their limited warranty.

1-09: Certification: Veneer faced wood doors to have Smart Wood Certificate approved by the Rain Forest Alliance and/or be approved and certified by the FSC (Forest Steward Council).

PART 2: PRODUCTS

2-01: General: Doors shall be of sizes, thickness, and types listed in Door Schedule and shown on drawings. Door manufacturer shall coordinate hardware, door, louver and glazing schedules with door and frame shop drawings. Door manufacturer shall supply to General Contractor printed instructions and recommendations for installation; 2 copies shall be submitted to Architect before installation is begun. Verify proper clearance for door swing and threshold height installation at floor finish transitions (refer to Finish Schedule and Door sill Details).

2-02: Wood Doors: Doors shall be Premium Grade Natural Rotary Cut veneer faced architectural units equal to "Heritage Collection" as produced by VT Industries. Door wood type and finish shall be BIRCH. Doors shall be composed of particleboard core with stiles and rails bonded to core under side pressure with high frequency method of cure and veneered with hardwood plies.

2-03: Physical Requirements

- 1) Thickness - 1-3/4"
- 2) Maximum Size – pre-fit or stock sizes up to 4'-0" x 8'-0", labeled (90 min.) up to 4'-0" x 8'-0" max. for singles.
- 3) Core Construction - solid particleboard core shall conform to Type I density (28-30 pcf), Class 1, Commercial Standard #236-66. Provide core reinforcement material for surface mounted closers and exit devices as required.
- 4) Stiles (dimensions given are min. sizes allowed after factory trimming to book-size or pre fitting) - 1-3/8" min. 2-ply edge strips glued to core; outer 5/8" ply species compatible with face veneer. Lamination to core on 4 sides shall conform with AWI 1300 - G-3, Spec. Symbol PC-5, PC-7 or PC-HPL.
- 5) Rails (dimensions given or min. sizes allowed after factory trimming to book-size or pre fitting) - 1-3/8" min. 2-ply mill-option hardwoods.
- 6) Cross Bands - thoroughly oven-dried hardwoods, 1/16" minimum thickness extending full width of door and laid with grain at right angles to face veneers.

7) Adhesives - cross bands and faces shall be laminated to cores with Type I, Melamine Fortified Urea Glue using hot plate process; edge bands shall be laminated to cores with Type II water-resistant glue using high frequency method.

8) Face Veneers (Interior Doors) - veneer shall conform with AWI 200-S-7 or ANSI/HPMA HP 1983 Table 2; faces must have 0.020" thickness minimum prior to factory sanding.

2-04: Cutouts for Lights and Louvers: Edge of any opening shall be no closer than 5" to edge or top of door and no closer than 8" to bottom of door. Where kick-plates occur, edge of cutout shall be 2" above kick-plate. There shall be not less than 5" between any light/louver cutout and any hardware or lock cutout. See Door Schedule Drawings for cutout dimensions.

2-05: Pre-finishing: Door shall have factory-finished faces, details and stiles; rails shall be sealed. Finish shall be equal to catalyzed conversion varnish equal to A.W.I. Section 1500 System #3, Premium Grade.

2-06: Pre-machining: Doors shall be sized and machined at the factory to receive all required hardware other than surface mounted items. After hanging, maximum clearance shall be 1/8" each side and top; bottom clearance for labeled (90 min.) door shall be 1/4" over noncombustible sill, if any, or 1/2" over noncombustible floor.

2-07: Louvers in Fire-Rated Doors: Louvers in the fire-rated doors shall have fusible link and be UL certified for given rating. Louvers shall be minimum 18-gauge construction with 16-gauge adjustable "Z" blades. Louver shall provide 50% free airflow.

PART 3: EXECUTION

3-01: General: Installation of doors shall be coordinated with application of finish hardware. Manufacturer's recommendations shall be followed in hanging doors. Surfaces shall be protected against physical damage, stain, discoloration or other injury, until project is accepted by Owner and Architect.

3-02: Machining and Fitting; All wood doors shall be machined by the manufacturer for cutouts, hinges, locks and other hardware requiring routing or mortising. Any required rabbeting to properly hang doors shall be performed by the manufacturer prior to finishing. Size doors to allow 1/8" clearance at tip and each side, and 3/4" at bottom (unless specified otherwise). Do not pre-drill for surface-applied hardware.

3-03: Installation of Hardware: General Contractor shall install hardware according to approved hardware schedule. Install hardware with full-threaded wood screws furnished by hardware manufacturer. Drill proper size pilot hole for all screws. Securely anchor hardware in correct position and alignment.

Adjust hardware and door for proper function and smooth operation, proper latching, without force or excessive clearance.

3-04: Installation of Fire Doors: Fire-rated doors shall be installed according to the requirements of the labeling agency and NFPA #80 and #101. The contractor shall pay for third party testing of all fire doors installed on the project. Provide third party testing report to architect, owner and local fire marshal. If deficiencies are discovered during third party testing, the contractor shall remediate the deficiencies at no cost to the owner.

3-05: Factory Finishing: Manufacturer shall pre-finish wood doors according to AWI Quality Standards Section 1500 Specification for System #3. Satin and semi-gloss finish will be standard unless specified otherwise. Finish samples shall be approved by the Architect prior to manufacturing or finishing of wood doors in the factory.

END OF SECTION

SPECIAL DOORS – ACCESS DOORS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install access doors in areas shown on drawings and as specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. manufacturers approved for use include:

Milcor limited Partnership
Birmingham Ornamental Iron Co.
Bilco Co.

1-04: Coordination: Work in this section shall be coordinated with work of Mechanical, Plumbing and Electrical Contractors, and with installation of contiguous drywall ceilings, soffits and walls.

1-05: Submittals: Submit 6 copies minimum of shop drawings for review; drawings shall show details of construction and materials for each type of access door required. Also include schedule of doors showing location, fire rating, type and finish.

1-06: Allowance: Note: Include Allowances, see Division 1

PART 2: PRODUCTS

2-01: General: Fire rated frame and panel assembly shall be manufactured under Factory Inspection Service of Underwriter's Laboratories, Inc. and shall display UL 1-1/2 hour "B" Label. Sizes are indicated on drawings.

2-02: Access Door (Milcor style DW): Frame shall be 16 gauge steel with 14 gauge steel panel. Provide galvanized steel drywall bead surrounding frame. Steel shall have chemically bonded prime coat of baked-on electrostatic powder. Hinges shall be concealed, spring type, opening to 175 degrees. Locks shall be flush, screwdriver operated, with metal cam. Size shall be as indicated on drawings.

2-03: Fire Rated Access Doors (Milcor style UFR): Frames shall be 14 gauge steel; panel shall be 20 gauge steel, reinforced sandwich type. Frame and panel shall be shop primed with rust-inhibitive paint. Panel shall be equipped with automatic closing mechanism on all doors. Lock assembly shall be cylinder type, self-latching, with key-operated cylinder lock and shall have release-type latch bolt from inside. Hinges shall be continuous steel piano type with stainless steel pin. Masonry anchors shall be factory-attached to frame.

2-04: Fire Rated Ceiling Access Doors (Milcor style CFRAD): Frames shall be 16 gauge cold rolled steel; door panel tops shall be 18 gauge cold rolled steel; panel sides shall be 20 gauge cold rolled steel and panel at channels shall be 26 gauge cold rolled steel.

Equip panels with one self-closing mechanism on 12"x12" doors and two self-closing mechanisms on doors larger than 12"x12". Lock assembly shall be self-latching spring bolt fiber board. Hinges shall be continuous stainless steel piano type. Steel shall have chemically bonded prime coat of baked-on electrostatic powder; exposed edges shall have prime coat of white, rust-inhibitive paint.

PART 3: EXECUTION

Install access panels in ceilings and walls where noted or indicated (verify with PME Drawings). Frames shall be attached to materials at openings in accordance with manufacturer's instructions. Fire rated access doors must be installed in strict accordance with manufacturer's instructions to allow self-closing mechanisms to operate freely without undue stress to adjacent materials. Panels shall be installed level and plumb, in proper alignment with adjacent ceilings and walls. Panels shall be finish painted in field as per requirements of Section 099000.

END OF SECTION

ALUMINUM WINDOW FRAMING

PART 1: GENERAL

1-01: References to Other Documents The General Conditions, Supplementary Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included This section includes labor, materials, equipment, and related services necessary to furnish and install glazed aluminum storefront system and aluminum windows with vent units in indicated window openings, sunshading and light shelf applications, with related trim / closure members as shown on drawings. Related items specified elsewhere:

- Sealant - Section 079000
- Special Doors - Section 083000
- Glazing - Section 088000

1-03: Substitutions For purposes of establishing the type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids.

1-04: Shop Drawings and Submittals Submit 6 copies minimum of shop drawings showing overall framing plans, elevations, and details of connections to steel, floor and wall supports. Submit metal samples with range of standard colors available for use. Submit sample of framing system showing aluminum and glazing extrusions.

PART 2: PRODUCTS

2-01: Aluminum mullion and perimeter framing shall be of one-part construction consisting of gutter and face sections, designed to permit unobstructed face glazing with through sight lines (no projecting stops). See drawings for special trim and anchoring conditions.

A. Storefront Window Framing: System to be used at all locations. System shall be equal to "Trifab VG 451" by Kawneer, Inc. (Greensboro, NC) (Kawneer Company, Inc., Technology Park/Atlanta, Norcross, Ga 30092, 404.449.5555)

- a. Unit shall be center glazed
- b. Unit shall have 2" sightline and 4.5" depth

C. Emergency Escape Windows shall be equal to "'8225TL" Thermal Windows by Kawneer Co., Inc.

- a. Units shall be outswing casement type
- b. Units shall meet the minimum clear opening requirements for NC Building Code Emergency Escape and Rescue windows.
- c. Units shall have full insect screening with screens that can be easily removed and locking hardware accessible thru built-in access door built into screen.

Manufactures approved for use shall also include:

- EFCO Corporation, Monett, Mo, (1.800.221.4169).
- Vistawall, PO Box 629, 803 Airport Road, Terrell, TX 75160, NC (919-828-4801).

2-03: Performance Requirements

- 1) Air Infiltration

Test infiltration rate according to ASTM E 283-84; air infiltration shall not exceed 0.08 cfm/sq.ft. of fixed area at 6.24 PSF pressure differential.

- 2) Water Infiltration

Test infiltration rate according to ASTM E 331; no water shall be detected on the inside surface of framing at a test pressure of 15 psf pressure differential with a water rate of 5 gallons/hr/sq.ft..

3) Structural

Maximum deflection of 1/175 of span and allowable stress with safety factor of 1.65. System shall perform to these criteria under wind load of 30 psf.

2-04: Materials Extrusions shall be 6063-T5 alloy and temper (ASTM B 221 alloy G.S. 10A-T5). The thermal barrier shall consist of a two-part, chemically curing, high density polyurethane. Fasteners where exposed, shall be aluminum, stainless steel or plated steel in accordance with ASTM A 164. Perimeter anchors shall be aluminum or steel, provided that steel is isolated from aluminum with elastomeric membrane or heavy-bodied non-metallic tape. Glazing gaskets shall be elastomeric extrusions.

2-05: Finish: All exposed framing surfaces shall be free of scratches and other serious blemishes.

- Aluminum components and moldings shall be given a chemical cleaning followed an approved pretreatment chemical conversion coating conforming to ASTM 1730, Type B , Method 5 or Method 7. Coating shall weigh a min. of 40 mg. per square foot (ASTM B 449, Sect 6).

a. Vent window units and doors:

- Primer/Pre Treatment: As required by manufacturer.
- Finish System: "Kawneer" Class I anodized finish "Black or Dark Bronze" to match existing finish

d. Storefront Components :

- Primer/Pre Treatment: As required by manufacturer.
- Finish System: "Kawneer" Class I anodized finish "Black or Dark Bronze" to match existing finish.

2-06: Fabrication

Vertical and horizontal framing members shall be flushed glazed on all sides with no projecting stops and have a 2" and a 2-1/2" face dimension. Overall depth shall be 4.5" with a 1-5/16" glass pocket width except at insulated spandrel areas that shall use adapters or varied glazing pockets. All frame corners and meeting rail intersections shall be coped and tenoned joined and forged. Make all corners and joints leak proof. Minimum depth of glazing rabbet shall be 13/16".

2-07: Hardware

Hinging hardware shall be heavy duty 4 bar hinges conforming to AAMA 904.1; hinges shall have positive stop and adjustable friction shoe. Locking hardware, strikes, keepers and pole rings shall be cast red bronze. Factory seal all hardware fasteners penetrating frame or inside plane of window with resilient non-hardening compound.

2-08: Aluminum Entry Door Requirements

Aluminum doors shall be equal to Kawneer Series 500 Wide Stile Swing Door.

- a) Door Sizes: See door schedule for sizes.
- b) Glass Stops: Beveled glass stops for 1/4".
- c) Door Frames: 1600 Series.
- d) Exit Device: Single action surface mounted units identified in the hardware schedule.
- e) Pull: Style CO-12.
- f) Door Closers: Single Acting: To be supplied with surface mounted closer equal to as specified in hardware section of this specification. Reinforcing and accessories to be designed by door manufacturer. Units shall be surface mounted.
- g) Pivots/Butts: Single acting: Kawneer top and bottom offset pivots (or) Kawneer top and bottom 4-1/2" x 4" (114.3 x 101.6) ball bearing butt hinge.
- h) Intermediate Pivots/Butts: Single Acting: Kawneer intermediate offset pivot.
- i) Locks Active Leaf: See hardware schedule

PART 3: EXECUTION

3-01: Installation

Following inspection of steel support framing system by General Contractor, Architect, Engineer and window framing Subcontractor and acceptance of anchoring conditions, Subcontractor shall install framing system in correct locations as shown in drawings.

Should steel framing system be misaligned from tolerance dimensions exceeding 1/2", the General Contractor shall provide additional framing, shimming or other approved corrective measures to provide proper alignment of support frame. window framing framing members shall be installed level, square and plumb according to manufacturer's recommendations. Subcontractor shall be responsible for sealant of adjoining construction (e.g. walls, floor, soffit).

3-02: Protection and Cleaning

Following installation of framing, glazing and sealant, the Subcontractor shall clean all framing free of excess sealant, touchup all scratches and blemishes and remove all installation debris from site. General Contractor shall protect installation from damage and staining; General Contractor shall be responsible for final cleaning of glass and framing.

END OF SECTION

FINISH HARDWARE

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to the work covered by this section.

1-02: Work Included: This section includes furnishing of finish hardware and items related to the security entry system (Note security entry system hardware will be supplied by the Owner), except hardware specified under other sections as follows:

- Section 062000 Finish Carpentry - millwork
- Section 083000 Access Doors
- Section 123216 Plastic Laminate Faced Casework

1-03: Hardware Schedule: Prime Contractor shall submit electronic copy of complete hardware schedule for review before hardware is ordered. Upon receipt of approval from Contractor, Supplier shall box each item of hardware separately, with each box labeled to denote contents and position in building as scheduled. Additional schedules shall be furnished for use on site.

1-04: Keying: Supplier will coordinate keying with Orange County Schools Maintenance key shop. For Bidding purpose all interior keyed locks shall be supplied with three (3) blanks. Cylinders and cores shall be Corbin Russwin 7-pin, 981 keyway, small format interchangeable core. Permanent cores are to have visual control as directed by the school district. Coordinate all core activities with Orange County Schools locksmith and Orange County Schools Maintenance Department. Verify core system standards with the Orange County Schools representative and have cores delivered to Orange County Schools Maintenance Department.

Locks, magnetic releases, electronic strike releases and interconnection with fire alarm system shall be provided by General Contractor and manual disconnects or key releases shall be coordinated with hardware supplier, installer and Corbin Russwin keying system.

1-05: Substitutions: For purposes of establishing type and quality of material specified for use on this project, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturer's approved for use:

Thresholds, weather-stripping	Reese Enterprises Inc., Rosemount, MN Pemko, Ventura, CA National Guard Products, Memphis, TN
Hinges / Electric Hinges	Stanley, New Britain, CN Hager Companies, St.Louis, MO McKinney, Scranton, PA
Exit Devices, Removable Mullions,	Von Duprin, Indianapolis , IN Yale, Charlotte, NC Sargent, New Haven, CT
Mortise and Cylindrical Locksets	Best Lock Corp., Indianapolis, IN Sargent, New Haven, CT
Electric Strikes	Von Duprin, Indianapolis, IN HES / ASSA ABLOY Sargent, New Haven, CT

Electric Latching	Sargent, New Haven, CT Yale, Charlotte, NC Von Duprin, Indianapolis, IN
Power Supplies	HES Von Duprin, Indianapolis, IN Sargent, New Haven, CT Yale, Charlotte, NC
Cores	Corbin Russwin, Berlin, CT
Push, Pull, Kick Plates Wall, Floor Stops, Flush Bolts	Builders Brass Works, Los Angeles, CA. Hager Companies, St.Louis, MO Trimco, Los Angeles, CA Hiawatha, Inc., Bloomington, MN
Base Stops w/ holder	Hager Companies, St.Louis, MO Trimco, Los Angeles, CA Hiawatha, Inc., Bloomington, MN
Closers • Interior and Entry	LCN, Princeton, IL Norton Door Controls, Charlotte, NC Yale, Charlotte, NC Dorma Door Controls, Reamstown, PA Sargent, New Haven, CT
Magnetic Holdback Device	Sargent, New Haven, CT LCN, Princeton, IL Corbin Russwin, Charlotte, NC
Overhead Holders & Stops	Dorma Door Controls, Reamstown, PA Glenn-Johnson, Indianapolis, IN Corbin Russwin, Charlotte, NC Sargent, New Haven, CT
Cylinders	Best Lock Corp., Indianapolis, IN
Sliding Door Hardware	L.E. Johnson Products, Inc., Elkhart, IN K.N. Crowder, Inc., Lewiston, NY Stanley Hardware, New Britain, CT

1-06: Owner Preferred Brand Alternate G-1: The following door hardware shall be included as part of the Preferred Brand Alternate. This alternate is requested based on the owners existing system wide locking being of the same type. Per NC General Statue 133 a preferred brand alternate is allowed where the alternate is maintaining an existing function or system:

- a. Cylinders/Cores: Corbin Russwin 7-pin, 981 keyway

PART 2: PRODUCTS

2-01: General: Hardware for doors and frames shall be made to templates and furnished with machine screws to metal and wood screws to wood. The Prime Contractor shall coordinate Hardware Supplier with Hollow Metal Manufacturer and Door Suppliers to exchange schedules and furnish templates promptly.

2-02: Products shall be equal to the following manufacturer’s no.

Thresholds	Reese “S205 Series” Pemko “171 Series”
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National Guard Products “425E Series”

Hinges / Electric Hinges	Hinges shall be full morticed, 5-knuckle hinges with oil impregnated bearings, non-removable pin and safety stud. Electric hinge shall be of equal quality. Hinges shall be heavy-weight, 4-1/2” tall, .180 gage
Exit Devices	Von Duprin “98 Series” Sargent “80 Series”
Smoke Doors	Von Duprin “9947L Series”
Security Mortise Locksets	Sargent “8200 Series” Best Lock “40H Series”
Cylindrical Locksets	Best “GK Heavy Duty Series”
Electric Strikes (Exit Device)	Von Duprin “6300 Series” HES “9600 Series” RCI “0162 Rim Strike”
Electric Strikes (Mortise Lockset)	Von Duprin “6400 Series” HES “8500 Series” Best “ES5 Series”
Electric Latching (Exit Device)	Von Duprin “EL Series” Sargent “ELR Exit Device” Yale “7000P Series”
Power Supplies	As required for operation of electric device
Removable Mullions	Von Duprin “9954”
Kick Plates	Trimco “KO050SS” Hager “193S” B.B.W.
Push Plates	B.B.W. “Model 47”
Pull Plates	B.B.W. “Model 290A/47”
Mop Plates	Trimco “KM050SS” Hager “190S”
Wall Stops	Trimco “1270CVSV” Hager “234W” Hiawatha “Model 9211”
Floor Stops	Trimco “Model 1210” Hager “Model 241F” B.B.W. “Model F8061”
Flush Bolts	Trimco “3917” Hager “282D” B.B.W. “Model 5021”

Closers	Sargent 281 Series Powerglide LCN “4040 Series” Yale “4400 Series”
Overhead Holders & Stops	Sargent “590 Series” Dorma “900 Series” Corbin Russwin “DH5000 Series” Glenn-Johnson “90 Series”
Weather-stripping	Reese “712A”, “797B”, “129CP” Pemko “315CN”, “588BL”, “29310CP” Nat. Guard Products “200NA”, “5050”, “140PA”
Cylinders & Cores	Best Lock Corp. (Indianapolis, Indiana) High Security Orange County Schools standards.
Magnetic Hold Back	Sargent Magnamatic “1501” (120VAC) or “1503” (24V DC & 24 VAC) LCN “7800” (24 or 120 volt) Corbin Russwin “DH57900 Series”
Sliding Door Hardware	L.E. Johnson Model 200SD Series K.N. Crowder, Inc., Lewiston, NY Series C-500 Stanley Hardware, Series 2841
Door Bottom-Raindrip	Reese “R100A” Pemko “345A”

2-03: Hardware Finish: Hardware finish shall be as follows:

US32D (630) Satin Stainless Steel:

- Exterior hinges
- Hinges at showers and bathrooms
- Exit device (push side)
- Protection plates
- Door pulls
- Wall bumpers
- Flat astragals

US26D (626 or 652) Satin Chrome Plated:

- Interior hinges
- Pivots
- Locks and latches
- Exit device trim
- Cylinder fronts
- Door bolts
- Floor stops
- Overhead stops and holders

US28 (628) Anodized Aluminum:

- Door sweeps
- Split astragals

Aluminum Mill Finish:

- Thresholds

EN (689) Aluminum Enamel / Powder Coat:

- Surface closers / arms

2-04: Hardware Sets: Required Hardware for this project shall be as follows:

HW SET 1:

Each to Receive:
(Interior Classroom Door)

3 hinges
1 mortise lock with ADA lever handle both sides
- Exterior keyed
- Interior thumb turn with locked indicator
1 core and cylinder
1 wall stop
1 closer with overhead stop
1 mop plate
1 set of mutes
1 set of fire rated gasketing as needed

HW SET 2:

Each to Receive:
(Exterior Classroom Door)

(Pivots in aluminum door supplier spec)
1 mortise lock with:
- Interior exit device with locked indicator
- Exterior keyed ADA lever handle
1 core and cylinder
1 closer with overhead stop
1 door sweep
1 aluminum threshold

HW SET 3:

Each to Receive:
(Classroom Bathroom)

3 hinges
1 mortise lock with ADA lever handle both sides
- Exterior coin turn
- Interior thumb turn with locked indicator
1 wall stop
1 mop plate
1 set of mutes

HW SET 4:

Each to Receive:
(Mechanical / Electrical)

3 hinges
1 mortise lock with ADA lever handle both sides
- Exterior key, interior opens with lever
1 core and cylinder
1 wall stop
1 closer with overhead stop
1 mop plate
1 set of mutes
1 set of fire rated gasketing as needed

HW SET 5:

Each to Receive:
(Office)

3 hinges
1 mortise lock with ADA lever handle both sides
- Exterior keyed
- Interior thumb turn with locked indicator
1 core and cylinder
1 wall stop
1 closer with overhead stop
1 mop plate
1 set of mutes
1 set of fire rated gasketing as needed

HW SET 6:

Each to Receive:

2 continuous hinges

2 surface mounted exit devices with surface mounted rod, top only
- Exterior keyed, with thumb latch and pull
- Interior with locked indicator
2 cores and cylinders
2 magnetic hold opens, long reach
2 closers
1 door coordinator
1 full height, fire rated astragal
2 mop plates
2 kick plates
2 sets of fire rated gasketing

HW SET 7:

Each to Receive:

6 hinges
2 rim, surface mounted exit devices
- Exterior keyed with ADA lever handle
- Interior with locked indicator
2 cores and cylinders
2 closers
1 removable mullion
2 mop plates
2 kick plates
2 sets of fire rated gasketing

HW SET 8:

Each to Receive:

6 hinges, non-removable pin, security stud
1 mortise lock w/ADA lever handle both sides (active leaf),
latch to inactive leaf
1 core and cylinder
1 closer
1 set top and bottom flush bolts (inactive leaf)
1 full height astragal (active leaf) to cover gap between doors
2 sets of fire rated gasketing

HW SET 9:

Each to Receive:

3 hinges, non-removable pin, security stud
1 mortise lock with ADA lever handle both sides
- Exterior key, interior opens with lever
1 core and cylinder
1 wall stop
1 kick plate
1 mop plate
1 set of mutes

HW SET 10:

Each to Receive:

6 hinges, non-removable pin, security stud
1 mortise lock w/ADA lever handle both sides (active leaf),
latch to inactive leaf
1 core and cylinder
1 set top and bottom flush bolts (inactive leaf)
1 full height astragal (active leaf) to cover gap between doors
2 mop plates
2 kick plates

HW SET 11:
Each to Receive: 6 hinges
1 mortise lock w/ADA lever handle both sides (active leaf),
latch to inactive leaf
1 core and cylinder
1 set top and bottom flush bolts (inactive leaf)
1 full height astragal (active leaf) to cover gap between doors
2 mop plates
2 kick plates

HW SET 12:
Each to Receive: 6 hinges, non-removable pin, security stud
2 rim, surface mounted exit devices
- Exterior keyed with thumb latch and pull
- Interior with locked indicator
2 cores and cylinders
2 closers
1 removable mullion
2 rain drips
2 door sweeps
2 mop plates
2 sets weather stripping
1 full length threshold

Notes:

1. All hardware in this project shall match the style and finish of existing hardware in the office area as much as possible.

PART 3: EXECUTION

Installation of hardware is specified in Section 062000, Section 081100 and Section 081400.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install glass in partitions, existing exterior curtain walls, interior hollow metal windows, door vision panels and sidelights, with related accessories and specialties as called for by drawings and specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use include:

Insulated Glazing Manufactures:

Libbey-Owen-Ford Company (Pilkington Group, Toledo, OH (800.221.0444)
 PPG Industries, Pittsburg, Pa. Fabricators:
 Glass Dynamics, Stoneville, NC (800.948.4027)
 Oldcastle Glass, Rock Hill, SC (800-845.9486)
 Hordis Glass- Guardian Industries, Rochburg, SC (803.789.6100)

Fire Rated Glass Providers:

Technical Glass Products (TGP) Architectural- (800.426.0279)
 Safti First, Brisbane CA, (888.653.3333)
 GCI, Secaucus NJ, (800.431.2042)

Break-in Resistant Window Film Manufactures:

3M Corporation (800.698.4595)
 Llumar (Eastman Performance Films) (800.255.8627)
 DuPont (800.441.7515)

1-04: Reference Standards:

- 1) ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- 2) ASTM E84 - Surface Burning Characteristics of Building Materials.
 ASTM C1036- Standard Specifications for Flat Glass
- 3) SIGMA No. 64-7-2 - Specification for Sealed Insulating Glass Units.
- 4) CPSC 16 CFR 1201 - Safety Standards for Architectural Glazing Materials

1-05: Quality Assurance: Conform to Flat Glass Marketing Association (FGMA) Glazing Sealing Systems Manual for glazing installation methods.

1-06: Submittals: Submit 6 copies of product data of each type of glass being furnished under this section. Include data on glazing sealant, gaskets, or compounds being used in various locations. Submit color chart for selection by Architect of color of proposed glazing sealants. Submit sealed glass unit manufacturer's certificate indicating units meet or exceed specified requirements.

1-07: Warranty: Provide 5 year manufacturer's warranty for sealed glass units covering seal failure, inter-pane misting or dusting, and replacement of same.

PART 2: PRODUCTS

2-01: General: Glass shall be furnished with labels showing strength and quality shall be attached to each piece of glass; or, if glass is not cut to size by Supplier but furnished unlabeled from local stock, Contractor shall submit an affidavit stating quality, thickness, type and manufacturer of glass furnished. Glazing products shall meet requirements of Category I and II classifications of glazing in areas required by Section 2404 of the NC Building Code and conforming with test requirements of CPSC 16 CFR 1201

2-02: Types of Glass:

- 1) **Clear Exterior Glazing:** 1” insulating clear glass shall be equal to PPG Solarban 60 Clear Low E , in new aluminum exterior glazing systems , with organic seal, composed of “clear lite plate glass, 1/2”air space, and interior 1/4” clear lite with interior coated plate glass. Visible light transmittance shall equal 70%, with winter night time U-Value of .29, (Winter) and shading coefficient of 0.44. Glazing in exterior walls shall be tempered at areas adjacent to entrances, below 5 feet above finish floor elevation, and at other locations where shown on drawings.
- 2) **Interior Fire Rated Glazing:** 3/8” laminated, UL rated, safety ceramic glazing, equal to “Pyran Platinum L” by SCHOTT Technical Glass Solutions. Glazing shall meet all I.B.C. impact requirements, for installation at all new hollow metal rated doors and rated side lights (90 min. rated).
- 3) **Interior Tempered Glazing:** Glazing at non-rated interior doors and frames shall be 1/4” clear tempered glazing meeting NC Building Code requirements for 1/4” tempered glazing.
- 4) Note: Requirements for insulated, metal faced on both sides, spandrel panel and accent panels used in glazed wall systems. See Section 088800 Metal Faced Glazing Panels.

2-03: Break-in Resistant Window Film: Where indicated on drawings, break-in resistant window film shall be applied per manufacturer’s directions to glazing where indicated on drawings.

- 1) Shatter-Resistant window film shall be equal in all aspects to 3M Safety and Security Window Film Ultra S800
 - a. Film shall be optically clear and made of several cross laminated layers. Film shall not contain dyed polyester.
 - b. Film shall have a nominal thickness of 8 mils and shall be identified as to manufacturer of origin.
 - c. Film shall pass 400 PT/lbs. Category II impact test per CPSC CFR 16, Part 1201 and meeting ANSI Z97.1 Class A, Unlimited.
 - d. Film shall pass impact of large missile “C” and withstand subsequent pressure cycling per ASTM E1996 and E1886 at +/- 75 psf Design Pressure with use of impact protection adhesive, tested on 1/4” tempered glass.
 - e. Film shall pass air blast testing – minimum level 3 at 4.0 psi.
 - f. Film shall meet Class A flame spread requirements.

2-04: Impact Protection Attachment System: Where Shatter-Resistant Film is shown on drawings an Impact Protection Attachment System shall also be used. System shall be a low VOC, wet glaze system equal to the 3M Impact Protection Attachment Sealant with the following properties:

- 1) Color shall be chosen by architect from manufactures standard colors
- 2) Ultimate Tensile Strength per ASTM D0412: 380 PSI after 21 days
- 3) Ultimate Elongation per ASTM D0412: 604% after 21 days
- 4) Durometer Hardness, Shore A per ASTM D2240: 38-39 points
- 5) Tear Strength, Die B per ASTM D0624: 72PPI

2-05: Glazing Compound, Tapes, and Gaskets: Glazing compound shall be an approved polysulfide or silicone compound. Tapes and gaskets shall be butyl or polybutylene. Compounds for Fire Rated Glazing System shall be as approved for specific product and rated in accord with assembly.

PART 3: EXECUTION

3-01: Installation of Glass: Glazing procedures shall conform to manufacturer’s recommendations. Glazing operations shall be carried on only when temperature is 40 degrees F., or above. Surfaces of glass and metal members which retain glass shall be clean and dry. Glass shall be cut to provide adequate bite, with room for expansion and contraction and perimeter clearance sufficient to avoid point loading. Glass shall have edges clean cut and cushioned to prevent contact with hard materials during and after installation. At completion of work, glass shall be free of

cracks, scratches, and other defects not permitted by specifications. Defective glass shall be removed and replaced with new glass at not cost to the Owner.

3-02: Shatter-Resistant Window Film: Film shall be applied by a manufacturer's authorized dealer / applicator (ADA) with 5-years' experience. ADA shall provide references for (10) projects where ADA has applied film. Film shall be applied using a high mass pressure sensitive weatherable acrylate adhesive. Adhesive shall be optically flat and when viewed from a distance of 10 feet at a 45-degree angle shall not appear to distort. Upon completion, the film shall have a dimpled appearance from residual moisture. Said moisture shall, under reasonable moisture conditions, dry flat with no moisture dimples within a period of 30 calendar days.

3-03: Impact Protection Attachment System: System shall be installed by an authorized dealer / applicator (ADA) with 5-years' experience. ADA shall provide documentation of manufactures certification to install system. Install minimum 1/2" bead overlap on both frame and film. Bead shall be triangular and tooled as needed.

END OF SECTION

DIVISION 09

FINISHES

GYPSUM WALLBOARD

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install gypsum wallboard for interior finish and backerboard substrate related accessories and specialties called for on drawings and specified herein. Metal studs are specified in Section 054000.

1-03: Examination of Adjacent Work: Areas in which drywall systems are to be installed shall be examined by Drywall Subcontractor; defects which should be corrected before installation of drywall materials shall be reported to General Contractor and Architect. Drywall materials shall not be installed until work of other trades is in compliance with applicable requirements of Appendix A of ANSI Standard A97.1. Installation of drywall components shall constitute acceptance of substrate material by Subcontractor.

1-04: Delivery and Storage of Materials: Materials shall be delivered in original packages, containers, or bundles bearing name of manufacturer and fire rating. All materials shall be kept dry by storing inside building under roof. Wallboard shall be neatly stacked flat, with care taken to prevent undue sagging, or damage to edges, ends or surfaces. Damaged materials will not be accepted.

1-05: Humidity and Temperature Control: Application of wallboard shall not begin until building has approached as closely as possible the moisture content it will reach in service. Ventilation shall be provided, if necessary, to maintain a uniform temperature range of 55 to 70 degrees F.

1-06: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Unless otherwise noted, all product numbers/names in this section refer to United States Gypsum products. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use include:

United States Gypsum Co.
National Gypsum Co.
Georgia Pacific

PART 2: PRODUCTS

2-01: Cold Rolled Channels and Hanger Wire: Carrying channels shall be painted cold-rolled steel 1-1/2"x9/16"x0.0653" (16 gauge) thickness tied back-to-back with 18 SWG galvanized steel wire 48" o.c. and suspended with 12 SWG galvanized steel wire to joist lower chords or around beams at 48" o.c. max. at each end. Furring channels for lath attachment shall be 3/4"x1/2"x0.0635 (16 gauge) thickness spaced 16" o.c. and tied to carrying channels with 18 SWG wire at 48" o.c. max. and at each end. Extend carrying channels to within 6" of wall surface and furring channels to approximately 1" from wall surface. Splice furring channels with minimum 24"1. Channel back-to-back with 18 SWG wire wrapped at ends and each side of splice. Where light fixtures or other openings occur, box out opening with carrying channels and suspend corners and midpoints of opening with 12 SWG wire to structure at distance not to exceed 48" o.c.

2-02: Metal Trim Molding: Minimum 0.0336" thick (22 gauge) galvanized steel molding equal to USG no. 402 (5/8" & 1 1/8" legs) around openings and secured to carrying channels with 1" Type S drywall fasteners. Spacing of fasteners approximately 8" o.c. along dimension and 10" o.c. along short dimension of opening.

2-03: Wall Angle: Minimum 0.0217” thick (26 gauge) galvanized steel angle with 1-1/4” legs, secured to walls along perimeter of ceiling to support steel framing member ends and for attachment of lath or drywall.

2-04: Gypsum Wallboard: All wallboard shall comply with requirements of ASTM C36 and bear UL Classification Marking and shall be 48” wide and of greatest practicable lengths for reduced number of joints; thickness shall be 5/8” throughout, unless otherwise listed on drawings

a) Wallboard for interior partitions, ceilings soffits and furred walls shall be equal to U.S. Gypsum Co., SHEETROCK® Brand Mold Tough® ULTRACODE® Gypsum Panels , or equal to Gold Bond® BRAND XP® Gypsum Board with Sporgard™* and meeting UL Classification, where indicated

b) Wallboard for interior use at areas of high humidity noted shall be U.S. Gypsum’s Firecode “C” Exterior Gypsum Ceiling Board, moisture and mold-resistant drywall, as indicated on drawings.

c) Wallboard for use in Toilets, Janitor Space, Mechanical Rooms or other high humidity areas shall be equal to USG 5/8 “ Th. “Humitek” gypsum panels with UL Classification.

d) USG Vinyl-faced Gypsum panels 5/8” thick, Firecode core shall be used as indicated on drawings.

2-05: Cement Board: Ceramic tile backup on all wall surfaces shall be equal to USG Durock Interior Tile Backer Board, 1/2” thick x 36” w. x longest practicable lengths. Board is composed of aggregated Portland cement with woven glass-fiber mesh embedded in back and front surfaces.

2-06: Trim Accessories:

a) Corner reinforcement: USG “Dur-A-Bead” heavy gauge No. 103.

b) Metal Trim: Interior - USG No. 200-A; Exterior - USG No. 402 metal.

c) Control Joints: USG No. 093, interior and exterior, where applicable.

2-07: Fasteners:

a) Wallboard to Steel Framing - 1”, and 1 5/8” Type S Buglehead

b) Wood Trim over Wallboard to Steel Framing - 1-5/8” Type S or S-12 Trim Head.

c) Cement Board to Steel Framing - 1-5/8” Durock steel screws.

d) Wallboard to Wood Framing - 1 1/4” Type W Buglehead

e) Gypsum sheathing to steel studs - 1” and 1 5/8” Type S-12

2-08: Joint Treatment – Interior:

a) Wallboard: USG Perf-A-Tape. & as req. by manufacturer for areas requiring Humitek or equal moisture and mold resistant gypsum panels

b) Cement Board: Durock Type P Tape.

c) Joint Compounds:

1. First Coat (embedding tape, over beads, spotting fasteners) - USG Compound Taping. At cement board, use basecoat for thin-set application - see Section 093000, Ceramic Tile.

2. Second Coat (filling over tape, beads, and fasteners) - USG Ready-Mixed Compound Topping for use with fire rated and mold resistant wallboard.

3. Third Coat (finishing over tape, beads, and fasteners) - USG Ready-Mixed Compound Topping for use with fire rated and mold resistant wall board.

PART 3: EXECUTION

3-01: General: Work specified in this section shall be performed by personnel experienced and skilled in erection and finishing of drywall components.

3-02: Installation of Drywall Ceiling: Install wallboard with long dimension perpendicular to metal framing with side joints centered along runner.

Fasten wallboard to framing channels with 1” long drywall fasteners at 12” o.c. along end joints, 8” o.c. along side joints, and 12” o.c. at intermediate framing. End joints of adjacent wallboard sheets shall be staggered not less than 48” o.c. with adjacent panels. Secure wallboard sheets to leg of wall angle with fasteners spaced 8” o.c.

3-03: Installation of Interior Gypsum Board: Panels shall be installed face out with long dimension perpendicular to furring channels or, if vertical, with edges over furring channels or studs. Edges and ends shall be fitted closely, but not forced together. Maximum practical lengths of wallboard shall be used; units shall not be “placed” at door frames. Joints shall be staggered on opposite sides of partitions. Cutouts shall be neatly made at outlets, switch boxes, etc. Screws shall be 1” long, spaced a maximum of 8” o.c. along abutting edges and 12” o.c. at ends, and 12” O.C. at intermediate framing. Distances of screws from edges or ends of panels shall be not less than 3/8”. Dimples shall be not over 1/32” deep; face paper shall not be broken. Screws shall be installed with electric screw gun.

3-04: Cement Board Installation: Follow similar methods as wallboard except that fastening of boards to metal framing shall be with screws spaced 6” o.c.

3-05: Taping and Finishing: Apply a thin uniform layer of compound to joints and angles to be reinforced. Immediately apply tape, center over joints and seat into compound. Provide sufficient compound under tape approximately 1/64” to 1/32” for proper bond. Apply skim coat immediately following tape embedment. Fold tape and embed in angles to provide true angle. Allow to harden prior to application of fill coat. Apply compound over taping skim coat. Fill board, taper flush with surface. On non-tapered joints, apply compound over tape and feather out at least 4” on either side of joint. Do not apply filling coat to interior angles. Apply compound evenly over and extending slightly beyond fill coat on all joints. Feather to a smooth, uniform finish. Over tapered edges, finished joint shall not protrude beyond plane of surface. Apply compound at taped angles to provide a true angle. Fastener depressions shall have a minimum of three coats of compound; each coat shall be allowed to dry or harden before succeeding coat is applied. Each coat shall be feathered out from ground to plane of adjacent surface, each slightly beyond preceding coat. Sanding of compound, to provide flat, smooth surface acceptable for application of finish specified.

END OF SECTION

RESILIENT FLOORING

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install resilient flooring and base, with related accessories and specialties, as called for on Drawings (Finish Schedule) and specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work in this section, names of manufacturers and brand names are used. Products of other manufacturers will be considered provided that requests for substitutions are accompanied by supporting technical literature, samples and performance data for comparative evaluation 10 days prior to receipt of Bids.

Manufacturers approved for this project:

Luxury Vinyl Tile
 Armstrong
 Azrock Industries Inc.
 Mannington Commercial
 Tarkett
 Rubber Base, Radial Rubber Tile, Rubber stair treads
 Roppe Corp
 Flexco Co.
 Johnsonite

1-04: Submittals: Submit samples of flooring materials for Architect and Owner's approval of patterns and colors. Submit layout of patterned flooring showing sizes, edge conditions and transitions to non-patterned areas.

1-05: Examination of Surfaces: General Contractor and Flooring Subcontractor shall inspect work of other trades which affects work specified herein prior to installation. Flooring Subcontractor shall be responsible for checking concrete slabs and testing for moisture content to determine if surfaces are satisfactory for installation of resilient materials. Flooring Subcontractor shall verify with General Contractor type of curing agent used in concrete finishing to assure compatibility with adhesive. Where material is to be installed over plywood sub floor, Flooring Subcontractor shall check for level conditions, tight flush joints with no protruding conditions, adequate support at corner joints, adequate moisture content and all indentations filled with no protruding surfaces which might cause telegraphing in resilient surface. Defect or unacceptable surfaces shall be reported to General Contractor for correction and to Architect in writing prior to installation. Beginning installation shall be considered as acceptance of work of other trades and assumption of responsibility by Flooring Subcontractor for finished product.

1-06: Replacement Materials: Provide two boxes of each type, color, pattern, and thickness of tile and base used, one roll of each type of sheet vinyl used (in addition to scrap material larger than 24"x48") and factory-sealed container (1 gal. minimum) of adhesive used in applying vinyl base.

1-07: Storage and Temperatures: Materials shall be packed, stored and handled carefully to prevent damage. Temperatures shall be maintained at 70F minimum of 48 hours before, during, and for one week after installation. A minimum temperature of 55 degrees F. shall be maintained thereafter.

PART 2: PRODUCTS**2-01: Vinyl Flooring:**

- a) **Vinyl Tile:** VCT shall be equal to Armstrong “Standard Excelon Imperial Texture”, 12 x 12 units
 - a. Minimum of 8 colors will be used on this project.

2-02: Material Characteristics:

a. Vinyl Tile

- 1) Resilience - 250 psi minimum with no permanent indentation.
- 2) Flame Spread - less than 75, ASTM E-84 or NFPA 255.
- 3) Smoke Production - less than 450, ASTM E-662.
- 5) Thickness – 3. mm

2-03: Base: For vinyl floor tile, provide rubber cove base equal to Roppe. Base to be 4” x 1/8” standard toe base. **Provide manufactured outside corners at all locations.** Corners to match base in color and profile. Rubber shall be TS-1 vulcanized rubber. Base shall be supplied in coils. Sections will not be allowed. Colors to be selected from manufactures standard colors.

2-04: Ancillary Materials: Adhesives, cleaners and waxes shall be in accordance with the recommendations of the manufacturer whose resilient flooring and base are approved.

PART 3: EXECUTION

3-01: Preparation: Where resilient flooring is scheduled, irregularities in the concrete slabs which might “telegraph” through finish materials shall be removed. Small depressions shall be filled with an approved underlayment. Slabs shall be smooth, dry, free of dirt, oil, grease, incompatible curing compounds, or other material, which might prevent satisfactory bonding of adhesives. At recreational sheet vinyl floors all joints in plywood finish layer shall be flush and tight except at perimeter where 1” min. expansion joint must be left.

3-02: Tile and Sheet Flooring Installation: Flooring shall be installed in accordance with the manufacturer’s latest printed instruction; a copy of these instructions shall be furnished to Architect before installation begins. Lay tile square with room axis; cut as required to maintain uniform widths at permanent parallel walls. No cut tile at walls shall be less than 6” wide. Tile shall be laid as directed by Architect. Tile flooring shall be continuous through openings where used in adjoining spaces; otherwise, it shall finish against door thresholds, vinyl edge moldings, or against other floor coverings. Flooring shall be laid so as to lie true and smooth without air pockets. Joints shall be fitted tight, and top surface shall be flush so that no edges will show. Symmetry must be preserved and all joints kept straight and balanced. Edges and ends shall be accurately and neatly cut to fit against other work; holes for pipes, etc., shall be cut neatly and closely fitted. Materials shall be free from cracks, spalls, dents, or other defects, and the finished work must be satisfactory to the Architect in every respect.

3-03: Protection, Cleaning and Waxing: Floor shall be protected and traffic controlled until project is accepted by Owner. Immediately before final inspection, resilient floors shall be thoroughly cleaned and given a coat of an approved self-polishing non-slip wax. Maintenance instructions for recreational sheet vinyl floor shall be in strict accordance with manufacturer’s recommendations.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and install carpeting, with related accessories and specialties as scheduled in Drawings.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids.

1-04: Submittals: Submit seaming diagrams to Architect for review before installing carpet. Use following criteria for diagram preparation:

- 1) Carpet widths to provide minimum number of seams.
- 2) Consistency of direction of pile.
- 3) Ease of future replacement.
- 4) Avoidance of seams at or perpendicular to openings.

Submit the following data:

- 1) Specific listing of manufacturer and mill, exact color, name, number and fiber (for use in reordering).
- 2) Manufacturer's recommendations for type of adhesive to be used with specified carpet, recommended tests for excessive moisture or alkalinity in concrete and proper installation procedures.

1-05: Certification: General Contractor to furnish certificate provided by carpet manufacturer stating that carpet identified by register number called for in Para. 1-07 was manufactured in accordance with these specifications.

1-06: Applicable Specifications and Standards: Methods of tests to be used shall be those applicable and reported in ASTM "Standards on Textile Materials" prepared by ASTM Committee D-13 and published by the American Society for Testing and Materials. Major method shall be ASTM D418, "Methods for Testing Woven and Tufted Pile Floor Coverings". Testing for such characteristics as flame spread, seam strength, shrinkage, and moth repellence shall be in accordance with testing procedures and end limits (for shrinkage) described in ASTM E-84 and DDD-C-95. Manufacturer's Certification for carpet materials shall comply with "Use of Materials Bulletin UM-44C" published by US Department of Housing and Urban Development and are currently listed in HUD "Certified Products Directory" and so identified by imprint on back of carpet. In addition to the methods of sampling described in the foregoing test procedures, samples can be taken from unused material on the job site, distributor's or retailer's as well as manufacturer's stock of certified materials.

1-07: Delivery and Storage: Carpet shall be delivered to the site in original mill wrappings with each roll having register number tags attached, or register number stenciled on wrapping and intact. Storage areas shall be dry, well ventilated, and heated if required to prevent shrinking or stretching. Carpet shall be protected against damage, dirt, stains, and moisture.

1-08: Inspection of Surfaces: Floor construction and surfaces to receive carpeting shall be inspected and tested for moisture content by carpet installer who shall promptly notify General Contractor and Architect in writing of substrate defects having adverse effect on quality of installation. Proceeding with work shall constitute acceptance of subfloor surface condition and responsibility by carpet installer for finished product. Floor areas to receive carpet shall be smooth, vacuum clean and dry prior to installation of carpeting. Floor temperature must be minimum of 65 degrees F. for 72 hours prior to installation and tested for excessive moisture or alkalinity by

carpet installer. Should tests reveal excessive moisture or alkalinity, surfaces of concrete shall be sealed using material and application methods recommended by carpet manufacturer.

1-09: Replacement Materials: For replacement and repairs, Contractor shall furnish Owner with eight square yards of each type and color of carpet installed, from same dye lot as installed carpet. Replacement carpet remnants, usable scrap (2' x 2' min.) and maintenance instructions shall be packaged in appropriate wrapping, labeled and left with Owner.

1-10: Guarantee/Warranty: Upon completion of installation, the carpet manufacturer must submit a certificate guaranteeing carpet against material and workmanship defects for a period of 1 year from date Certificate of Compliance is received by General Contractor. Manufacturer shall furnish to Owner a standard warranty for 10 years.

PART 2: PRODUCTS

2-00: Modular Carpet: General: Modular carpet products shall meet the guidelines as set forth in the Americans with Disabilities Act for minimum static coefficient of friction of 0.6 for accessible routes

Carpeting furnished by the following manufacturers is approved for use:

- A) Tarkett
- B) Mannington
- C) Mohawk

Colors shall be selected by the architect and owner from the manufacturer's standards.

2-01: Physical Requirements:

- a) Size: 24"x 24"
- b) Const. Type – Patterned Loop
- c) Gauge – 1/10"
- d) Stitches per inch – 7.3 per inch – 10 per inch
- e) Face Weight – 20oz./yd min and shall not be more than 1 oz. under the specified amount.
- f) Dye Method – solution / yarn dyed
- g) Primary Backing – synthetic
- h) Additives: antistatic control and bacteria protection
- i) Density Factor – 5,448 min
- j) Flammability – Flooring radiant panel (ASTM E-648): Class 1
- k) ASTM E662: 450 or less (flaming mode)
- l) Testing – Independent Testing Lab results for flame spread, smoke production, static control, fuel contribution to be submitted by successful bidder.

2-02: Ancillary Materials:

a) Concrete floor sealer, adhesive, cleaning solutions shall be chemically compatible with subfloor and carpet materials and shall conform to manufacturer's recommendations. Flammability rating of adhesive material shall not exceed the flame spread specified above for carpet. Adhesives shall be environmentally safe and low odor type.

b) Solid vinyl edge strips, trim, molding, and transition strips shall be submitted to Architect for approval.

PART 3: EXECUTION

3-01: General: The work shall be done by personnel fully experienced in carpet installation. Carpet shall not be installed until the building is enclosed, permanent heating and cooling systems are in operation and residual moisture from plaster, concrete, or terrazzo work has dissipated. Carpet installer shall conduct moisture test of surfaces to receive carpet and be satisfied that surface meets moisture criteria, prior to installation. Carpet shall be installed by the direct glue-down method in accordance with manufacturer's recommendations for seaming technique and for proper amount of stretch in width and length. Each color to be installed shall be from same dye lot.

3-02: Installation: Adhesive shall be thoroughly stirred and evenly applied. Coverage shall be not more than 20 square yards per gallon; there shall be a minimum of 90% bond of carpet to slab. Seams shall be made by the compression method; stripping or plugging will not be accepted. Seams shall be trimmed and fitted neatly and shall be bonded with Roberts Seam Adhesive No. 41-4015 or approved equal material; adhesive shall be applied to cut edges of carpet at the level of carpet backing. Adhesive shall be submitted to Architect for approval. Saddles or “T”- Seams shall not be used in doorways. Carpet surface shall be rolled down to expel any air bubbles. Installer will be required to re-lay any carpet that does not provide wrinkle-free appearance and shall correct any condition due to faulty installation, which may appear for a period of one year from the date of the completed installation. Edge strips, of approved materials and design, shall be installed where floor covering materials change or where exposed edges occur. Installed carpet shall be clean, free of spots, dirt or soil, and shall be without tears, frayed or pulled tufts.

3-03: Protection After Installation: Carpeting shall be protected after installation with 6 mil polyethylene sheeting lapped at edges and joints taped securely. Sheeting shall remain until construction activity is completed.

END OF SECTION

ACOUSTICAL TREATMENT

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install suspended acoustical ceilings and acoustical panels as called for by Drawings and Finish Schedule, and as specified herein.

1-03: Substitutions: In order to establish type and quality of materials required for work under this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable provided that requests for substitutions are accompanied by supporting technical literature, samples, details and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for this project include:

- | | |
|------------------------|---------------|
| a) Acoustical ceilings | Armstrong |
| | Celotex Corp. |
| | USG Interiors |

1-04: Coordination: Work included in this section shall be coordinated with work of mechanical and electrical trades for ceiling / wall fixtures, switches, receptacles, etc., and installation of contiguous drywall ceilings.

1-05: Samples: Submit samples as follows:

- Acoustical material - 1-12"x12" piece of each type.
- Runners and cross tees: 1 each, approximately 12" long.
- Wall molding: 1 piece approximately 12" long.
- Acoustical wall material: 1-12"x12" piece and color samples of fabric coverings.

1-06: Standards: Acoustical treatment shall be installed under conditions outlined in the Acoustical and Insulating Materials Association's Bulletin under "Job Conditions".

1-07: Quality Standards: Acoustical Subcontractor shall examine building before beginning work specified herein to determine if space is complete enough to receive installation. Report improper conditions to General Contractor and Architect; do not proceed with work until proper conditions are achieved. Installing material shall constitute acceptance of substrate conditions.

PART 2: PRODUCTS**2-01: Suspended Acoustical Ceiling:**

- Suspension system shall be exposed grid hung from structure (bar joists and steel beams) by means of galvanized wire not lighter than 12 gauge. Framing shall be of electro-galvanized steel with baked on polyester paint finish. Color to be selected from manufacturer's standards. Matching wall moldings shall be provided. Framing shall comply with ASTM C635 requirements for Intermediate Duty systems. System to be equal to Armstrong Prelude XL.
- Type A – For use in all spaces except cafeteria.

Shall be equal to "Fine Fissured – Square Lay-in" by Armstrong Model 1754.	
24" x 24" x 7/8" panels square cut for exposed grid system.	
Light reflectance	- L.R. 0.85 as per ASTM E1264
NRC Rating / CAC Rating	- .75/35
Surface Burn Characteristics	- Class A, Flame spread 25 or less
- Type B – Cafeteria

Shall be equal to "Ultima High NRC – Square Lay-in" by Armstrong Model 1940.	
24" x 24" x 7/8" panels square cut for exposed grid system.	

Light reflectance	-	L.R. 0.88 as per ASTM E1264
NRC Rating / CAC Rating	-	.80/35
Surface Burn Characteristics	-	Class A, Flame spread 25 or less

PART 3: EXECUTION

3-01: General: Acoustical materials and suspension systems shall be installed by experienced subcontractor for types of work involved. Installation of acoustical ceilings panels and baffles shall not begin until building is enclosed and heat is provided so that residual moisture from other trades is dissipated.

3-02: Acoustical Ceiling: Ceilings shall be installed in accordance with patterns indicated on Reflected Ceiling Plan. Suspension system shall be installed in accordance with the requirements of ASTM C636, “Recommended Practice for Installation of Metal Ceiling Suspension System for Acoustical Tile and Lay-in Panels” and manufacturer’s recommendations. Acoustical panels shall be installed in accordance with the recommendations of the Acoustical and Insulating Materials Association, contained in the current AIMA Bulletin. Units shall be of the greatest possible size. Members shall be aligned and leveled to provide true surfaces and straight lines. Provide tile in unopened boxes for replacing 100 sq.ft. minimum of each pattern type and leave with Owner.

3-04: Cleaning and Replacement: Before installation is accepted by Owner, ceiling units or panels which have been improperly installed, or which have been damaged, shall be removed and replaced. Discolored or soiled surfaces shall be cleaned in accordance with manufacturer’s recommendations. Contractor shall furnish (6) complete boxes of ceiling tile from same product run for Owner’s use as attic stock.

END OF SECTION

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to provide and apply paints, sealers, and related materials called for by drawings and finish schedule and specified herein. In general, all exposed surfaces of factory and/or shop primed work that is delivered to job site without final finish, shall be painted under this section by the General Contractor. Exposed electrical, plumbing, and HVAC equipment in public spaces, excluding mechanical spaces to be painted by the respective trade, shall be painted by the General Contractor. Work covered by this section shall be coordinated with work of other trades; surfaces which are left unfinished by requirements of other sections of specifications shall be painted or otherwise finished as required in this section. Altered existing work or damaged surfaces that have been repaired shall be painted under this section. Finishes shall match existing adjacent surfaces.

1-03: Samples and Colors: Maximum number of different colors which will be used for interior painting will be eight; not more than four different paint colors will be used in any one school. General Contractor shall obtain color selections from Architect for all types of work and shall prepare samples of each type and color for approval. Samples shall be applied to surfaces which represent surface to be painted; they shall have required number of coats and be treated and finished in same manner as completed work. In lieu of preparing sample panels to show finish and color, Contractor shall have option to prepare a room (complete or in part) to establish standard for workmanship and appearance of finish. See 1-05 below for additional information.

1-04: Storage and Protection: Materials to be used on project shall be stored in an area approved by Paint Suppliers and Architect. Storage spaces shall be protected against damage from spilled or carelessly handled materials and shall be safeguarded against fires. Used rags shall be kept in closed metal containers; paints and other liquids shall be kept covered. All stored materials shall be stored outside building in storage facility equipped to maintain temperatures above manufacturer's low temperature storage requirements or off site.

1-05: Environmental Conditions: Materials specified are assumed to be low or no VOC type coatings. Should manufacturer's specifications change, Architect shall be notified and appropriate coatings submitted for review and approval prior to acceptance for use at this facility. Surfaces to be painted shall be thoroughly dry and clean of any oils or material which will prohibit proper bonding of paint. Painting shall be done at temperatures recommended by manufacturer for air, humidity and surface to receive paint. Failure to comply with these recommendations shall be cause for rejection of work or repainting. For interior work, temperature of spaces in which painting is being done, or where paint and finish are drying, shall be maintained above 60 degrees F.

1-06: Inspection of Surfaces: Surfaces to be finished under this section shall be examined before work is begun by Painting Subcontractor to determine if they are in condition to receive finish specified. Report improper conditions to General Contractor and to Architect in writing; work shall not proceed until proper substrate conditions have been obtained. Coatings scheduled to be applied to existing "painted surfaces" shall be tested for primer and finish coat compatibility and bond strength prior to application. No work shall be done to surfaces that fail the coating/bonding test prior to remedy of surface bonding as required by the coating manufacturer. Application of paint or other coating to any surface shall constitute acceptance of substrate conditions for that surface and responsibility for finished product. Note General Contractor will be responsible for getting existing walls ready for repainting.

1-07: Approval of Coating Applications: General Contractor shall report to Architect application of each coat on each surface painted or otherwise finished. After coat has been applied, it shall be inspected and approved by Architect before application of succeeding coat; failure to comply with this provision may result in Contractor's

being required to recoat any areas not so reported and approved; no additional compensation will be allowed for such recoating work.

PART 2: PRODUCTS

2-01: General: In order to establish type and quality of materials required for work covered by this section, manufacturer’s names and brands are listed in Subsection 2-03, Approved Materials. Products of other manufacturers equal in quality and in suitability for the usage intended, will be acceptable provided that requests for substitutions shall be accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Materials for which no brand names are listed, such as thinners, shellac, linseed oil, wood filler, and turpentine, shall be of highest quality and shall have identifying labels on containers. Materials shall be delivered to site in their original containers, seals intact, with labels to include manufacturer’s name, product name and number, color code and batch number, undamaged. All finish coats shall constitute a system; i.e., primer shall be compatible with top coat as recommended by paint manufacturer. Wet mil and dry mil thickness range is only a guide for film thickness required; actual film thickness shall be as stated by approved manufacturer for type of paint used.

2-02: All paint products to be low V.O.C. Approved Manufacturers include:

- Sherwin Williams
- PPG
- Coronado
- Glidden

2-03: Approved Materials (Note: (3) coats of paint will be required on all existing walls)

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
<u>Finish No. 1: Ferrous Metal - Interior</u>			
Prime Coat:	1	4.0 - 5.0 W.M.	1.5 - 2.0 D.M.
Sherwin Williams Kem Kromik Universal Metal Primer B50 Series			
PPG Pitt-Tech Plus – 4020-PF / Devflex-4020-PF			
Coronado Rust Scat White Metal Primer 35-111			
Top Coats:	2	4.0 W.M. ea.	1.5 D.M. ea.
Sherwin Williams ProMar 200 Semi-gloss Enamel			
PPG Pitt-Tech Plus – 4216-HP / Devflex-4216-HP			
Coronado DTM Acrylic Semi-gloss 180 Series			
<u>Finish No. 2: Galvanized Metal - Interior</u>			
Prime Coat:	1	3.0 - 4.0 W.M.	1.4 - 2.0 D.M.
Sherwin Williams Galvite High Solids B50W230			
PPG Pitt-Tech Plus – 4020-PF / Devflex-4020-PF			
Coronado Perma-Bond Primer 100-10			
Top Coats:	2	4.0 W.M. ea.	1.5 D.M. ea.
Sherwin Williams ProMar 200 Latex Semi-gloss Enamel			
PPG Pitt-Tech Plus – 4216-HP / Devflex-4216-HP			
Coronado Acrylic Latex Semi-gloss Enamel 12 Series			
TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
<u>Finish No. 3: Concrete Block - Interior</u>			
Prime Coat:	1	6.0 - 20.0 W.M.	4.0 - 10.0 D.M.
Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25			
PPG Speedhide Interior / Exterior Masonry Latex Block Filler			
Coronado Superkote Latex Masonry Filler 946-11			
Top Coats:	2	4.0 W.M. ea.	1.5 D.M. ea.
Sherwin Williams ProMar 200 Latex Semi-gloss Enamel			

PPG Speedhide Zero Interior Latex
 Coronado Acrylic Latex Semi-gloss Enamel 90 Series

Finish No. 4: Interior Concrete Block - Glazed Coating

Prime Coat: 1 6.0 - 20.0 W.M. 4.0 - 10.0 D.M.
 Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25
 PPG Speedhide Interior / Exterior Masonry Latex Block Filler
 Coronado Superkote Latex Masonry Filler 946-11

Top Coats: 2 3.6 - 9.0 W.M. ea. 2.0 - 6.0 D.M. ea.
 Sherwin Williams Water Based Catalyzed Epoxy
 PPG Aquapon WB EP Epoxy
 Coronado Acrylic Epoxy 138 Line Series ,Semi-Gloss

Finish No. 5: Gypsum Board/Plaster - Glazed Coating

Prime Coat: 1 4.0 W.M. 1.5 D.M.
 Sherwin Williams Prep-Rite 200 Latex Primer B23W200
 PPG Speedhide Interior Latex Quick Dry Sealer
 Coronado Superkote Latex Masonry Filler 946-11

Top Coats: 2 3.6 - 9.0 W.M. ea. 2.0 - 6.0 D.M. ea.
 Sherwin Williams Water Based Catalyzed Epoxy
 PPG Aquapon WB EP Epoxy
 Coronado Acrylic Epoxy 138 Series

Finish No. 6: Gypsum Board/Plaster - Wall partitions

Prime Coat: 1 4.3 W.M. 1.1 D.M.
 Sherwin Williams Prep-Rite 200 Latex Primer B23W200
 PPG Speedhide Interior Latex Quick Dry Sealer
 Coronado Super Coat Latex Primer-sealer 40-11

Top Coats: 2 4.0 W.M. ea. 1.5 D.M. ea.
 Sherwin Williams ProMar 200 Latex Semi-gloss Enamel
 PPG Speedhide Zero Interior Latex Semi-Gloss Paint
 Coronado Latex Semi-gloss Enamel 90 Series

Finish No. 7: Gypsum Board/Plaster - Interior Ceilings, Furred Soffits & Fascia Areas

Prime Coat: 1 4.3 W.M. 1.1 D.M.
 Sherwin Williams Prep-Rite 200 Latex Primer B23W200
 PPG Speedhide Interior Latex Quick Dry Sealer
 Coronado Super Coat Latex Primer-sealer 40-11

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
Top Coats:	2	3.0 W.M. ea.	1.2 D.M. ea.

Sherwin Williams ProMar 200 Latex Flat Wall Paint
 PPG Speedhide Zero Interior Latex Flat Paint
 Coronado Flatwalls Flat Latex 24 Series

Finish No. 8: Moisture Resistant Gypsum Board

Prime Coat: 1 3.2 - 4.0 W.M. 1.7 D.M.
 Sherwin Williams Prep-Rite 200 Latex Primer B23W200
 PPG Speedhide Interior Latex Quick Dry Sealer
 Coronado Super Coat Latex Primer-sealer 40-11

Top Coats: 2 9.5 W.M. ea. 6.0 D.M. ea. Sherwin
 Williams Tile-Clad II High Solids Epoxy
 PPG Aquapon WB EP Epoxy Semi-Gloss

Coronado Acrylic Epoxy Enamel

Finish No. 9: Interior Wood - Painted

Prime Coat: 1 3.1 W.M. 1.5 D.M.
 Sherwin Williams Prep-Rite VOC-Complying Wall and Wood Primer B49WZ2
 PPG Seal Grip Interior / Exterior Universal Primer Sealer
 Coronado Alkyd Enamel Undercoat 37-11

Top Coats: 2 4.0 W.M. ea. 1.5 D.M. ea.
 Sherwin Williams ProMar 200 Latex Semi-gloss Enamel
 PPG Speedhide Zero Interior Latex Semi-Gloss Paint
 Coronado Acrylic Semi-gloss Enamel 90 Series

Finish No. 10: Interior Wood - Natural Finish

Prime Coat: Tint , as selected, with oil stain; fill voids with wood filler paste
 Sherwin Williams Natural Wood Filler D7051
 PPG Deft Interior Water-Based Sanding Sealer
 Coronado Sanding Sealer 67-11

Top Coats: 2 3.3 W.M. ea.
 Sherwin Williams Waterborne Polyurethane Varnish A68 Series
 PPG Deft Interior Water-Based Polyurethane Acrylic / Satin Finish
 Coronado Polyurethane 67-100

Finish No. 11: Interior Concrete Floors

Prime Coat: (Thin 20%) 1 W.M. 1.5 D.M.
 Sherwin Williams Armour Tread-Flex WB Acrylic Floor Coating Primer B90W100
 PPG Aquapon WB EP Epoxy
 Coronado Polyurethane Floor Finish 1231 Series

Top Coats: 1 or 2 (as required) 10.0 W.M. 1.5 D.M.
 Sherwin Williams Armour Tread-Flex WB Acrylic Floor Coating B90W100
 PPG Aquapon WB EP Epoxy

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
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Finish No. 11b: Interior Concrete Floors, Mechanical / Storage other Utility Areas-Transparent Sealer

Prime Coat: (Thin 20%)	1	W.M.	1.5 D.M.
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1. PPG Aquapon WB EP Epoxy
2. Coronado Polyurethane Floor Finish 63 series
3. Sherwin Williams Concrete and Terrazzo Sealer

Top Coats:	2	W.M.	1.5 D.M. ea.
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1. PPG Aquapon WB EP Epoxy
2. Coronado Polyurethane Floor Finish 63 series
3. Sherwin Williams Industrial Enamel

Finish No. 12: Ferrous Metal - Exterior

Prime Coat	1	4.0-5.0 W.M.	1.5-2.0 D.M.
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1. Glidden Glid-Guard Alkyd Metal Primer No. 4570
2. Sherwin Williams Kem Kromik Metal Primer
3. Coronado Rust Scat White Metal Primer 35-111
4. PPG Multi-Prime 4160 / Devguard 4160

Top Coats:	2	4.5 - 5.5 W.M. ea.	2.0 - 2.5 D.M. ea.
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1. Glidden Glid-Guard Alkyd Industrial Enamel No. 4550

2. Sherwin Williams Industrial Enamel Gloss B54
3. Coronado Urethane Alkyd Enamel Series M 31
4. PPG HPC Industrial Alkyd 4308 / Devguard 4308

Finish No. 13: Galvanized Metal - Exterior

Prime Coat:	1	3.0 - 4.0 W.M.	1.5 - 2.0 D.M.
	<ol style="list-style-type: none"> 1. Glidden Glid-Guard All Purpose Metal Primer No. 5229 2. Sherwin Williams Galvite Primer 3. Coronado Perma-Bond Primer 100-10 4. PPG Multi-Prime 4160 / Devguard 4160 		
Top Coats:	2	4.5 - 5.5 W.M. ea.	2.0 - 2.5 D.M. ea.
	<ol style="list-style-type: none"> 1. Glidden Glid-Guard Alkyd Industrial Enamel No. 4550 2. Coronado Urethane Alkyd Enamel Series M31 3. Sherwin Williams Industrial Enamel Gloss B54 4. PPG HPC Industrial Alkyd 4308 / Devguard 4308 		

Finish No. 14: Painted Wood - Exterior

Prime Coat:	1	3.6 - 4.6 W.M.	2.2 D.M.
	<ol style="list-style-type: none"> 1. Glidden Prime Coat Oil/Alkyd No. 3651 2. Sherwin Williams a-100 Exterior Oil Wood Primer 3. Coronado Oil House Paint Primer 9-11 4. PPG Seal Grip Interior / Exterior Universal Alkyd Primer Sealer 		
Top Coats:	2	4.5 W.M. ea.	2.5 D.M. ea.
	<ol style="list-style-type: none"> 1. Glidden Spred Gel-Flo House & Trim Paint No. 1901 2. Sherwin Williams Pro Mar Alkyd Flat Exterior B38W 3. Coronado Flat Oil House Paint 7 series 4. PPG Speedhide Interior / Exterior WB Alkyd 		

TYPE	NO. OF COATS	WET MIL RANGE	DRY MIL RANGE
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Finish No. 15: Existing Exterior Masonry and Concrete Panel System

Preparation: Scrape, sand and power wash (min 2100 psi) and allow to dry, Repair racks, voids and other penetrations with coating product manufacturer's patching material and / or sealants. Remove existing mildew with approved method prior to application of primer.

Prime Coat:	1	8.0 W.M.,	3.2 D.M.
	<ol style="list-style-type: none"> 1. PPG Perma-Crete Concrete and Stucco Primer 2. Coronado Masonry Sealer 48-11 3. Sherwin Williams Loxon Masonry Coatings 		
Masonry Filler as Required:	1 Coat	5.0 W.M.	8.2-16.4 D.M
	<ol style="list-style-type: none"> 1. Sherwin Williams Prep-Rite Interior/Exterior Block Filler B25W25 2. PPG Speedhide Interior / Exterior Masonry Latex Block Filler 3. Coronado Superkote Latex Masonry Filler 946-11 		
Top Coats:	1 or 2	10.0 W.M.	1.6 D.M. ea
	<ol style="list-style-type: none"> 1. PPG Speedhide Exterior Latex Semi-Gloss 2. Coronado 138 series Epoxy Enamel 3. Sherwin Williams A-100 Exterior Paint Coating 		

2-03: Mechanical and Electrical Equipment: Items in Division 23 and 26 that require painting are to be executed under those contracts. Prime and finish coats applied to those items are specified in Paragraph 2-02. Painting including but not limited to following items are covered by this Section and shall be the responsibility of respective trades of those Divisions to provide required paint finish:

- Exposed steel piping
- Copper piping

Cast iron piping
Insulated piping
Electrical conduit
Fittings
Ducts
Hangers
Supports

These items shall be primed as specified for their material and shall be painted to color of particular surfaces against which they occur unless directed otherwise by Architect or specified in Color Schedule.

PART 3: EXECUTION

3-01: Preparation of Surfaces:

1) Surfaces to be finished shall be free of imperfections or contamination which would interfere with uniform appearance, adhesion and quality of coating. Contractor shall clean all existing walls of tape, stickers or other items that have been adhered to existing walls before beginning painting operations.

2) Ferrous metal surfaces, excluding stainless steel surfaces, that will be exposed in complete work shall be prepared in accordance with SSCP-SP3, Power Tool Cleaning, for normal requirements, or SSCP-SP6, Commercial Blast Cleaning, for when prolonged job site exposure occurs, prior to placement of primer coat.

3) Galvanized steel surfaces shall be prepared in accordance with SSCP-SP1, Solvent Cleaning, prior to placement of primer coat.

4) Wood surfaces shall be sanded smooth and dust removed before application of any coating. Knots or sap spots shall be sealed with 2-pound cut shellac prior to application of prime coat. Nail holes shall be puttied or filled with plastic wood after priming or undercoating is applied, then sanded smooth; wood filler shall match color of finish where clear coats of finish are specified.

5) Abraded areas of shop coats shall be primed.

6) Concrete Floors

a) Unpainted floors - Acid etch or detergent removal of contaminants as per manufacturer's recommendations

b) Previously painted floors - Sand blast or Detergent/power wash removal of existing paint/contaminants as recommended by the manufacturer

3-02: Application:

1) Methods

Materials may be applied to surfaces of large area by brush, roller or spray, provided that final coating has solid hiding and uniform appearance. Brush applied coatings shall be brushed out uniformly, to eliminate laps, skips, and excess brush marks. Cutting in with brush on surfaces adjoining roller or spray coated areas shall be done carefully so that finish will be of the same texture, color, and hiding as adjacent areas. Roller coated areas shall show no signs of lapping or excess paint lines from edges of roller. Spray painting shall be done prior to installation of fixtures, hardware, flooring, and other finish items, unless all such items are thoroughly protected. Spraying equipment shall be suitable in type and of adequate capacity for experienced painters, to assure a uniform finish of acceptable quality. Methods of application, including adherence to spreading rate listed by the approved paint manufacturer to obtain recommended dry mil thickness, time lapse between successive coats, etc., shall be in accordance with manufacturer's recommendations.

2) Mixing and Tinting

Job site tinting of finish coats shall be done only with the approval of the Architect. Primer, undercoating, and intermediate coats shall each be visibly different in color from preceding coats. Tinted colors are to be of the type recommended by the manufacturer of the coatings approved for use on the project.

Thinning shall be done only when specifically permitted by the manufacturer; if permitted, it shall be done with the materials and to the extent recommended by the manufacturer; wet mil thickness shall be increased to provide manufacturer's recommended dry mil thickness.

3) Final Coatings

Finished work shall show no runs, sags, curtains, excessive brush marks, holidays, or other evidence of poor applications. Spot painting to correct soiled or damaged paint surfaces shall be blended into surrounding finish so that it will not be visible to normal viewing; if it is not, entire sections shall be re-coated between corners or other approved stopping points. Edges of paint adjoining other materials or colors shall be sharp and clean, without overlapping. Sanding between coats, with fine sandpaper, shall be done as required to achieve even, smooth

finish on wood and metal surfaces. Should the number of coats specified to be applied to surfaces herein listed not cover, additional coats shall be applied until a satisfactory finish is produced.

3-03: Protection and Cleaning:

Adjacent work and materials shall be protected with suitable covers during painting and finishing operations. Splatters or spills of paint or other coatings on floors, adjacent coatings, glass, and other finished surfaces shall be carefully removed.

END OF SECTION

DIVISION 10

SPECIALTIES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install LCS Type dry erase boards, of length indicated at locations indicated on the drawings, with related accessories and specialties, as called for by drawings and specified herein.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids. Manufacturers approved for use on this project include:

- Claridge Products and Equipment, Inc. (Harrison, Arkansas)
- American Chalkboard (Wetumpka, Alabama)
- Carolina Chalkboard (Landis, NC)
- Nelson Adams (Corona CA)
- Penensular Slate Co. (Troy, MI)
- ADP Lemko (West Jordan, UT)

1-04: Shop Drawings: Furnish 6 copies minimum of shop drawings showing locations, sizes, trim, installation details, etc. Installation shall not begin until shop drawings have been reviewed. Samples of dry erase board, bulletin board and display rail shall be submitted for approval of color and surface texture.

PART 2: PRODUCTS

2-01: Dry Erase Boards: Boards shall be equal to Claridge Series 1 Factory-Built units. Size and type shall be as shown on drawings. Dry Erase board panels shall be nominally 1/2" thick, two-ply, with "LCS" liquid chalk writing surface; colors to be selected by Architect and Owner from standards. Trim shall be extruded aluminum with manufacturer's standard anodized satin finish. Furnish Series 1 chalk tray with end caps. Provide 0.015 aluminum backing on back-up material for dry erase boards. Note: Each LCS marker board and bulletin board shall be independently trimmed to allow relocation of units.

2-02: Accessories shall be supplied per unit of dry erase board as follows:

- (4) No. 51-C Display hooks
- End Closure stops as required
- 12 Markers - 3 each of red, blue, black, green for each classroom location

2-04: Tack Boards: Construction of tack boards shall be equal to dry erase boards except that hardboard backing shall be 1/4" thick; tack panels shall be 1/4 "natural cork" material compounded with linseed oil and pigment on burlap back. Note: Each LCS marker board and tack board shall be independently trimmed to allow relocation of units.

PART 3: EXECUTION

3-01: Installation of Dry Erase Boards & Tack Boards: Boards and trim shall be installed in accordance with manufacturer's recommendations and with approved shop drawings. Furnish minimum 2 copies of manufacturer's printed instructions to Architect before any materials are installed. Finished installation shall have boards in flat planes parallel to walls; trim shall be securely attached with flush tight joints. Protect surfaces against soil or physical damage until project is accepted by Owner.

END OF SECTION

INTERIOR SIGNAGE

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services required to furnish and install interior identifying devices where scheduled and as specified herein.

1-03: Submittals: Submit 6 copies minimum of shop drawings showing signage layout, method of attachment, typeface, finishes and location schedule. Provide 2 copies minimum of printed instructions for cleaning and maintenance.

1-04: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be reviewed, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use on this project include:

ASI SIGN SYSTEMS, Raleigh, NC 919.859.2811.

ANDCO INDUSTRIES CORP., Greensboro, NC 800.476.8900.

BEST SIGN SYSTEMS, Montrose CO 800.235.2378.

ADVANCE PRINTING PRODUCTS, INC. Ashland VA

PART 2: PRODUCTS

2-01: Laminated Plastic (Interior Type): Room Identifying Devices shall be equal to products of ASI "EMBOSS SERIES" laminated plastic, 1/8" thick, with letters or numbers formed by "blasting" through surface color to expose contrasting core color and incorporating Braille copy. For bidding purposes assume one sign at each interior door. Color shall be selected by Architect from supplier's stock laminates. Owner shall supply actual numbering and naming schedule at submission of shop drawings. **Contractor shall not fabricate signage without an approved room and number schedule from the Architect.**

2-02: Standards: Signage shall meet the requirements of ADA and ANSI A117.1. Exterior room signs shall have Braille plaque mounted at height required by ADA standards. Unit fire-rating shall be "Self-Extinguishing".

PART 3: EXECUTION

3-01: General: Signage shall be installed by personnel approved and provided by Supplier. Supplier shall coordinate exact locations with General Contractor and Architect.

3-02: Installation of Laminated Plastic: Install interior devices, as required by ADA standards, 60" above finished floor to the centerline of the sign on the wall adjacent to the latch side of the door with chrome-plated fasteners or other fastener of equal quality.

END OF SECTION

PLASTIC TOILET COMPARTMENTS

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment, and related services necessary to furnish and install toilet compartments with related accessories and specialties called for by drawings and specified herein.

1-03: Submittals: Submit shop drawings to show layouts, elevations, sizes of components, anchoring, doweling, fitting and other details of construction. Prime Contractor shall verify dimensions in building.

1-04: Handling and Storage: Partition components and doors shall be transported, handled and stored in a manner which will prevent soiling, staining, or physical damage.

1-05: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, brand names, types, etc., are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data as required in order to make valid comparisons of products involved. Products approved for this project include the following:

“Poly-Pro” - Capitol Partitions, Inc., Rockville, Maryland (301.251.0155).

“High-Density Polymer” - General Partitions Mfg. Corp., Erie, PA (814.833.1154).

“Poly-Mar HD” - Santana Products Co., Scranton, PA (800.368.5002).

“Trident” - Trident Partition Systems Inc., Walterboro, SC (800.538.3321).

1-06: Warranty: All copolymer materials shall be warranted against defects due to normal use for a period not less than 10 years. Warranty shall cover hardware and trim.

PART 2: PRODUCTS

2-01: Materials and Construction: Panels and pilasters shall have a finished thickness of 1” min. and shall have a uniform flush front appearance. Panels shall be manufactured from high density polyethylene copolymer. All units shall be floor mounted and overhead braced. All panels shall have a continuous aluminum bottom channel attached to lower edge. Floor plinth shall be fabricated from Type 304 stainless steel having a satin finish. Surfaces of compartments shall be polyethylene copolymer plastic with matte finish and radiuses edges. Head rails and head rail returns shall be of anodized aluminum satin finish with “anti-grip” design.

Panels shall be attached to adjoining panel or wall with continuous aluminum brackets #201c, #102c, #101c. Hardware shall include heavy-duty continuous aluminum door hinge #500 aluminum door latches #403 with bumper #403 or #405 tamper-proof screws and thru bolts, and coat hook that incorporates bumper #408. **All brackets and hinges shall be zero sight line hardware.**

Toilet accessories are specified in Section 102800. See drawings for locations and additional requirements.

PART 3: EXECUTION

Partitions shall be erected in accordance with contract drawings and approved shop drawings. Partitions and fronts shall be plumb, level, in proper alignment and relation to walls. Anchorage to floors and walls shall be secure. Surfaces shall be protected from damage until the project is accepted.

END OF SECTION

TOILET AND BATH ACCESSORIES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install toilet and bath accessories, with related specialties, called for by drawings and specified herein. Note that items supplied by the Owner shall be installed by the contractor with Owners coordination and ADA dimensional standards.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names, types, patterns, etc., are used. Equal products of other manufacturers will be considered provided that requests for substitutions are accompanied by supporting technical literature, samples, and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use:

BRADLEY, Charlotte, NC (704.543.7053)

BOBRICK, Charlotte, NC (704.545.4545)

McKINNEY, Scranton PA (717.346.7551)

PART 2: PRODUCTS

2-01: Toilet Tissue Dispensers: Shall be provided by the Owner and mounted by General Contractor.

2-02: Stainless Steel Grab Bars (See drawings for mounting heights)

1) At each 5' x 5' ADA toilet in group toilets and at each single toilet room provide the following:

- a. Bobrick B-6206 x 42: 1 each
- b. Bobrick B-6206 x 36: 1 each
- c. Bobrick B-6206 x 24: 1 each

Note: Each 5' x 5' HC toilet shall have a total of (3) grab bars.

2) At each 3' x 5' Ambulatory ADA toilet provide the following:

- a. Bobrick B-6206 x 42: 2 each
- b. Bobrick B-6206 x 24: 2 each

Note: Each 3' x 5' HC toilet shall have a total of (4) grab bars.

2-03: Soap Dispenser: Shall be provided by the Owner and mounted by General Contractor.

2-04: Stainless Steel Channel Mirrors

- a) Bradley 780 (24" x 60") One at each group toilet and one at each single toilet. To be located by Architect.
- b) Bradley 781 (24" x 36") One at each wall mounted sink

2-05: Paper Towel Dispensers: Shall be provided by the Owner and mounted by General Contractor.

PART 3: EXECUTION

The exact location of accessories will be determined on site by the Architect. They shall be set in proper relationship with wall finishes, anchored securely to blocking or masonry as required, erected level and square without damaging accessories or finished surface. Mountings shall be heavy-duty, concealed type.

Toilet tissue dispensers shall be attached to metal stud walls with 1/8" toggle bolts. Grab bars shall be attached with anchors or mounting kits with anchor plates concealed. Grab bar mountings shall meet requirements of N.C. State Building Code, and table 3201 of NC Code, that they support a 250-pound load. All exposed screws, nuts, washers, etc., used in mounting devices or accessories shall be of brass, chromium-plated; of stainless steel; or of other non-corroding material as approved on shop drawings. Mirrors shall be sealed to wall with clear caulking on all sides.

END OF SECTION

FIRE PROTECTION SPECIALTIES

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services required to furnish and install fire protection equipment as scheduled and specified herein. Extinguishers are furnished and installed by General Contractor.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be considered, provide that requests for substitutions are accompanied by supporting technical literature, samples, drawings and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use:

LARSEN'S MFG. CO., Ft. Lauderdale, FL (954.486.3325)
 POTTER-ROEMER, Atlanta GA (800 .762.0542)
 J.L. INDUSTRIES, Bloomington, MN (952.835.6850)

1-04: Submittals: Submit 6 copies minimum of shop drawings showing equipment construction, mounting, overall dimensions, clearances, finishes and method of operation. Provide 2 copies minimum of printed instructions for cleaning and maintenance.

PART 2: PRODUCTS**2-01: General:**

a) Fire Extinguisher Cabinets shall be equal to JL Industries Ambassador Series with the following options:

- Finish: Steel White Powder Coat Finish
- Type: Semi-Recessed 3" Rolled Edge Trim (Locations to be determined in field with fire marshal)
- Door Style: Full glass with Saf-T-Lok
- Glazing: Tempered Glass
- Rating: 1-hour and 2-hour rated

Finish shall be "white" with red letters vertical on the cabinet glass. Extinguishers used in mechanical, electrical and storage areas will not require cabinets unless otherwise indicated. Surface mounted units shall have radius corners and be mounted in such a manner that the unit shall not present a problem to circulation of occupants and ADA criteria, and shall conform to ADA standards. Cabinets used in fire rated walls, as indicated on the drawings, shall be fire rated type, UL rated. Contractor shall supply 10 lb "ABC" fire extinguisher at each cabinet. Inspection date shall be current. Fire extinguisher cabinets shall be located as indicated on drawings.

- (10) Semi-recessed, 1-hour rated units
 - (3) Surface mounted units
- Total of 13 units for project

PART 3: EXECUTION

3-01: Cabinets shall be shipped to site and stored by General Contractor in a place that will not adversely effect equipment. Units shall be installed by General Contractor in locations shown on plans. General Contractor to verify height with Fire Marshal and Inspections Dept. Make sure all cabinets open freely without binding. Coordinate all locations with Orange County Fire Marshal **before** installation.

END OF SECTION

ALUMINUM WALKWAY COVERS (Alternate G1)

PART 1: GENERAL**1.01 SUMMARY**

- A. Section Includes: Design, fabrication, and installation of welded extruded aluminum walkway cover systems.
- B. Products Furnished but not Installed Under this Section: Column sleeves (styrofoam blockouts) or anchor bolts (if required)

1.02 REFERENCES

- A. The Aluminum Association (AA):
 - 1. The Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.
- B. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- C. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- D. American Society for Testing and Materials (ASTM):
 - 1. ASTM B 209, Specification for Aluminum and Aluminum- Alloy Sheet and Plate.
 - 2. ASTM B 221, Specification for Aluminum and Aluminum- Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 3. ASTM C 150, Specification for Portland Cement.
 - 4. ASTM C 404, Specification for Aggregates for Masonry Grout.
- E. American Welding Society (AWS):
 - 1. ANSI/AWS D1.2, Structural Welding Code - Aluminum.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design Walkways in accordance with The Aluminum Design Manual 2000.
 - 2. Comply with the wind requirements of ASCE 7.
 - 3. Provide an all welded extruded aluminum system complete with internal drainage. Non-welded systems are not acceptable.
 - 4. Provide expansion joints to accommodate temperature changes of 120 degrees F. Provide expansion joints with no metal to metal contact.
- B. Performance Requirements:
 - 1. Grout: Compressive strength of 2000 psi, minimum.

1.04 SUBMITTALS

- A. Product Data: Manufacturer's product information, specifications, and installation instructions for walkway cover components and accessories.

- B. Shop Drawings: Include plan dimensions, elevations, and details.
- C. Samples:
 - 1. Selection: Manufacturer's standard range of colors for the finishes selected.
- D. Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the state where the project is located. Design calculations shall state that the walkway cover system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least ten years experience in the design, fabrication, and erection of extruded aluminum walkway cover systems.
- B. Installer Qualifications: Have walkway covers installed by manufacturer, third party installation is not acceptable.

PART 2: PRODUCTS

2.01 MANUFACTURERS

- A. The design is based on products fabricated by: Peachtree Protective Covers, Inc., 3255 South Sweetwater Rd., Lithia Springs, GA 30122, 770-439-2120, fax 770-439-2122.
 - 1. Comparable products by the following manufacturers also will be acceptable:
 - a. Dittmer Architectural Aluminum
 - b. Avadek Walkway Cover Systems
 - 2. Substitutions: Comparable products of other manufacturers will be considered under standard substitution procedures.

2.02 MATERIALS

- A. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
- B. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.
- C. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
- D. Grout:
 - 1. Portland Cement: ASTM C 150, Type I.
 - 2. Sand: ASTM C 404.
 - 3. Water: Potable.
- E. Gaskets: Dry seal santoprene pressure type.
- F. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

2.03 MIXES

- A. Grout: 1 part portland cement to 3 parts sand, add water to produce a pouring consistency.

2.04 FABRICATION

- A. General:
 - 1. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.

2. Welding: In accordance with ANSI/AWS D1.2.
 3. Bent Construction: Factory assemble beams to columns to form one-piece rigid bents. Where used make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints can be used if supported by engineering calculations and/or testing.
 4. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Assemble deck with sufficient camber to offset dead load deflection.
- B. Columns: Provide radius-cornered tubular extrusions with cutout and internal diverter for drainage where indicated. Circular downspout opening in column not acceptable.
 - C. Beams: Provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner.
 - D. Deck: Extruded self-flashing sections interlocking into a composite unit. Provide welded plate closures at deck ends.
 - E. Fascia: Manufacturer's standard shape. Provide fascia splices where continuous runs of fascia are jointed. Locate splices to be in line with bents and fasten in place on hidden or non-vertical surfaces.
 - F. Arches: For barrel vault protective covers, provide sharp-cornered tubular extrusions.
 - H. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.
 1. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.7 mils or thicker), complying with AAMA 611.

PART 3: EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.02 ERECTION

- A. Erect protective cover true to line, level, and plumb. Protect aluminum columns embedded in concrete with clear acrylic. Fill downspout columns with grout to the discharge level to prevent standing water. Install weep holes at top of concrete in non-draining columns to remove condensation.
- B. Provide hairline miters and fitted joints.

3.03 CLEANING

- A. Clean all protective cover components promptly after installation.

3.04 PROTECTION

- A. Protect materials during and after installation.

END OF SECTION

DIVISION 12

FURNISHINGS

WINDOW TREATMENT

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install operable window blinds at exterior windows in all rooms, at all interior window openings between rooms and corridor, between rooms and rooms, and at vision windows in all door frames. Blinds shall be provided at all clear glazed openings and in all new or remodeled spaces in the building.

1-03: Substitutions: For purposes of establishing type and quality of materials required for work included in this section, manufacturer's names and brand names are used. Equal products of other manufacturers will be acceptable, provided that requests for substitutions are accompanied by supporting technical literature, samples, drawings, and performance data for comparative evaluation 10 days prior to receipt of Bids. Products approved for use include:

- Levolor
- Hunter Douglas
- Bali

1-04: Shop Drawings: Submit 6 copies of shop drawings minimum for review before fabrication is begun. Drawings shall indicate sizes, and hardware installation details.

PART 2: PRODUCTS**2-01: General:**

a. **Horizontal Blinds** shall be nominal 1" wide horizontal slats in assembly similar to Levolor Lorentzen, Inc., Riviera DustGuard Series. Slats shall be supported by braided ladders. Products of Bali Classic Mini-blinds are also approved for use.

For bidding purposes assume blinds at all exterior and interior windows. Assume blinds at all interior and exterior door sidelights.

2-02: Horizontal Blind Construction and Finish:

a) Slats shall be 0.007" thick before painting, 0.008" after painting. Slats shall have a finish similar to "tomized" catalytic undercoat bonded to aluminum and finished with baked enamel coat. Color of blinds (and other related accessories) shall be selected from standard color samples. Slats shall have an elliptical crown of proper contour formed after coating and curing. Radius of corners shall be 5/32". Note: "Tomized" treatment refers to corrosive resistive treatment on the metals. Other treatments of corrosive resisting finish shall be verified with the Architect.

b) Head channel shall be .025" "Tomized" steel with baked enamel finish coating. It shall be U-shaped, 1" high x 1-9/16" wide with flanged edges at top.

c) Tilter shall be .042" "Tomized" steel and shall have a wand of grooved plastic, which by turning shall adjust slats to desired angle.

d) Cord lock shall be .042" thick "Tomized" steel securely attached to head, crashproof type to snub cords without tearing and to lock slats at one height when cores are released.

e) All blinds shall have a cradle and drum for each ladder. Cradle shall be .042" "Tomized" steel and shall have holes with rolled edges to guide the ladder and cord through bottom of head. The drum shall be .031" thick "Tomized" steel and shall have 2 holes with rolled edges to anchor the barbs of each of the two ladders ends.

f) Tilt rod shall be of solid "Tomized" steel with sectional dimension of 1/4".

g) End braces of .042" thick "Tomized" steel shall be fastened at each end of head. Each brace shall have an adjustable tab.

h) Installation brackets of .042" thick shall be provided to support ends of head channel. Intermediate brackets shall be installed as required by manufacturer's recommendations according to unit size of blind.

i) Slab supports shall be braided of polyester yarn, the vertical component which shall be not less than .045 inch diameter, nor greater than .068 inch diameter for maximum strength. Braiding shall be accurate to hold slats at uniform parallel position for proper tilt control. There shall be 28 rungs per 2'-0" or ladder equally spaced at .788" intervals. Distance between ladders shall not exceed 21".

j) Bottom rail shall be of .031" "Tomized" steel and shall be provided with pierced holds for the ladders and cord. Plastic caps shall lock onto rail to cover cord and ladder holds. End caps with bottom flange shall be provided.

k) Lift cord shall be of rayon core and braided with synthetic fibers and shall have a minimum breaking strength of 200 pounds. Cord ends shall be securely anchored to bottom rail at maximum spacing of 45" between cords.

PART 3: EXECUTION

Frames of blinds and shades shall be installed in required location, set accurately with respect to adjacent building elements, level and square. Anchors shall be as recommended by manufacturer and shall be securely anchored. Width of units shall be verified with Architect. Motorized shading devices shall be installed by manufacturer or manufacturers authorized installer using approved licensed electrician or contractor's electrician. An electrical permit shall be issued by the governing body for this work. Materials shall be protected against physical damage, stain, or other injury, which might be cause for rejection, until the project is accepted by the Owner.

END OF SECTION

PLASTIC LAMINATE FACED CABINETWORK

PART 1: GENERAL

1-01: Reference to Other Documents: The General Conditions of the Contract, Special Conditions and Division 1 contain requirements relevant to work covered by this section.

1-02: Work Included: This section includes labor, materials, equipment and related services necessary to furnish and install manufactured base and wall cabinetwork with countertop and backsplash as shown on the drawings and specified herein.

1-03: Manufactures: The following manufacturers are listed as approved for use on this project. Approval is conditional on meeting the requirements of the specifications:

- 1) TMI Systems Design Corp., Dickinson ND.
- 2) LSI Corporation, Minneapolis, MN
- 3) Stevens Cabinet Co., Teutopolis IL
- 4) Blair Dumond, Richmond VA
- 5) Interior Wood Specialties, High Point NC

Other manufactures shall be pre-approved by Owner and Architect and approval acknowledged by addenda during the bidding period.

1-04: Shop Drawings: Submit shop drawings of cabinetwork to show location, arrangement, dimensions, materials, construction, hardware, finishes, laboratory fixtures and other pertinent information. No items shall be delivered to site until these drawings have been approved. The General Contractor is responsible for coordinating field dimensions. **Coordination with the plumbing and electrical contractor must be documented on the Shop Drawings by the General Contractor, otherwise drawings will be rejected.**

1-05: Delivery and Storage: No items shall be delivered to the building until temperature and humidity conditions are approximately those which will exist when the building is in use by the Owner. The General Contractor shall designate a place for storage upon delivery until installation is complete. Protect items from physical damage or stain.

1-06: Related work specified in other areas:

Plumbing Fixtures	see Plumbing Drawings
Electrical Devices	see Electrical Drawings

1-07: Warranty: All materials and workmanship covered by this section will carry a 5-year warranty from date of acceptance by Architect and Owner.

PART 2: PRODUCTS

2-01: General

- a) The Casework Subcontractor shall furnish and install all cutouts, fillers, scribes, finished ends, finished backs and tops as required for a complete finished product.
- b) Finished rubber base shall be furnished and installed by the General Contractor.
- c) MCP II or Thermofused Melamine will NOT be permitted on door and drawer fronts or other exposed faces.
- d) All door and drawers shall have a full 3mm PVC edge. (T-mold is not acceptable).
- e) All countertops shall be solid surface equal to Wilsonart Solid Surface with 4" high backsplash
 - 1) Colors shall be chosen from price groups 1, 2 & 3
- f) All cabinet components shall be 3/4" thick BEFORE lamination, unless otherwise listed on drawings or specified herein.

- g) All base and wall cabinets over 36" wide shall have a full height vertical divider.
- h) Interiors shall be selected from manufacturer's full range of PVC colors.
- i) All sink base bottoms and sides shall be laminated with CL-20 cabinet liner.
- j) For bidding purposes provide locks on 50% of cabinets.
- k) All shelves shall be banded on front edge with 3mm PVC edging.

2-02: Definitions

- a) Unit Body Open Interiors - any storage unit surface without solid door or drawer fronts and units with glass sliding or glass frame doors.
- b) Unit Body Closed Interiors - any storage unit surface behind solid door or drawer fronts.
- c) Unit Body Exposed Side - any storage unit exterior side surface that is visible.
- d) Concealed Surfaces - any surface not normally visible after installation.

2-03: Core Materials

- a) Particleboard - minimum density 45 lb. western particleboard of fir or pine meeting or exceeding ANSI A208 1-1979, 1-M-3 requirements. Thickness used shall be 1/4", 1/2", 3/4" and 1".
- b) Hardboard - prefinished hardboard in 1/4" thickness meeting or exceeding commercial standards CS-251.
- c) Plywood - 9 ply veneer core hardwood.

2-04: Decorative Laminates

- a) GP50 - high pressure (0.050), NEMA Test LD-3-1985.
- b) GP38 - high pressure (0.038), NEMA Test LD-3-1985.
- c) GP28 - high pressure (0.028), NEMA Test LD-3-1985; laminate shall be counter balanced.
- d) PF42 - high pressure (0.042), NEMA Test LD-3-1985.
- e) CL20 - high pressure (0.020, NEMA Test LD-3-1985; cabinet liner shall be counter balanced.
- f) Melamine Laminate - NEMA Test LD-3-1985; laminate shall be counter balanced.
- g) BK20 - high pressure (0.020); laminate shall be counter balanced.
- h) Colors:
 - 1) Colors for countertop grades GP50, GP38, PF42 and PF30 shall be selected from Wilsonart's standards, 5 colors maximum per project.
 - 2) Colors for cabinet surfaces grade GP28 shall be selected from Wilsonart's standards, 1 color per unit face and 5 colors maximum per project.

2-05: Plastic Edging: 3mm PVC - hot melt glue applied.

2-06: Metal Parts: Countertop support brackets, legs and miscellaneous metal parts shall be furniture steel, welded, degreased, cleaned, treated and powder painted. Color to be selected from standards, 1 color per project.

2-07: Cabinet Hardware

- a) Pulls - shall be 96mm surface mounted die-cast zinc alloy, powder coated epoxy finish. One color to be selected from standards. Pulls shall be accurately positioned and mechanically fastened from the inside face of door or drawer. Pulls to be compatible with requirements of Americans with Disabilities Act.
- b) Hinges - shall be 5-knuckle 2-3/4" overlay type, hospital tip, 0.095" thick steel. Hinges shall have 8 minimum edge and leaf fastenings. Doors 48" and over in height shall have 3 hinges per door. Magnetic door catches are required with this hinge and shall have minimum 10 lb. pull, attached with screws and slotted for adjustment.
- c) Extension Drawer Slides:
 - 1) Bottom mount - shall be Blum No. BS 230E with epoxy finish. Slides shall have 100 lb. load rating at full extension, with built-in positive stop both directions. Glides shall have lifetime warranty as offered by manufacturer.
 - 2) Paper storage drawers - shall be Blum No. BS 230E with epoxy finish and lifetime warranty.
 - 3) Knee space drawers - shall be Grant No. 522 with minimum load capacity of 50 lbs. each.
- d) Adjustable Shelf Supports

Units shall be capable of supporting 200 lbs., self-locking nylon, to fit 32mm pre-drilled holes in cabinet ends and vertical partitions. Shelf supports shall have 2 pins 5mm in diameter to prevent shelf support from rotating and tipping. Available for 3/4" or 1" thick shelves.

e) Locks:

1) Doors and Drawers - locks shall be National Lock #M4-7054C, removable core, disc tumbler, cam style lock with strike. Each lock shall be furnished with 2 keys, all locks to be keyed alike per classroom. Each classroom shall be keyed separately.

2) Sliding Doors, 3/4" - locks shall be disc type plunger lock, sliding door type with strike. Locks for sliding glass door shall be ratchet type sliding showcase lock.

3) Chain Bolts - units shall be 3" long, with 18" pull and an angle strike to secure inactive door on cabinets over 72" in height. Elbow catches shall be used on inactive doors up and including 72" in height.

f) Sliding Door Track

Wood and glass sliding doors shall be mounted in anodized aluminum double channel.

g) Coat Rods

Units shall be 1-1/4" o.d., 14-gauge chrome-plated steel.

h) Mirrors

Units shall be 1/4" thick polished mirror plate.

i) Undercounter shelf supports:

Welded steel countertop support frames shall be provided at all knee spaces as indicated on drawings. Frames to be fabricated from minimum 1 1/4" square steel tube frame with flange for attachment to wall with 1/2" expansion anchors 12" O.C. Frames to be factory finished, color to be selected from manufacturer's standards.

2-08: Fabrication

a) General

Fabricate laminate clad casework to dimensions, profiles and details shown on drawings.

b) Joinery

Tops and bottoms shall be joined to ends using 6 dowels min. at each joint for 24" deep cabinets and 4 dowels min. at each joint for 12" deep cabinets. All dowels shall be industrial grade hardwood laterally fluted with chamfered ends and minimum diameters of 10mm. Internal components such as fixed horizontals, rails and verticals shall be doweled in place. Dowels shall be securely glued and cabinets clamped under pressure during assembly to assure secure joints and cabinet squareness.

c) Unit Door and Drawer Fronts

Units shall be 3/4" thick particleboard laminated with GP28 on exposed surface and CL20 on interior surface. Edges shall be finished with 3mm PVC. Double doors shall be used on all cabinets in excess of 24" in width.

d) Unit body Open Interiors

Exposed cabinet shall be 3/4" thick particleboard laminated with GP28 on exterior and balanced with CL20. Unexposed cabinet sides shall be laminated both sides with melamine. All cabinet sides shall be front edge banded with 3mm PVC with color matching door and drawer fronts. All base units except sink bases to be furnished with full sub-top of 3/4" thick particleboard laminated with both sides with melamine and front-edged with 1mm PVC to match door and drawer front edge color. All sub-tops shall be full depth. Bottom of base and wardrobe units shall be 3/4" thick particleboard laminated both sides CL20 and front edged with 1mm PVC. Fixed intermediates shall be 3/4" thick particleboard laminated both sides with melamine and front edged with 1mm PVC; an intermediate shall be provided on all units over 36" wide. Standard unit back shall be 1/2" thick prefinished particleboard, color to match interior. Exposed back on fixed or movable cabinet to be 3/4" thick particleboard laminated with CL20 on interior and GP28 on exterior. Adjustable shelves shall be 3/4" particleboard up to 30" wide and 1" thick over 30" wide, laminated both sides with melamine and front edged with 3mm PVC to match shelf color.

e) Unit Body Closed Interiors

Requirements listed above (Item d.) shall be included herein with the following exception:

1) Sink cabinet bottoms shall be laminated both sides with CL20.

f) Wall Unit Bottoms

Requirements listed above (Item d.) shall be included herein.

g) Drawers

Sides, back and sub-front shall be particleboard, 1/2" thick, laminated with melamine. the back and sub-front shall be doweled and glued into sides. Top edge is banded with 3mm PVC edging. Bottom shall be 1/2" thick

prefinished particleboard screwed directly to bottom edge of drawer box. Paper storage drawers shall be 3/4" particleboard laminated both sides with melamine and constructed with retaining hood at rear of each drawer.

h) Continuous or Unit Tops

All cabinets over 42" and up to 72" in height shall be supplied where shown with a finished 1" continuous top laminated with GP28 and balanced with CL20.

j) Bases

All base and tall units shall have an integral base. Rubber base shall be furnished and installed by General Contractor around all edges exposed to view. Separate plywood base is acceptable.

PART 3: EXECUTION

3-01: General: Cabinet Installer must examine surfaces and areas to receive casework and report to General Contractor and Architect of unsatisfactory conditions. Do not proceed with work unit defective conditions have been corrected; installing products shall be understood by all parties of the acceptance and responsibility by the Installer of conditions being acceptable.

3-02: Cabinets shall be set accurately in place, level, plumb in proper relation to adjacent construction. Connecting and attaching devices, closures, and trim members shall be supplied and installed as required. Moving parts shall be adjusted to operate freely. Debris shall be removed from site as it accumulates. Exterior and interior surfaces shall be cleaned and left from stain, dust, or foreign materials of any kind. Cabinets shall be protected from damage or stain until accepted by the Owner.

3-03: Cleaning and Protection: Repair or remove and replace defective work as directed upon completion of installation. Clean plastic surfaces, repair minor damage as directed by plastic laminate manufacturer; replace other damaged parts or units. Advise contractor of procedures and precautions for protection of casework and tops from damage by other trades until acceptance of work by Owner.

END OF SECTION

DIVISION 22

PLUMBING REQUIREMENTS

PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

1.2 REFERENCES & INTENT

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Study all drawings and specifications before submitting bids.
- C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.
- D. Field verify all building dimensions. The drawings are not to be scaled for final dimensions. However, the equipment is to be installed substantially as shown.
- E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.
- F. Job site Conditions. The Contractor shall visit the site and familiarize himself with the existing conditions before submitting this bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.3 WORK INCLUDED

- A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
 1. All plumbing scope of work as specified herein and as shown on the plans.
 2. Work includes all piping, supports, anchors, insulation, labeling and identification.
 3. All associated cutting and core drilling. The Plumbing Contractor shall cut floor slabs and remove them where required. The General Contractor shall replace floor slabs where required. The Plumbing Contractor shall seal and/or fire stop penetrations as required.
- B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

1.4 STANDARDS AND CODES

- A. All equipment with electrical components shall bear the UL label.
- B. The following minimum standards apply wherever applicable:
 - 1. AGA American Gas Association, Inc.
 - 2. ANSI American National Standards Institute, Inc.
 - 3. ANSI B31.9 Building Services Piping Code
 - 4. ASME/ASME Code Sec.9 American Society of Mechanical Engineers Boiler and Pressure Vessel Code - Welding and Brazing Qualifications
 - 5. ASTM American Society for Testing Materials
 - 6. AWWA American Water Works Association
 - 7. AWWA C651 Disinfecting Water Mains
 - 8. NBFU National Board of Fire Underwriters
 - 9. NEC National Electric Code
 - 10. NEMA National Electrical Manufacturers Association
 - 11. NFPA National Fire Protection Association
 - 12. OSHA Occupational Safety and Health Act
 - 13. MSS Manufacturer's Standardization Society of the Valves and Fittings Industry
 - 14. UL Underwriters laboratories, listed Product Directories
 - 15. North Carolina Plumbing Code, 2018 – International Plumbing Code 2015
- C. In the event, there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.5 QUALITY ASSURANCE

- A. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.
- B. Plumbing equipment and fixture installation shall be by a licensed plumber specializing in performing the work of this section with minimum 3 years' experience.
- C. Materials and installation shall be in accordance with North Carolina State Building Code 2018 Edition (Year 2015 of the International Plumbing Code as modified and approved by the NC Building Code Council).

1.6 PERMITS AND FEE

- A. Make application for all necessary permits and pay applicable fees.

1.7 STRUCTURAL STEEL AND CONCRETE

- A. Structural members may not be pierced without prior written approval of the Engineer.

1.8 WATERPROOFING

- A. Waterproofed floors and walls may not be penetrated without prior written approval of the Engineer.

1.9 WORK SCHEDULE

- A. Work schedule shall be in accordance with Division 01.

1.10 PROTECTION OF EQUIPMENT

- A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.
- B. Provide protection against theft, physical damage and the entry of dirt, water, corrosive fumes into the material and equipment. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes in a dry, heated space.

1.11 FIRE SAFETY

- A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10-pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.
- B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

1.12 GUARANTEES

- A. Furnish written guarantee in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.13 SUBMITTALS

- A. It shall be noted that submittals processed by the Engineer are not change orders; that the purpose of submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The Engineer may also require the contractor to submit samples of proposed or specified equipment for approval, with the samples to be returned to the contractor upon request.
- B. Prior to procurement or manufacturing, submit for approval appropriate shop drawings, manufacturer's catalog data, and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, installation instructions, dimensions including rough-in dimensions, pipe connection sizes, trim, and finishes material, etc., for all items under this Division.
- C. Field verify the characteristics of all specified equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc.
- D. Where different products have to work together, it is the contractor's responsibility to select manufacturers whose products are visually or technically compatible.
- E. Prepare listing of plumbing fixtures, specialty items, piping materials, identification materials, and insulation for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented. Plumbing materials shall not be delivered to the building until the Designer has inspected and approved the completed listing.

- F. Submittals of shop drawings and manufacturer's data, etc. shall be provided to the Engineer electronically in PDF format. The Engineer will review the submittals and return them electronically. The exception would be color samples or other material that cannot be adequately represented electronically, and these should be submitted as five (5) hard copies. The Engineer will review them and return three (3) copies.

1.14 RECORD DOCUMENTS

- A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer maintenance manuals and colored scans of the marked-up prints in PDF format indicating any installed work that is different from what is shown on the drawings.
- B. These record drawings shall include detailed locations and depths for all below slab pipes.

PART 2 - PRODUCTS

2.1 QUALITY OF MATERIAL

- A. Plumbing equipment manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum three years' experience. Equipment of the same general type shall be of the same make. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.
- B. All materials provided shall be new and shall be approved by the Underwriter's Laboratories, Inc. wherever that agency has applicable standards.

PART 3 - EXECUTION

3.1 CLEARANCE AND RESTORATION OF SITE

- A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire ratings of rated assemblies. All penetrations shall be sealed to existing conditions per UL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.2 COORDINATION

- A. Install all work to permit removal or maintenance of equipment and fixtures without damage to the equipment, fixtures, or the building. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the Engineer of any conflict.
- B. Do not rough prior to receipt of approved shop drawings.

3.3 EQUIPMENT ARRANGEMENT AND SUPPORT

- A. Support plumb, rigid and true to line all work, including equipment, fixtures, and piping furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, fixtures and piping are to be supported, mounted or suspended. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.

- B. All gauges, meters and similar items shall be mounted so they are readable without requiring a ladder.

3.4 FINAL ADJUSTMENT AND TESTING

- A. General - Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship only may be corrected after discovery of defect by tests.
- B. Working Tests - Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.5 LABELS, IDENTIFICATION AND TAGS

- A. Label plumbing equipment and specialty items in conformance with Section 22 05 53 - "Plumbing Identification and Painting".

3.6 OWNER'S RIGHT TO TEST SYSTEMS

- A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exists as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.7 CLEANING UP

- A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Engineer.
- B. Buildings will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

3.8 INSPECTION CERTIFICATES

- A. Obtain all inspections required by law, ordinances, rules, and regulations of the authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.9 DESIGNER INSPECTIONS

- A. The Designer will make regular site visits during construction and will keep a deficiency log of all observed exceptions. The contractor shall resolve these noted deficiencies as expediently as possible.

3.10 FINAL REVIEW

- A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative and shall be at such times as are convenient to the Engineer. Final tests shall show conclusively that all fixtures and equipment perform their intended and specified functions and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

3.11 MAINTENANCE MANUALS

- A. O&M documentation shall be delivered within 60 days of the Contractor receiving approved shop drawings.
- B. Maintenance Manuals shall be submitted in three (3) copies in vinyl 3-ring binders, and three (3) copies in electronic format as PDF files on disks. Each manual shall have the following:
 - 1. Service telephone number of the installing company, including an emergency number.
 - 2. Contact person, phone number, and address of manufacturer or distributor where equipment was purchased.
 - 3. The manufacturing company's operating and maintenance manuals for each piece of equipment.
 - 4. Copies of all approved submittals.
 - 5. Copies of warranties with their start dates.
 - 6. A diagram of all valve locations, giving their identification and function. This shall be submitted to the Engineer for review and approval as part of the O&M manual, and to be mounted as indicated below.
- C. Furnish for each building permanent type charts, framed under clear plastic, mounted in the Boiler Room or where directed as follows:
 - 1. Service organizations with day and night telephone numbers.
 - 2. A diagram of all valve locations, giving their identification and function.

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 21, Division 23, Division 26, and Division 31 specifications apply to work of this section.

B. Section 23 0510 - Basic Mechanical Requirements.

C. Section 22 0110 – Plumbing General Requirements.

1.2 DESCRIPTION

- A. Pipe and fittings shall be in accordance with specifications listed herein and shall be installed as outlined under applicable Divisions of the specifications. Materials shall be new and free of manufacturing defects or damage.

1.3 QUALIFICATIONS

- A. The pressure ratings of pipe and fittings shall be compatible with maximum pressures anticipated in respective systems.

PART 2: PRODUCTS

2.1 PIPE AND PIPE FITTINGS (GENERAL REQUIREMENTS)

- A. All above grade water piping 3" and smaller shall be ANSI/ASTM B88, Type "L" copper, hard drawn, with the type and manufacturer's name on each piece. Fittings shall be wrought brass or copper. Under no circumstances shall notching or mitering be permitted. Appropriate fittings shall be used for all turns, and joints.
- B. All above grade water piping 4" and larger shall be cement lined ductile iron with flanged joints.
- C. All below grade water piping 3" and smaller shall be Type "K" copper soft annealed, with the type and manufacturer's name on each piece. Copper tubing which is out of round or kinked will not be acceptable on this project.
- D. Below grade water piping is also permitted to be cement lined ductile iron pipe meeting the requirements of ANSI-AWWA C151/A21.51-91, thickness class 50 or greater. Refer to Section 221000 – Plumbing Piping and Specialties for more details.
- E. Roof Leader, Storm Drain, Sanitary Soil, Waste and Vent Piping:
 1. Above Grade: All 1-1/2" through 8" cast iron soil, waste pipe and house or building sewer lines and fittings shall bear the registered insignia "CI" or "CI No-Hub" indicating that these items used in the sanitary system comply with the Cast Iron Soil Pipe Institute's Standard 301-63T. Universal "Alpha Couplings" or "No-Hub" stainless steel connections shall be used above grade. Cast iron pipe, ASTM A 74, service weight with cast iron fittings and hub-and spigot joints may be used above grade where

needed to connect to existing pipes. 1-1/2 and 2-inch galvanized Schedule 40 nipples may be used at wall rough-in for sinks.

2. Below Grade: New roof leader, storm drain, sanitary soil, waste and vent piping shall be PVC as indicated below. New piping may need to connect to existing piping which consists of varying types of material. Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical-sealing type conforming to ASTM C1173, ASTM C1460 or ASTM C1461. Connectors and adapters shall be approved for the application (refer to 2018 NC Plumbing Code section 705.16 and its sub-paragraphs).
3. Below grade: PVC DWV pipe and fittings: ASTM D 2665, Schedule 40, installation per manufacturer's instructions, and connect by ASTM D 2564 PVC solvent cement. Use 2-inch minimum size underground.
4. Where required to connect to existing cast iron: All 1-1/2" through 8" cast iron soil, waste pipe and house or building sewer lines and fittings shall bear the registered insignia "CI" or "CI No-Hub" indicating that these items used in the sanitary system comply with the Cast Iron Soil Pipe Institute's Standard 301-63T. Universal "Alpha Couplings" or "No-Hub" stainless steel connections shall be used above grade. Cast iron pipe, ASTM A 74, service weight with cast iron fittings and hub-and spigot joints may be used above grade where needed to connect to existing pipes. 1-1/2 and 2-inch galvanized Schedule 40 nipples may be used at wall rough-in for sinks.
5. Pumped waste discharge piping shall be Schedule 40 black steel with malleable iron threaded fittings.
6. Fixture Arms: Schedule 40 galvanized steel pipe with threaded fittings.

2.2 PIPE MATERIAL

A. PVC Pipe and fittings below ground waste piping.

1. ASTM D 2665, Schedule 40, installation per manufacturer's instructions, and connect by ASTM D 2564 PVC solvent cement.

B. Cast Iron Soil Pipe and fittings above ground.

1. Cast iron pipe, CISPI 301, hubless, service weight with cast iron fittings. Joints shall be by heavy duty shielded couplings, as specified ASTM C 1540-2 with stainless steel clamp-and-shield assemblies.

C. Copper Piping and Fittings

1. Water Piping Type L and K - Conforming to ASTM B-88 and hard or soft temper as specified elsewhere.
2. Water Pipe Fittings - Cast brass ANSI B-16.18.

D. Schedule 40 black steel piping and malleable iron threaded fittings: refer to Specifications Section 22 10 00 – Plumbing Piping and Specialties.

E. Standard Cast Iron Fittings

1. 175 PSI WOG, cast iron, screw type, ANSI B-16.4.

F. Cast Iron Drainage Fittings

1. ANSI B-16.12 drainage pattern, standard weight, screw type. Galvanized where specified.

G. Malleable Fittings

1. 150 PSI, SWP malleable iron, screw type, ANSI B-16.3.

2.3 ADAPTORS

A. Cast Iron to Screwed Pipe

1. Half couplings, Schedule 40 steel, galvanized where specified.

B. Cast Iron to Copper

1. Water Service Piping: Dielectric flanged union iron pipe to copper with insulating gasket, 175 PSI rated iron flanges and dielectric space between iron flange and copper pipe. Epco Sales or approved equal.

C. Copper to Screwed

1. Dielectric union with female iron thread to copper solder joint, 250 PSI, with insulating gasket. Epco Sales or approved equal.

2.4 SLEEVES

A. Refer to Specification Section 221000 – Plumbing Piping and Specialties

2.5 ESCUTCHEONS

A. General: Use chrome-plated B & C Type 40 flush escutcheons on ceiling and wall. At floors, use Ritter No. 36-A deep cup chrome-plated escutcheon. Use Ritter, Grabler, Blaw-Knox, or equal. Escutcheons shall be used at all piping in finished areas. Escutcheons on insulated piping shall fit insulation tightly.

B. For Exposed Flush Valves, Water Supplies, and P-traps: Provide chrome-plated cast brass escutcheons with set screws.

2.6 FLASHING

A. Sheet Lead

1. Sheet lead for general use shall weigh at least 4 pounds per square foot.

B. Sheet Copper

1. Sheet copper for general use shall weigh at least 12 ounces per square foot and conform to ASTM B152.

PART 3 - EXECUTION

3.1 PIPING JOINTS

A. Connectors and adapters between different types of material for waste and vent piping shall be approved for the application (refer to 2018 NC Plumbing Code section 705.16 and its sub-paragraphs).

B. Cast Iron Soil Pipe (Below Ground)

1. Neoprene gaskets conforming to ASTM C564, as manufactured by Tyler or Charlotte Pipe Foundries for use on service weight or extra heavy weight soil pipe.

C. Cast Iron Soil Pipe (Above Ground)

1. No hub coupling type joint for two spigots ends of pipe and/or fittings with neoprene sealing sleeves, stainless steel corrugated shield and stainless-steel clamping band.

D. Threaded Pipe

1. Clean male and female threads. Make up with approved pipe joint compound applied to male thread only. Lead and wicking will not be allowed.

E. Copper Pipe or Tubing

1. Domestic Water: Cut tube end square. Ream and remove burrs. Use steel wool or wire brush to clean both tube and cup to a bright metal.
2. Solder for 1-1/4" Piping and Smaller: Apply non-corrosive flux to outside of tube and inside of cup and solder with 95-5 tin-antimony solder. Remove excess solder. Solder shall be composition Sb5, 95 percent tin, 5 percent antimony conforming to Federal Specifications QQ-S-57 lb. Flux shall be non-corrosive type conforming to Federal Specification O-F-506. Solder containing lead will not be permitted on this project.
3. Silver Brazing Alloy for 1-1/2" to 2-1/2": Silver 15%, copper 80%, phosphorous 5%.

F. Flanged Joints

1. Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

3.2 SLEEVES

- A. Provide for all pipes passing through floors, walls and ceilings.
- B. Sleeves shall be of sufficient size to receive insulation and of proper length to terminate 1" above finished surfaces.
- C. Sleeves for covered lines shall fit over covering without unnecessarily large clearances.
- D. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.
- E. Sleeves for piping from mechanical rooms shall be made air and vapor tight by caulking with UL listed fireproof caulking equivalent to 3M CP 25 N/S.

3.3 ESCUTCHEONS

- A. Provide for all exposed piping passing through floors, walls or ceilings of all spaces including equipment rooms.

3.4 FLASHING

A. Vent Piping

1. Sanitary Vent - Extend vent 12 inches above finished roof surface roof insulation.

END OF SECTION 22 01 50

EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections and other Division 22 specification sections, Division 21, Division 23, Division 26, Division 31 specifications apply to work of this section.

1.2 WORK INCLUDED

A. Provide excavation and backfill for all underground interior and exterior utilities and services provided under this contract including:

1. Excavation and backfill.
2. Repair and replacement of grade features to prior condition.

1.3 NOTIFICATIONS

A. Notify the following before commencing any digging.

1. All local utilities, and municipal services including telephone, gas, and electric utilities of construction and or blasting near gas lines, electrical power lines, communication and telephone lines as required by local and State regulations. Obtain and complete necessary forms from respective utilities.

PART 2 - PRODUCTS

2.1 BACKFILL

- A. General fill – Refer to Specification Section 31 05 00 - Earthwork.
- B. Sand - clean fine-grained sand.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Do all necessary excavation work to proper depth, including removal of all material of any nature and description including all existing brick work, rubble, earth, quicksand, abandoned pipe lines, drains and sewers, rocks, boulders, old concrete, and provide fill, forms, sheet piling, drainage, pumping and work space.
- B. Locate and stake each utility line its entire length before starting. Determine exact location of any underground facilities near proposed new lines.
- C. Verify existing elevations, inverts, and grades before proceeding.

- D. Excavate to proper depth and grade with bottom tamped hard. Excavate holes for bell hub, valve flanges, couplings, etc. Pipe to rest on solid ground.
- E. Remove all wood or other organic materials before backfilling.
- F. Should rock be encountered, excavate 6 inches below bottom of pipe and fill space between bottom and pipe with sand, well tamped to form a firm bed.
- G. Maintain sides and slopes of elevations in a safe condition until completion of backfilling. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of sides of excavation.

3.2 SAFETY PRECAUTIONS

- A. When for any reason work is left unfinished at the end of the work day, all open trenches shall be covered, protected or filled.
- B. Provide lights and barricades to properly protect persons and property.
- C. Where necessary provide properly constructed bridges and walkways, with railings, properly illuminated.

3.3 REMOVAL OF WATER

- A. The contractor shall, at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations and shall remove all such water, in such a manner and at such times that the presence of water shall not interfere with the progress of the work or contribute to the weakening of or destabilizing of the bounding soils.
- B. Provide all necessary pumps, hoses, well points, labor and fuel as required for water removal.
- C. Discharge water in accordance with any approved storm water requirements or plans and in such a manner as not to cause a nuisance or damage to adjacent property.
- D. Provide sheathings, cofferdams, sluiceways, etc., as required.
- E. Provide all maintenance and operation of the same.

3.4 BACKFILL

- A. Piping
 - 1. Backfill around piping with sand.
 - 2. Apply in layers of no more than 8 inches to at least 8 inches above the top of the pipe.
 - 3. Compact under and at sides by mechanical means.
 - 4. Fill remainder of trench in 12-inch layers, of compacted, general fill or stone as required by Section 31 05 00 – Earthwork.

3.5 COMPACTION

- A. Control soil compaction during construction providing minimum percentage of density specified for each area classification.
- B. Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture-density relationship as determined in accordance with ASTM D

1557; and not less than the following percentages of relative density as determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship.

1. Lawn or unpaved areas: Compact top 6" of sub-grade and each layer of backfill of fill material to 90% of maximum dry density.
2. Under roadways, drives, parking areas, floor slabs, and walks: Compact top 12" of sub-grade and each layer of backfill or fill material to 95% maximum dry density or 90 percent relative dry density for cohesive soil material.

C. Where sub-grade or soil material must be moisture conditioned before compaction, uniformly apply water to surface of sub-grade, or layer of soil material to prevent free water appearing on surface during or subsequent to compaction operations.

D. Remove and replace or air-dry soil materials that are too wet to permit compaction to specified density.

3.6 SHORING, BRACING AND SHEETING

A. The contractor shall furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such a manner as to prevent any movement which could, in any way injure the pipe, effect the limits of the site, or other work, diminish the width necessary for construction, or otherwise damage or delay the work.

B. In no case, will bracing be permitted against pipes or other structures in trenches or other excavations.

3.7 HAULING MATERIAL ON STREETS

A. When it is necessary to haul material over streets or pavements, the contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from vehicles, the contractor will clean up as often as required to keep the streets and pavements free from mud, dirt, stone and other hauled material. The contractor is responsible for obtaining all State, County, and local permits or variances to allow transport of any and all materials or equipment on public highways.

END OF SECTION 22 05 10

PLUMBING IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

1.2 SCOPE

A. The plumbing contractor shall contract the services of a professional painting subcontractor to do the required painting.

1. Color coded painting of pipes to indicate what is being conveyed in the pipes will not be required.
2. All uninsulated piping and equipment not concealed in chases, crawl spaces, or above ceilings shall be painted to match surroundings, except for copper piping in mechanical or other utilitarian rooms.
3. Black steel pumped waste piping shall be painted dark gray.
4. All insulated piping and equipment exposed to view in public spaces shall be painted unless provided with an aluminum or PVC jacket.
5. The plumbing contractor shall be responsible for labelling the plumbing piping and equipment after it is painted.

B. Identify the following:

1. Domestic cold and hot water piping.
2. All plumbing equipment including valves.
3. All electrical equipment associated with plumbing, including disconnects, panels or sensors.
4. Provide maintenance and emergency repair contact information for all equipment on labels placed in an easily visible location on the equipment.

1.3 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical product data and installation instructions.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE MARKERS

- A. Snap-On Type: Provide manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1. Provide full-band pipe markers, extending 360 degrees around pipe at each location.
- B. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance.
- C. Size of Pipe Identification:

OD Pipe or Covering	Length of Background Color Field	Size of Letters
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1. 3/4 in. thru 1-1/4 in.	8 in.	1/2 in.
2. 1-1/2 in. thru 2 in.	8 in.	3/4 in.
3. 2-1/2 in. thru 6 in.	12 in.	1-1/4 in.
4. 8 in. thru 10 in.	24 in.	2-1/2 in.
5. Over 10"	32 in.	3-1/2 in.

- D. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 VALVE TAGS

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
- B. Provide 1-1/2" diameter tags, except as otherwise indicated.
- C. Valve Tag Fasteners: Provide solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves and manufactured specifically for that purpose.

2.3 ENGRAVED PLASTIC-LAMINATE SIGNS AND EQUIPMENT MARKERS

- A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes indicated, 1/16" thick, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Fasteners: Self-tapping stainless steel screws.

PART 3 - EXECUTION

3.1 PAINTING

- A. All equipment, except where otherwise specifically noted, shall be furnished in prime coat. All uninsulated black steel or cast-iron piping, and water storage tanks shall be prime coated, and finish painted in light gray unless otherwise required by schedule below to be color coded. All welds, on both insulated and uninsulated piping, shall be painted with one coat of primer. All miscellaneous black steel items such as hangers and rods, machinery supports, breechings and stacks, etc., shall be prime coated and finish painted in light gray. Exposed surfaces of insulation shall be sealed. All metal surfaces shall be thoroughly cleaned of rust and dirt and shall be degreased before application of primer. All prime coated equipment shall be touched up where prime coats are chipped, scratched, or otherwise damaged. All prime coated equipment shall be thoroughly cleaned and left ready for finish painting. Where cast iron accessories or galvanized pipe, or equipment surfaces are to receive finish painting, the item shall be properly primed.
- B. Ferrous surfaces shall be painted with the following coats:
1. 1 coat of primer equivalent to Bruning Silathane 520-14 grey-green primer, Benjamin Moore 06- 20 red oxide alkyd primer or Richards SR-1399 red metal primer.
 2. 2 coats of finish equivalent to Bruning Silathane Gloss Enamel 520-32 quarry gray, Benjamin Moore Gloss Enamel 22-38 or Richards Gloss Enamel 1003 Series.
- C. Refer to Division 09 for more information.
- D. Finish painting of all equipment and piping (both insulated and uninsulated) shall be provided. Where indicated, or specified, existing equipment, piping, duct, etc. shall be cleaned and painted along with new work. Do not paint piping that is provided with aluminum or PVC jacketing insulation covering. Paint piping insulation per color schedule below and provide stenciled identification or plastic pipe markers.

3.2 IDENTIFICATION SCHEDULE

A. Painting and/or identification shall be in accordance with the following schedule:

ITEM	IDENTIFICATION	MARKER BACKGROUND COLOR	LETTERING COLOR
1. Domestic cold water	DCW	Green	White
2. Domestic hot water	DHW	Yellow	Black
3. Domestic hot recirculation	DHC	Yellow	Black

B. Size of lettering shall be the as indicated in paragraph 2.01.C above.

C. All other uninsulated ferrous pipes shall be painted light gray with stenciled identification as specified under stenciling.

3.3 GENERAL PLUMBING IDENTIFICATION

A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finishes, including valve tags in finished mechanical spaces, install identification after completion of covering and painting.

3.4 PIPING SYSTEM IDENTIFICATION

A. General: Install plastic pipe markers or stenciling on each system indicated to receive identification.

B. Locate pipe markers and color bands or stenciling as follows:

1. Near each valve and control device.
2. Near each branch.
3. Near locations where pipes pass through walls, floors, ceilings, roofs or enter non-accessible enclosures.
4. Near major equipment items and other points of origination and termination.
5. Spaced intermediately at maximum spacing of 25' along each piping run, except reduce spacing to 10' in congested areas of piping and equipment and in mechanical rooms. Lettering shall be readily observable within the room or space where the piping is located.
6. Exception: Where piping is exposed to public view, identification should be discretely placed for minimal visual impact. Consult Engineer for placement in this type of space.

C. Stenciling: In lieu of plastic pipe markers, stenciling may be used for identification. Apply stenciling after finished painting has been completed. Stencil indication shall be in block letters, applied with black paint (except white paint on dark surface) as follows:

D. Stencil as follows:

	OD Pipe or Covering	Length of Background Color Field	Stencil Letter Size
1.	3/4 in. thru 1-1/4 in.	8 in.	1/2 in.
2.	1-1/2 in. thru 2 in.	8 in.	3/4 in.
3.	2-1/2 in. thru 6 in.	12 in.	1-1/4 in.
4.	8 in. thru 10 in.	24 in.	2-1/2 in.
5.	Over 10"	32 in.	3-1/2 in.

E. All underground lines outside the building footprint, shall have a warning tape installed in the backfill between 6 inches to 24 inches below finished grade directly over piping.

1. Metallic lines shall be identified with durable printed plastic warning tapes, minimum 3 inches wide, with lettering to identify buried line below.
2. Non-metallic pipes shall be marked using an approved tracer. A yellow insulated copper tracer wire or other approved conductor shall be installed adjacent to and over the full length of underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the building drain and building sewer. The tracer wire size shall not be less than 14AWG and the insulation type shall be listed for direct burial.

3.5 VALVE IDENTIFICATION

- A. General: Provide valve tag on every valve, cock and control device in each piping system. List each tagged valve in typed valve schedule for each piping system with diagrams showing their locations, and post under glass in main mechanical room and/or boiler room. Valve schedules and diagrams shall also be included in the O&M manuals.
- B. The contractor shall provide the designer with a set of drawings with the valve numbers marked at their installed locations throughout the buildings. These valve numbers shall be included on the as-built drawings at the end of the project.

3.6 PLUMBING EQUIPMENT IDENTIFICATION

- A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of plumbing equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
 1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 2. Electrical disconnects for plumbing equipment.

3.7 ACCESS PANEL AND CEILING GRID IDENTIFICATION

- A. Install engraved plastic laminate sign or plastic equipment marker on access panels or ceiling grid for concealed plumbing equipment, valves, and other operational devices.

END OF SECTION 22 05 53

PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

1.2 WORK INCLUDED

- A. Provide insulation for piping and equipment installed under this contract, as indicated on the drawings and specified herein, including, but not limited to:

1. Domestic cold, hot, and hot water recirculation piping, valves and fittings.
2. Exposed drain and hot water piping below handicapped fixtures.
3. Piping carrying cold condensate drainage.
4. Piping exposed to outdoor conditions.

1.3 SUBMITTALS

- A. Submit manufacturer's product data on all insulation products specified, including thermal resistance values, flame and smoke ratings, UL listing, and manufacturers published installation recommendations.

1.4 GENERAL REQUIREMENTS

- A. For the purpose of this specification, the term "exposed" is generally intended to mean work that is visible in finished spaces and above partially open ceilings. The term "concealed" is generally intended to mean work that is installed behind walls, plastered ceilings, gypsum board ceilings, continuous lay-in ceilings, and under floors.
- B. Where subject to freezing, cover piping and fittings with single piece, double the thickness normally specified. Areas "subject to freezing" shall be defined as all unconditioned interior spaces and all above grade outdoor spaces.
- C. All insulation, jackets, adhesives, and other insulation materials shall be UL rated, non-combustible, with maximum permanent flame spread rating of 25, and a smoke developed rating of 50 or less and fuel contributed of 50 or less when tested in accordance with ASTM E-84. Submit smoke and flame spread ratings for every material proposed to use.
- D. Unless otherwise indicated, insulation thickness or "R" value shall conform to the North Carolina Energy Code.
- E. Where differences occur between any referenced standard or code the most stringent requirements shall apply.
- F. All products shall be free of asbestos.
- G. All piping insulation shall be performed by a company regularly engaged in piping insulation using full time insulation mechanics.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

A. Type 1 - Thermal Pipe Insulation with Jacket. Preformed Fiberglass Pipe insulation complying with ASTM C547, Class 3, rigid, molded pipe insulation, noncombustible. Maximum K-factor of .24 Btu per inch/h-ft²-°F at mean temperature of 75°F. All insulation shall have a jacket of white kraft paper reinforced with a glass fiber yarn and bonded to an aluminum foil, with self sealing longitudinal laps and butt strips. Jacket shall comply with ASTM C1136 (Type 1). Insulation and jacket shall be equal to Johns Manville Micro-Lok with AP-T Plus, PPG Industries, Owens Corning, Certainteed, or Knauf.

1. Insulate all fittings, valves and strainers with molded fittings, mitered segments of pipe insulation or over- sized pipe insulation held in place with wire. Finish in accordance with manufacturer's recommendations to comply with the UL Systems listing. Preformed jackets of PVC material as manufactured by Zeston, Inc., may be used at fittings.

a. Insulation for valves, fittings and unions shall be the same thickness as the pipe insulation by any of the following methods, including both insulation and cover.

- i. Insulate with one pound per cubic foot density fiberglass blanket wrapped firmly under compression (minimum 2 to 1) and secure with number 20-gauge annealed steel wire.
- ii. Insulate with molded fiberglass fittings secured with number 20-gauge annealed steel wire.
- iii. Miter fiberglass piping insulation to form fittings, secured with number 20-gauge annealed steel wire.
- iv. Cover with Zeston or Johns-Manville premolded one piece PVC fitting covers secured by banding. If additional securing is required, taping and stapling may be used. Covers shall be sealed with vapor barrier pressure sensitive tape. Color to match cover.
- v. Cover with a smooth coating of Johns-Manville no. 375 cement. Open weave glass fabric to be smoothly adhered and coated with lagging adhesive. Lap glass on fabric at least 1" on itself and 2" on adjoining pipe insulation.
- vi. Seal all joints and seams with tape as recommended by manufacturer.

B. Type 2 - Flexible Elastomeric Unicellular Foam Plastic Pipe Insulation.

1. Material: Preformed elastomeric closed cell vapor barrier insulation, flexible, flame retardant, .27 Btu per inch/h-ft²-°F thermal conductivity, by testing conforming to ASTM C 177 or C518. Temperature range 40 to 200 degrees F.

2. Fittings: Sleeve type fitting covers and miter cut pipe insulation or preformed fittings; "Zeston" or equal.

3. Manufacturers - Make

- a. Armstrong - Armaflex AP or Self Seal 2000
- b. Johns Manville - Aerotube II
- c. PPG Industries - Foamed Plastic Pipe Insulation
- d. K-Flex USA

2.2 EXPOSED DRAIN AND HOT WATER PIPING BELOW HANDICAPPED FIXTURES

A. Features and construction

1. Prefabricated, removable, insulating covers to fit traps, drains, valves and supplies, extensions for drains, and offset tail pieces.

2. Insulating foam liner

3. Heavy gauge vinyl cover

4. Recloseable sealing seams

5. Tamperproof locking straps

6. Weep seams to prevent leakage build-up.
7. Conforms to Uniform Federal Accessibility Standards 4.19.4 GSA and ANSI Document A117-1-2017.
8. White color

B. Manufacturer

1. Plumberex Specialty Products - Handy-Shield Safety Covers.
2. Brocar Products Inc. - Trap Wrap
3. Trueboro, Inc. – Lav Guard

2.3 FIELD APPLIED JACKETS

- A. PVC Jacket: Roll jacketing made from high impact UV-resistant polyvinyl chloride material in 20 mil thickness.
- B. Canvas Jacket: UL listed fabric, 8 oz/sq yd, plain weave cotton treated with dilute fire-retardant lagging adhesive.
- C. Aluminum Jacket: 0.016-inch-thick sheet, embossed finish, with longitudinal slip joints and 2-inch laps, die shaped fitting covers with factory attached protective liner.

2.4 HEAT TRACE SYSTEM (Not Required for this project)

- A. Self-regulating type with 16 AWG nickel-plated copper bus wires, semi-conductive self-limiting matrix, and cross-linked polyolefin insulating jacket.
- B. Provide 5.0 watts per foot for pipe sizes up to 4”, 8 watts per foot for pipe sizes 5” through 8”, and 12 watts per foot for pipe sizes above 8”. For this project use 5XL2-CR heating cable.
- C. Heat tape shall be hard wired to the heat trace circuit through an electronic controller. The electronic controller shall have an adjustable set point between 32°F and 200°F. The enclosure shall be NEMA 4X fiberglass reinforced polyester plastic. The controller shall be rated for voltages from 100 to 277V, be capable of switching up to 30 Amperes, and include ground-fault protection. The controller shall come with a 25 ft. temperature sensor. The unit shall be UL Listed and/or CSA certified for nonhazardous locations. This description is specifically for Model ECW-GF by Raychem. Controllers for other manufacturer’s systems shall be comparably adjustable, rugged, listed and certified.
- D. System shall be installed using RAYCLIC-PC power connection and end seal fittings, GT-66 glass tape and other manufacturer recommended accessories.
- E. Provide warning labels to indicate there is heat trace cabling installed.
- F. Convenience or service outlets shall not be used for heat tape.
- G. All components shall be installed as a system from the same manufacturer.
- H. Manufacturer: Raychem XL-Trace (Basis of Design), Thermon FLX, Chromalox or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. Apply insulation in strict accordance with manufacturer’s instructions.
- B. All surfaces must be free of dirt, dust, grease, oil, scale or loose particles before insulation.

- C. Do not cover fittings until required tests have been completed and accepted.
- D. Insulation shall be continuous passing through walls. Size sleeves accordingly to accommodate insulation. Where insulation passes through floor or wall sleeves, pack the space outside of the insulation and inside of the sleeve with fiberglass blanket. Seal with fire rated sealant on fired rated partitions.
- E. For cold lines for condensation protection or for safety protection of hot lines unions shall be insulated as follows: Covering shall be terminated at each end of the union and sealed. Cover union with separate section of insulation, routed out to fit over union, of section of pipe insulation whose inside diameter matches the outside diameter of the adjoining insulation, lap adjoining insulation on both sides by 3", seal vapor tight plastic tape.
- F. Provide insulation saddles and shields at hangers to prevent deformation or penetration of insulation by contact with hangers.

3.2 DOMESTIC WATER PIPING

- A. Type 2- for cold water piping, 1/2 " thickness for all piping up to an including 1-1/2". 1" thickness for pipes 2" and above.
- B. Type 2- Double insulation thickness for cold water piping subject to freezing.
- C. Type 1 or Type 2- for hot water piping and hot water recirculation piping, 1" thickness for piping up to and including 1", 1-1/2" thickness for all piping larger than 1".
- D. On cold water piping, the insulation may switch from Type 2 to Type 1 for the short section of cold water piping going through a rated wall to meet firestopping detail requirements. Thickness to match Type 2 for cold water.

3.3 EXPOSED WASTE AND HOT WATER PIPING AT FIXTURE DESIGNATED HANDICAPPED

- A. Prefabricated insulating covers, securely installed in accordance with manufacturers instructions.

3.4 WATER PIPING EXPOSED TO OUTDOOR CONDITIONS (Not used in this project)

- A. Type 2 – for pipes of all sizes; provide heat trace system and 2" insulation thickness (no doubling required). Cover with aluminum jacketing.
- B. Heat Trace Tape shall be wired through an electronic controller monitoring ambient temperature set at 40°F.
- C. Install heat tracing prior to insulation for piping exposed to ambient temperature. Install per manufacturer's instructions. Perform and record the results of an insulation resistance test as required by the manufacturer. Install warning labels every 10 feet on the exterior of the insulation jacketing.

3.5 FIELD APPLIED JACKETS

- A. Provide canvas or PVC jackets where piping is exposed to view in occupied spaces.
- B. Provide PVC or aluminum jackets where insulated piping is exposed in mechanical, plumbing, storage, or similar utilitarian rooms within 8' of the floor.

END OF SECTION 22 07 00

PLUMBING PIPING AND SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

1.2 REFERENCED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specification Divisions and Sections as referenced in Division 22 Section "Plumbing General Requirements", and Division 22 Specification Sections as follows apply to work of this section:
- C. Section 220110 - Plumbing General Requirements
- D. Section 220150 - Basic Materials and Methods
- E. Section 220700 - Plumbing Insulation
- F. Section 224000 - Plumbing Fixtures
- G. Section 224800 – Water Heating Systems

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
 1. AMERICAN GAS ASSOCIATED LABORATORIES (AGA)
 - a. AGA American Gas Association Laboratories Listing.
 2. AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
 - a. ASSE 1010 Water Hammer Arrestors
 - b. ANSI/ASSE 1011 Performance Requirements for Hose Connection Vacuum Breakers
 - c. ASSE 1012 Backflow Preventers with Immediate Atmospheric Vent
 - d. ASSE 1013 Backflow Preventers, Reduced Pressure Principle
 - e. ASSE 1019 Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types
 3. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
 - a. ANSI A112.21.1M Floor Drains
 - b. ANSI A112.21.2M Roof Drains
 - c. ANSI A112.26.1 Water Hammer Arrestors
 - d. ANSI B16.18 Cast Copper Alloy Solder Joint Pressure Fittings
 - e. ANSI B16.23 Cast Copper Alloy Solder-Joint Pressure Fittings - DWV

- f. ANSI B31.2 Fuel Gas Piping
 - g. ANSI B31.9 Building Services Piping Code
4. AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
- a. ANSI/ASHRAE 90.1B Energy Conservation in New Building Design
5. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
- a. ANSI/ASME Code Boiler Pressure Vessel Code
 - b. ANSI/ASME Code Sec.9 Boiler and Pressure Vessel Code -Welding and Brazing Qualifications
 - c. ANSI/ASME A112.19.8M Certification of Suction Fittings & Drains
 - d. ANSI/ASME B16.1 Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
 - e. ANSI/ASME B16.3 Malleable-Iron Threaded Fittings, Classes 150 and 300
 - f. ANSI/ASME B16.4 Cast-Iron Threaded Fittings Class 125 and 250
 - g. ANSI/ASME B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
 - h. ANSI/ASME B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes
 - i. ANSI/ASME B16.29 Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV
 - j. ANSI/ASME B16.32 Cast Copper Alloy Solder-Joint Fittings for Solvent Drainage Systems
6. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- a. ASTM A 47 Ferritic Malleable Iron Castings
 - b. ASTM A 53 Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless
 - c. ASTM A 74; CIS {O 3-1, Cast Iron Soil Pipe and Fittings ASTM A888
 - d. ASTM A 234/A234M Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
 - e. ASTM B 32 Solder Metal
 - f. ASTM B 42 Seamless Copper Pipe, Standard Sizes
 - g. ASTM B 43 Seamless Red Brass Pipe
 - i. ASTM B 62 Cast Bronze Valves
 - j. ASTM B 75 Seamless Copper Tube
 - k. ASTM B 88 Seamless Copper Water Tube
 - l. ASTM B 251 Wrought Seamless Copper and Copper-Alloy Tube
 - m. ASTM B 302 Threadless Copper Pipe (TP)
 - n. ASTM B 306 Copper Drainage Tube (DWV)
 - o. ASTM B 447 Copper or Copper Alloy Tubing
 - p. ASTM C 1540 Heavy duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings
 - q. ASTM C 564 Rubber Gaskets for Cast Iron Soil Pipe and Fittings
7. AMERICAN WELDING SOCIETY (AWS)
- a. ANSI/AWS A5.8 Brazing Filler Metal
8. AMERICAN WATER WORKS ASSOCIATIONS (AWWA)
- a. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids
 - b. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids

- c. ANSI/AWWA C110/A21.10 Ductile - Iron and Gray - Iron Fittings 3 in. through 48 in., for Water and Other Liquids
- d. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
- e. AWWA C506 Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types
- f. AWWA C651 Disinfecting Water Mains

9. CAST IRON SOIL PIPE INSTITUTE (CISPI)

- a. CISPI 301 Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems
- b. CISPI 310 Joints for Hubless Cast Iron Sanitary Systems

10. NATIONAL CERTIFIED PIPE WELDING BUREAU (NCPWB)

- a. NCPWB Procedure Specifications for Pipe Welding

11. NATIONAL FIRE PROTECTION ASSN (NFPA)

- a. NFPA 70 National Electrical Code

12. NATIONAL SANITATION FOUNDATION (NSF)

- a. NSF Std 5 Commercial Hot Water Generating and Heat Recovery Equipment

13. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- a. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum)

14. PLUMBING AND DRAINAGE INSTITUTE (PDI)

- a. PDI WH-201 Water Hammer Arresters

15. UNDERWRITERS LABORATORIES (UL)

- a. UL 1453 Electric Booster and Commercial Storage Tank Water Heaters
- b. UL listed Product Directories

1.4 SUBMITTALS

- A. Submit under provisions of Division 01, and Division 22, “Plumbing General Requirements” the following: manufacturer’s catalog data, installation, dimensions (including rough in dimensions) and operating and maintenance data for plumbing specialty items; catalog data and material certification for pipe materials and fittings. Provide for all items as listed in Specification Section 220110.

1.5 QUALITY ASSURANCE

- A. Equipment of the same general type shall be of the same make.
- B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment of material.
- C. All materials provided shall be new and shall be approved by the Underwriter’s Laboratories, Inc. wherever that agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years' experience.
- B. Installer: NC State licensed plumber specializing in performing the work of this section with minimum 3 years' experience.

1.7 REGULATORY REQUIREMENTS

- A. Installation and materials shall be in conformance with the North Carolina State Building Code 2018 Edition (Year 2015 Edition of the International Plumbing Code as modified and adopted by the North Carolina Building Code Council).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 01 and Division 220110, Plumbing General Requirements.

1.9 SYSTEM COMPLETION

- A. Provide all bolts, nuts, gaskets, sleeves, hangers, supports, miscellaneous valves and fittings, and specialties required for complete installation of the piping and equipment to be provided.

PART 2 - PRODUCTS

2.1 BURIED WASTE AND STORM DRAIN PIPING

- A. Below grade: PVC DWV pipe and fittings: ASTM D 2665, Schedule 40, installation per manufacturer's instructions, and connect by ASTM D 2564 PVC solvent cement. Use 2 inch minimum size underground.
- B. Where required to connect to existing: Cast iron pipe, ASTM A 74, service weight with cast iron fittings. Joints shall be either 1) hub-and spigot joints, CISPI HSN compression type with ASTM C 564 neoprene gaskets.

2.2 ROOF DRAIN AND SANITARY DRAIN PIPING ABOVE GROUND

- A. Cast iron pipe: All 1-1/2" through 8" cast iron soil, waste pipe and house or building sewer lines and fittings shall bear the registered insignia "CI" or "CI No-Hub" indicating that these items used in the sanitary system comply with the Cast Iron Soil Pipe Institute's Standard 301-63T. Universal "Alpha Couplings" or "No-Hub" stainless steel connections shall be used above grade.
- B. Fixture Arms: Schedule 40 galvanized steel pipe with threaded fittings.

2.3 WATER PIPING

- A. All above grade water piping 3" and smaller shall be ANSI/ASTM B88, Type "L" copper, hard drawn, with the type and manufacturer's name on each piece. Fittings shall be wrought brass or copper. Under no circumstances shall notching or mitering be permitted. Appropriate fittings shall be used for all turns, and joints.
- B. All above grade water piping 4" and larger shall be cement lined ductile iron with flanged joints.
- C. All below grade water piping 3" and smaller shall be Type "K" copper soft annealed, with the type and manufacturer's name on each piece. Copper tubing which is out of round or kinked will not be acceptable on this project. Use as few joints as possible under the building slab. Where fittings are required under the building slab, provide wrought copper and connect by silver brazing.

- D. Below grade water piping is also permitted to be cement lined ductile iron pipe meeting the requirements of ANSI-AWWA C151/A21.51-91, thickness class 50 or greater.
 - 1. Push-on joints shall be single rubber gasket push on type or mechanical joint type employing a single elongated rubber gasket to effect the joint seal and shall conform to ANSI A21.11 or AWWA C-111.
 - 2. Restrained pipe joints shall be push-on type with bolted retainer rings and welded retainer bars or the boltless type which includes ductile iron locking segments and rubber or neoprene retainers. Restrained pipe fittings shall be American Lok-ring, American Flex-ring, Griffin Snap-Lok, Clow Super-Lock, U.S. Pipe TR Flex, or approved equal.
 - 3. Cement lining shall be in accordance with ANSI A21.3 or AWWA C-104.
- E. Fittings for copper pipe shall be wrought copper, ANSI B16.22, or cast brass, ANSI B16.18, with solder joints. Solder for potable water systems shall be lead free, 95 /5 Tin/Antimony. Joints on piping 1-1/2" and larger shall be silver brazed. Under no circumstances shall notching or mitering be permitted. Appropriate fittings shall be used for all turns, and joints.
- F. Below Ground piping shall have a bituminous coating in accordance with ANSI A21.4 or AWWA C-104, Section 4-14. Avoid use of underground fittings. Where underground fittings are required, provide wrought copper and connect by silver brazing.
- G. Solder: 95-5 tin - antimony solder. Solders containing lead shall not be used on potable water systems.

2.4 PUMPED WASTE PIPING STEEL PIPES AND PIPE FITTINGS: (not used in this project)

- A. Applications: All pumped waste piping shall be steel piping.
- B. Carbon Steel Pipe: Schedule 40 (minimum) ASTM A 53 for piping 4" and larger, A 106 or A 120 for piping 3" and smaller; except comply with ASTM A 53 or A 106 where close coiling or bending is required.
- C. Malleable-Iron Threaded Fittings: ANSI B16.3, Class 150; ANSI B1.20.1 threads, plain or galvanized as indicated.
- D. Malleable-Iron Threaded Unions: ANSI B16.39, Class 150: selected by Installer for proper piping fabrication and service requirements, including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.
- E. Threaded Pipe Plugs: Malleable Iron, ANSI B16.14, rated at 300 PSIG at 150 degrees W.O.G.; ANSI B1.20.1 Threads.
- F. Steel Flanges/Fittings: ANSI B16.5, Class 150; Includes bolting and gasketing of the following material group, end connection and facing, except as otherwise indicated.
 - 1. Material Group: Group 1.1.
 - 2. End Connections: Buttwelding; weldneck flanges.
 - 3. Facings: Raised-face.
- G. Forged-Steel Socket-Welding and Threaded Fittings: ANSI B16.11, Class 2000: except MSS SP-79 for threaded reducer inserts; rated to match schedule of connected pipe; ANSI b1.20.1 Threading.
- H. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1-1/2", and where pipe size is less than 1-1/2", and do not thread nipples full length (e.g., no close-nipples).

2.5 DIELECTRIC CONNECTORS

- A. Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.6 ESCUTCHEONS

- A. General: Use chrome-plated B & C Type 40 flush escutcheons on ceiling and wall. At floors, use Ritter No. 36-A deep cup chrome-plated escutcheon. Use Ritter, Grabler, Blaw-Knox, or equal. Escutcheons shall be used at all piping in finished areas. Escutcheons on insulated piping shall fit insulation tightly.
- B. For Exposed Flush Valves, Water Supplies, and P-traps: Provide chrome-plated cast brass escutcheons with set screws.

2.7 FLASHING

- A. Sheet lead for general use shall weigh at least 4 pounds per square foot. Sheet copper for general use shall weigh at least 12 ounces per square foot and conform to ASTM B152.

2.8 SLEEVES

- A. Pipe Sleeves with Link Seal below grade: Modular mechanical type wall sleeve seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall sleeve. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with pressure plate under each bolt head and nut. Tightening of the bolts shall cause the rubber links to expand and provide a positive weather tight seal between the pipe and the wall sleeve. Mechanical wall sleeve seals shall be "Link-Seal" model as manufactured by Thunderline Corporation, Wayne Michigan, Wade, Zurn, or equal.
- B. Walls and Floors
 - 1. Sleeves through poured through concrete walls and floors, and non-bearing partition walls shall be linear polyethylene as manufactured "Crete Sleeve", Sperzel Division, Tyler, or Charlotte Pipe.
 - 2. Sleeves through waterproof floors or where exposed in rooms with floor drains shall be coated cast iron with flashing device and under deck clamp. J.R. Smith #1720, Josam, Wade or Zurn.
 - 3. General Provision for Sleeves: Provide sleeves for all pipe passing through masonry fire walls, floors, foundation walls or ceilings of concrete or masonry construction, provide a Schedule 40 galvanized steel pipe large enough to clear pipes by 1/4 inch all around. No sheet metal sleeves are to be permitted. All floor sleeves shall extend 1/2 inch above floor. Sleeves at walls and ceilings shall be flush at wall lines. For insulated pipes, sleeves shall be larger than the outside diameter of the insulation and insulation shall be continuous through the sleeves. Sleeves shall be machine cut at right angles to centerline of pipe and deburred. No flame cut sleeves will be permitted.

2.9 FLOOR DRAIN STAINERS

- A. Provide new nickel-bronze strainers for existing floor drains where noted on the drawings. Field verify sizes required. Strainers to be manufactured by Josam, Jay R. Smith, Wade, Zurn or approved or equal.

2.10 CLEANOUTS

- A. Cleanouts shall be adjustable and equipped with an internal brass plug with countersunk brass screws holding the rim to the body and cover. Provide tops with tile recess for floor coverings or terrazzo. Provide a permanent carpet indicator where cleanout is located under carpet. Line type shall have lacquered cast iron body and round epoxy coated gasketed cover. Wall cleanouts shall have stainless steel round access covers, frame with anchor lugs and cover plate with screws; as manufactured by Josam, or equal by Zurn, Jay R. Smith, or Wade.
- B. Exterior cleanouts shall be brass recessed type protected by 24" x 24" x 6" thick concrete pad poured to finished grade.

2.11 HOSE BIBBS

- A. Bronze or brass with integral adjustable mounting flange, hose thread spout, integral vacuum breaker, hand wheel or loose key operated as indicated in Plumbing Specialties Schedule on the drawings, in conformance with ANSI/ASSE 1011; as manufactured by Woodford, Wilkins, Watts, Jay R. Smith, Nibco, or Crane.
- B. All hose bibbs exposed to public view shall have chrome plated finish.

2.12 SUMP PUMPS (not used in this project)

- A. Furnish and install Submersible Stainless Steel Pump(s). The pump(s) shall be designed to pump dirty waters containing 3/8" spherical solids without damage during operation. The pump(s) shall be designed so that the pump shaft horsepower (BHP) shall not exceed motor rated horsepower throughout the entire operating range of the pump performance curve. Pump(s) shall be built to operate whether fully or partially submerged.
- B. Casing and Impeller: Major parts of the pumping unit shall be manufactured of stainless steel. The casing, impeller, motor frame, and fasteners shall be manufactured of 304 stainless steel. The impeller shall be semi-open design. The pump(s) shall have a discharge size of 1-1/4" or 1-1/2" NPT per the schedule on the drawings.
- C. Shaft seal: The pump(s) shall be furnished with a double mechanical seal.
- D. Motor: The pump motor shall be 1/3 or 1/2 HP per the schedule on the drawings, 115V, 60Hz, single phase. Motor shall be air filled with Class F insulation and shall be of split capacitor design. The motor shall be rated for continuous duty. Motor shaft shall be 303 stainless steel.
- E. Motor cable: Pump motor cable shall be suitable for submersible pump applications. Cable shall be 20 feet UL/CSA approved water resistant #16 AWG cord.
- F. Provide Optional Float Switch: mechanical, non-mercury float switch to accomplish automatic operation.
- G. Pumps shall be EBARA Model EPD as scheduled, or approved equal by Armstrong, B&G, Gould, Grundfos, Flygt, Little Giant, Stancor, Taco, Weinman, or Zoeller Pump.

2.13 WATER HAMMER ARRESTORS

- A. ANSIA112.26.1; All stainless-steel construction, meets standards PDI WH-201 and ASSE 1010, filled with glycerin, pressurized with argon or nitrogen, size as indicated by PDI WH 201 letter designation; Series 75000-S as manufactured by Josam, or equal by J.R. Smith, Watts, or Zurn. Install where shown on the drawings.

2.14 BUTTERFLY VALVES

- A. MSS SP-67: Butterfly Valves shall be lead free full-tapped lug design suitable for dead-end service. Valves through 6" shall have infinite position handles equipped with adjustable memory stops. Valves shall be suited for working pressure up to 150 psi and 275 F, shall have cast iron body, ductile iron discs, stainless steel shaft, and elastomeric seats and o-rings. Provide with stem extension for insulated pipe applications.

2.15 ANGLE VALVES

- A. Up to and including 2 Inches: Lead-free, MSS SP-80, Class 150, body and union bonnet of ASTM B 62 bronze, inside rising stem of bronze, brass packing gland, Teflon-impregnated packing, and malleable-iron handwheel.
- B. Up to and including 2 Inches: Lead-free, Class 300, body and union bonnet of ASTM B 61 bronze, inside rising stem of bronze, plug disc and seat ring of stainless steel, and malleable-iron handwheel.

- C. Over 2 inches: Lead-free Class 125, Iron body, MSS SP-85, bronze mounted with body and bonnet ASTM A 126, Class B cast iron, flanged ends, outside screw and yoke, with Teflon-impregnated packing and two-piece packing gland assembly, and malleable-iron handwheel.

2.16 CHECK VALVES

- A. Up to and Including 2 Inches: Lead-free, Class 125 or Class 150, body and caps of ASTM B584-C89836 bronze, renewable bronze seat, threaded ends or solder ends, and swing type disc.

2.17 BALL VALVES

- A. Up to and Including 4": Lead-free, 400 psig CWP, 150 psig SWP, bronze body, full port, adjustable packing gland, reinforced seats, blow-out-proof stem, inline repairable, chrome-plated brass ball, threaded, or soldered ends.
- B. Provide with stem extension for insulated pipe applications.

2.18 STRAINERS

- A. Size 2 Inches and Under: Lead-free, screwed bronze cast iron body for 175 psig working pressure, Y pattern with 1/32-inch perforated stainless-steel screen.
- B. Each strainer with gate-type drain valve with 3/4-inch hose nipple and cap.

2.19 CIRCULATING PUMPS

- A. Inline, approved for potable water service, all bronze or stainless steel construction, maintenance free, permanently lubricated, close coupled, with carbon/silicon carbide seal on stainless steel shaft, and dry motor design.
- B. Provide pump and motor size and capacity as indicated.
- C. Manufacturer: Pump shall be Model 009 by Taco, Series PL by ITT Bell & Gossett or approved equal by Armstrong, Aurora, or Grundfos.

2.20 EXPANSION TANK

- A. Provide for installation on potable water lines between the backflow preventer or pressure reducing valve and the water heater to protect against water thermal expansion. Outer shell shall be carbon steel coated with epoxy finish, liner shall be polypropylene, end connections threaded NPT ANSI B1.20.1, and the diaphragm shall be butyl rubber. Rated for maximum supply pressure of 80 PSI. Tank shall be certified to NSF 61, and suitable for temperatures up to 200°F, Therm-X-Trol ST-30V by Amtrol, Series XT by Zurn Wilkins, or approved equal.

2.21 THERMOSTATIC MIXING VALVES

- A. Thermostatic mixing valves shall meet ASSE 1070 requirements and be listed by NSF. Provide Models listed in the Plumbing Fixture Schedule manufactured by American Standard, or approved equal by Bradley, Haws, Lawler, Leonard Water Temperature Controls, Watts, or equal.

2.22 FLOOR DRAINS

- A. ANSI A112.21.1, coated cast iron two-piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer. All floor drains shall have round tops, except where square tiles are employed provide square tops. Provide tractor grate, perforated stainless steel basket or sediment bucket, funnels, and trap primer connections where called for in the Plumbing Specialties Schedule.

B. Provide Series 30000 as manufactured by Josam, or equal by Zurn, Jay R. Smith, or Wade.

C. Use deep seal p-traps with all floor drains.

2.23 VACUUM BREAKERS

A. Atmospheric type – bronze body and trim with 212F temperature rating, 125 PSI working pressure, bottom inlet, side outlet, and silicone sealing disc. Provide polished chrome finish where exposed in finished areas.

2.24 TRAP SEAL PRIMERS

A. Install where shown on the drawings and use the type indicated on the drawings for a specific location.

B. TP-1: Automatic pressure drop activated, lead free, Model PR-500 as manufactured by Precision Plumbing Products, or approved equal by Watts, Souix Chief, MIFAB, Zurn, or others. Trap primer shall be activated by a 3 psi pressure drop across the valve and deliver a metered amount of water to the floor drain. System operating range is 20 psi minimum to 80 psi maximum. Trap primer installation shall include a means to prevent backflow.

C. TP-2: Flush valve type with vacuum breaker, Model FVP-1VB as manufactured by Precision Plumbing Products, or approved equal by Sloan, Delta, or Zurn. All exposed parts to be chrome plated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that excavations are required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Coordinate cutting and forming of roof and floor construction to receive drains to required invert elevations.

3.3 INSTALLATION

A. Install all equipment in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever joining dissimilar metals. Protect insulating material if heat is applied to fitting.

C. Route piping in orderly manner. Grade piping to low points and provide drain valves.

D. Install piping to conserve building space and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide Sleeves for all pipes passing through floors, walls and ceilings, of sufficient size to receive insulation and of proper length to terminate 1" outside finished surfaces. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.

- H. Pipe Penetrations through fire partition walls and through floors shall be made by UL penetration detail as indicated with caulking with UL listed fireproof caulking.
- I. Provide clearance for installation of insulation and access to valves and fittings.
- J. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with those specified in Division 05.
- K. Establish elevations of buried piping outside the building to ensure not less than 3 ft of cover, except where noted otherwise.
- L. Piping buried under slab within building shall be installed with a minimum of joints and shall be completely encased in sand.
- M. Changes in pipe sizes shall be made with reducing fittings.
- N. Make copper piping joints for 1-1/4" pipe and smaller with 95-5 solder, and no corrosive solder paste. Flux and solder combinations are not permitted. Make copper piping joints for 1-1/2" to 3" with silver brazing.
- O. Provide domestic water branch piping to fixtures and make final connections to fixtures provided by this or other contractors.
- P. Do not rough piping inside spaces, partitions, stud wall voids, plenums, or cavities subject to potential freezing.
- Q. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- R. Provide escutcheons for piping passing into finished areas. All uninsulated piping in finished areas shall be chrome plated.
- S. Hangers supports and threaded rods shall be furnished galvanized, except where attached to copper pipe. Clamps or other attachments on copper piping shall be copper or copper plated steel.
- T. Prepare pipe and accessories not prefinished, ready for finish painting. Refer to Division 09 and Section 220553.
- U. Excavate in accordance with Section 220510 for work of this Section.
- V. Backfill in accordance with Section 220510 for work of this Section. All underground lines shall be marked as follows. Provide warning tape or tracer wire in the backfill of all pipe trenches. Install at least 6 inches below grade, but not deeper than 24 inches below grade, directly over piping.
 - 1. Metallic lines shall be identified with durable printed plastic warning tapes, minimum 3 inches wide with lettering to identify buried line below.
 - 2. Non-metallic pipes shall be marked using an approved tracer. A yellow insulated copper tracer wire or other approved conductor shall be installed adjacent to and over the full length of underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the building drain and the building sewer. The tracer wire size shall not be less than 14 awg and the insulation shall be listed for direct burial.
- W. Install bell and spigot pipe with bell end upstream.
- X. Provide valves at inlet and outlet of each piece of equipment, at each fixture, on branch lines and where indicated on the drawings.
- Y. Install valves with stems upright or horizontal, not inverted.

- Z. Install all devices in accordance with manufacturer's instructions.
- AA. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system. Encase exterior cleanouts and valve boxes in concrete flush with grade.
- BB. Install water hammer arrestors complete with accessible isolation valve on hot and cold-water supply piping to lavatories, sinks, and water closet flush valves.

3.4 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- D. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- E. Install ball valves for throttling, bypass, or manual flow control services.

3.5 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to 1/8 or 1/4 inch per foot, as required. Maintain gradients. Slope water piping and arrange to drain at low points.

3.6 SUMP PUMP INSTALLATION (not required on this project)

- A. Install in accordance with manufacturer's written instructions.
- B. Provide line sized isolating valve and line sized soft seated check valve on discharge.
- C. Support piping adjacent to pump such that no weight is carried on pump casings.
- D. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- E. Verify operation of automatic float control and pump by adding water to the sump pit and allowing the pump to remove it.

3.7 PLUMBING SYSTEM TESTING

- A. Water: Upon completion of a section of, or entire water distribution system, the system, or portion completed, shall be tested and proved tight under a water or an air test of not less than 100 psi. This pressure shall be held for not less than 15 minutes.
- B. Waste and Vent: A water test shall be applied to the drainage system within the building either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. When testing in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet of the system, shall have been submitted to a test of less than a 10-foot head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.

3.8 POTABLE WATER SYSTEM STERILIZATION

- A. All pipe and fittings connected to and forming a part of a potable water supply shall be sterilized. Sterilization shall be accomplished after the pipe has passed the hydrostatic pressure tests. The method used by the contractor shall be in full accordance with the requirements of the AWWA Specification C-601, and state and local Departments of Health.
- B. All new piping shall be filled with not less than 25, nor more than 50 parts per million (ppm) of available chlorine and held in contact with such for not less than 24 hours. Final tests after 24 hours shall show minimum residual chlorine content of 25 ppm in all parts of the system. All chlorine introduced into the system shall be totally dissolved. The introduction of solid hypochlorite directly into the system is prohibited.
- C. Sterilization tests shall be repeated as often as necessary and as directed by the engineer and/or Department of Health, until the minimum residual chlorine content has been maintained. The chlorine solution shall be thoroughly flushed prior to placing the new sections of piping in service. The contractor is cautioned that the spent chlorine solution must be disposed of in such a way as not to be detrimental to plant, animal or aquatic life.
- D. After disinfection, the water system shall not be placed in service until bacteriological test results of representative water samples analyzed in an independent, EPA approved laboratory, are found to be satisfactory. Certification of bacteriological testing for quality of the domestic water shall be conducted, accepted by the Project Engineer and submitted to Orange County prior to requesting Beneficial or Final Occupancy Permit.

END OF SECTION 22 10 00

PLUMBING FIXTURES
PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

B. Section 22 01 10 - Plumbing General Requirements

C. Section 22 10 00 - Plumbing Piping and Specialties

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation.

1. Air conditioning and refrigeration institute (ARI)

- a. ANSI/ARI 1010 Drinking Fountains and Self-Contained, Mechanically Refrigerated Drinking Water Coolers.

2. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- a. ANSI/ASME A112.6.1M Supports for Off-the-Floor Plumbing Fixtures for Public
- b. ANSI/ASME A112.18.1M Plumbing Fixture Fittings
- c. ANSI/ASME A112.19.2M Vitreous China Plumbing Fixtures
- d. ANSI/ASME A112.19.3M Stainless Steel Plumbing Fixtures (Designed for Residential Use)
- e. ANSI/ASME A112.19.5 Trim for Water Closet Bowls, Tanks, and Urinals
- f. ANSI/ASME A112.19.6 Hydraulic performance Requirements for Water closets and Urinals

3. AMERICAN SOCIETY OF SANITARY ENGINEERS (ASSE)

- a. ASSE 1037 Pressurized Flushing Devices (Flushometers) for Plumbing Fixtures

- 1.3 Submit under provisions of Division 01 and Division 22 "Plumbing General Requirements": listing of plumbing fixtures, including manufacturer's catalog data, installation instructions, dimensions including rough-in dimensions, pipe connection sizes, trim, and finishes. Provide certification from Manufacturer that lead based solders were not used in fabrication of electric water coolers or fountains. No fixtures shall be delivered to the building until the Engineer has inspected and approved the complete listing of fixtures.

- 1.4 Perform Work in accordance with the current State of North Carolina Building Code (International Plumbing Code as modified by the NC Code Council).

- 1.5 Deliver products to site, store, protect, and handle under provisions of Division 01. Accept fixtures on site in factory packaging. Inspect for damage. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.
- 1.6 Verify that the field measurements are consistent with the dimensions as indicated on approved shop drawings. Confirm that millwork is constructed with adequate provision for the installation of countertop fixtures.

PART 2 - PRODUCTS

- 2.1 Unless specifically indicated otherwise, each plumbing fixture shall be provided with a trap, waste, and water fittings with connections as indicated, each plumbing fixture shall be provided complete for the specified function (including water inlet(s) and waste outlet(s)), and except for stainless steel fixtures, the fixture color shall be white. Use the same manufacturer for each grouping of faucets, valves, flush valves, etc. for the entire building.
- 2.2 Vitreous china plumbing fixtures, ASME 112.19.2M, shall be thoroughly fused so that a fractured surface shall show a homogeneous mass, free from pores and with close grain. Glaze shall cover all surfaces that are exposed when the fixture is installed in its normal manner. Vitreous china fixture manufacturers shall be American Standard, Eljer, Kohler, Toto, Sloan, or Crane.
- 2.3 Enameled cast iron fixtures, ASME 112.19.1M, shall be of one piece, high grade cast iron, minimum thickness of 1/8", sound, true to form, and free from porosity, cracks, or any other defects. The enamel shall be applied by a method to thoroughly fuse the enamel to the metal. Acid resisting enamel shall be acid resisting throughout.
- 2.4 Stainless steel fixtures, 304 stainless steel, of the specified thickness (but of a minimum of 20 gauge) and undercoated with a sound absorbent material. Provide drillings to match faucet selection, stainless steel or chrome plated brass strainer, with trap and tailpiece to match.
- 2.5 Exposed piping, trimming and fittings shall be chromium or nickel-plated brass with polished surfaces. Floor and wall plates shall be chromium plated brass.
- 2.6 Fixtures, faucets, flush valves and other trim shall contain $\leq 0.25\%$ total lead content by weighted average.
- 2.7 **FLUSHOMETER TYPE WATER CLOSETS**
 - A. Flushometer Type Water Closets, ANSI/ASME A112.19.2M, white vitreous china, floor mounted, or wall mounted as scheduled, siphon jet, 1-1/2" top spud, elongated bowl with white, solid, plastic, elongated open-front seat, and ANSI A112.19.5 trim. The inside of water closet bowl trapways shall be glazed.
 - B. Flush valves shall be manually operated, exposed type and furnished with integral stop valve, solid ring support, backflow preventer and flush pipe. Provide not less than 3 inches in diameter diaphragm non-hold-open flushometer including vacuum breaker and angle control-stop valve. The water flushing volume of the flushometer and water closet combination shall not exceed 1.28 gallons per flush. Flush valve supply pipe shall be threaded brass pipe. The flush valve hydraulics shall conform to ASME A112.19.6 and ASSE 1037 and shall be capable of operation without chattering or water hammer, at any inlet pressure from 20 to 50 psi. Provide straight or angle type stop as required to suit flush valve.
 - C. Handicapped Water Closets and trim shall be specified by the manufacturer to compliance with the ADA. The top of the seat of the handicapped toilet for adults shall be 17" to 19" above finished floor. The top of the seat of handicapped toilet for children shall be 11" to 17" above finished floor. The flush valve handle shall be located on the "wide side" of the room.
 - D. Water Closet Manufacturers: American Standard, Crane, Eljer, Kohler, Toto, or Sloan.

- E. Flush Valve Manufacturer: Sloan Model Royal 111-1.28 or approved equal by Delaney (Flushboy series), Delta, Kohler, Toto, Sloan, Zurn, or the manufacturer of the water closet provided.

2.8 URINALS

- A. Urinals, Flushometer Type, ANSI/ASME A112.19.2M, white vitreous china, wall mounted, wall outlet, washout, integral trap, extended side shields, and ANSI/ASME A112.19.5 trim. Provide exposed, manually operated, diaphragm flush valve with features same as water closet flush valve, except for size and volume. The water flushing volume of the flushometer and urinal combination shall not exceed 0.125 gallon per flush; urinal manufacturer shall furnish certification of compliance.
- B. Provide ANSI/ASME A112.6.1M concealed wall hangers with thru bolts and back plates for mounting.
- C. Handicap urinals and trim shall be certified by the manufacturer to comply with ADA when installed to ADA guidelines. Rim of urinal shall be a maximum of 17" above finished floor.
- D. Urinal Manufacturers: Kohler, American Standard, Toto, Crane or Sloan.
- E. Flush Valve: Sloan Model 186-0.125 or approved equal by Delaney (Flushboy series), Delta, Kohler, Toto, Sloan, Zurn, or by the manufacturer of the urinal provided.

2.9 LAVATORIES – ENAMELED CAST IRON

- A. Lavatory (P-3H): wall hung, white enameled cast iron, front overflow, chrome plated grid drain, American Standard Regalyn™ model 4869.004, Kohler model K-2812, or equivalent by Eljer or Ceco. Provide carriers recommended by lavatory manufacturer to support these lavatories.
- B. For lavatories that have cold and hot water service: Provide commercial grade ANSI/ASME A112.18.1/CSA B125, and ADA compliant chrome plated cast brass construction, single-handle metering pillar tap faucet, cast spout, single hole, 0.5 GPM pressure compensating vandal-resistant non-aerated spray, factory set for maximum of 0.083 gallons per cycle, replaceable cartridge, adjustable flow cycle, for single temperature water. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P traps with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.
 - 1. Provide thermostatic mixing valve, Model # 605XTMV1070 by American Standard or approved equal by faucet manufacturer or Lawler, Bradley, Haws, Leonard Water Temperature Controls, Watts, or equal. The mixing valve shall be of the thermostatic type with built-in check valves to prevent cross-flow, ASSE 1070 certified. Provide 20" long stainless steel hoses with 3/8" compression fittings.
 - 2. Faucet Manufacturer: American Standard Model 1340.119, Delta Teck, Chicago Faucets, Kohler, Moen, T&S Brass, Sloan, Wolverine, or Zurn.

2.10 LAVATORIES – VITREOUS CHINA

- A. Lavatory (P-4H, P-5H, P-6H, P-7H): wall hung, white vitreous china, front overflow, chrome plated grid drain, American Standard Lucerne Model 0356.421, or equivalent by Kohler, Crane, Eljer, or Sloan. Provide carriers recommended by lavatory manufacturer to support these lavatories.
- B. For lavatories that only have cold water service in classroom toilets (P-4H): Provide commercial grade ANSI/ASME A112.18.1/CSA B125, and ADA compliant chrome plated cast brass construction, single-handle metering pillar tap faucet, cast spout, single hole, 0.5 GPM pressure compensating vandal-resistant non-aerated spray, factory set for maximum of 0.083 gallons per cycle, replaceable cartridge, adjustable flow cycle, for single temperature water. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P traps with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.

1. Faucet Manufacturer: American Standard Model 1340.119, or approved equal by Delta Teck, Chicago Faucets, Kohler, Moen, T&S Brass, Sloan, Wolverine, or Zurn.
- C. For lavatories that have cold and hot water service IN Pre-K toilet rooms (P-5H): Provide commercial grade ANSI/ASME A112.18.1/CSA B125, and ADA compliant chrome plated cast brass construction, single-handle metering pillar tap faucet, cast spout, single hole, 0.5 GPM pressure compensating vandal-resistant non-aerated spray, factory set for maximum of 0.083 gallons per cycle, replaceable cartridge, adjustable flow cycle, for single temperature water. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P traps with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.
1. Provide thermostatic mixing valve, Model # 605XTMV1070 by American Standard or approved equal by faucet manufacturer or Lawler, Bradley, Haws, Leonard Water Temperature Controls, Watts, or equal. The mixing valve shall be of the thermostatic type with built-in check valves to prevent cross-flow, ASSE 1070 certified. Provide 20" long stainless steel hoses with 3/8" compression fittings.
 2. Faucet Manufacturer: American Standard Model 1340.119, or approved equal by Delta Teck, Chicago Faucets, Kohler, Moen, T&S Brass, Sloan, Wolverine, or Zurn.
- D. For lavatories that have cold water only in non-pre-K classrooms (P-6H): Provide Heritage/Amarilis chrome plated cast brass construction, single-handle ADA pantry/bar sink faucet, gooseneck swivel spout, single hole, 1.5 GPM (5.7 LPM) maximum flow rate, 1/4 turn washerless ceramic disc valve cartridge, all brass shank nut and coupling nut. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P traps with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.
1. Faucet Manufacturer: American Standard Model 7100.271H, or approved equal by Delta Teck, Chicago Faucets, Kohler, Moen, T&S Brass, Sloan, Wolverine, or Zurn.
- E. For lavatories that have cold and hot water in pre-K classrooms and staff toilets (P-7H): Provide Monterrey chrome plated cast brass construction, two-handle ADA 4" centerset faucet, field-convertible swivel/rigid gooseneck spout, 1.0 gpm pressure compensating vandal-resistant aerator, vandal-resistant lever handles, and ceramic disc valve cartridges. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P traps with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.
1. Provide thermostatic mixing valve, Model # 605XTMV1070 by American Standard or approved equal by faucet manufacturer or Lawler, Bradley, Haws, Leonard Water Temperature Controls, Watts, or equal. The mixing valve shall be of the thermostatic type with built-in check valves to prevent cross-flow, ASSE 1070 certified. Provide 20" long stainless steel hoses with 3/8" compression fittings.
 2. Faucet Manufacturer: American Standard Model 7502.140-V10, or approved equal by Delta Teck, Chicago Faucets, Kohler, Moen, T&S Brass, Sloan, Wolverine, or Zurn.

2.11 STAINLESS STEEL SINK FOR CUSTODIAN ROOM 71 (P-8)

- A. Single Compartment Scullery Sink: ANSI/ASME A112.19.3, overall size 27" x 27-1/2" x 44", 24" x 24" x 14" bowl, 8" high backsplash, floor mount, single compartment sink. Sink to be 14-gauge 304 stainless steel with a buffed satin finish, and 3-1/2" center drain. Sink shall be supported by (4) 16-gauge stainless steel, 1-5/8" o.d. tubular legs with bullet shaped feet adjustable up to 1".
- B. Faucet and Drain: Wall mounted ANSI/ASME A112.18.1 and ADA compliant, chrome-plated brass, 7" vented spout, 2" lever handles faucet, with 1/2" offset inlets & stops and 1/4 turn ceramic disc valve. Provide 3-1/2" drain with Type 304 stainless steel body strainer, basket rubber seal, and 4" long 1-1/2" O.D.

stainless steel tailpiece, and 1-1/2-inch adjustable chrome plated cast brass P trap with ground joint and cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.

- C. Manufacturers and models of sink: Elkay Sturdibilt SS81242 , American Standard, Just, Sterling, Kohler or equal.
- D. Manufacturers and models of faucet: Commercial grade Elkay Model LK940VS07L2S, Just, Delta, Chicago Faucets, Moen, Kohler, American Standard, T&S Brass, or equal. Provide angle supplies with stops.
- E. Manufacturers and models of drain: Commercial grade Elkay Model LK99, Just, Delta, Chicago Faucets, Moen, Kohler, American Standard, T&S Brass, or equal.

2.12 ELECTRIC WATER COOLERS

- A. Water Fountain, wall mount bi-level ADA bottle filling station and filtered refrigerated, electronic bottle filler sensor, with electronic front and side bubbler push bar activation, Flexi-Guard Safety Bubbler, visual filter monitor, stainless steel with brushed satin finish including skirt. Fountain shall comply with ADA & ICC A117:1 and ADA for visual and motion disabilities, shall meet the requirements of ANSI/NSF 61 & 372 (lead free), and the Safe Drinking Water Act. Unit shall be certified to UL 399 and CAN/CSA C22.2 No. 120.
- B. High efficiency, air-cooled condensing unit, capacity to cool 8.0 gallons per hour to 50 degrees F at 80 degrees F inlet water temperature and a 90 degrees F room temperature, R-134A refrigerant, 115V, single phase power.
- C. Provide drain with PVC p-trap (PVC to isolate electrically from plumbing system). Provide water shut-off valve.
- D. Provide with optional cane apron accessory to be installed on high side of dual units, Elkay Model LKAPREZL or approved equal from other manufacturers for their units.
- E. Provide mounting frame, wall carrier, or surface mounting plate to support drinking fountains, whichever suits the wall and available space where the fountain is to be hung.
- F. Manufacturer: The basis of design is Elkay Model LZSTL8WSSK, or provide an approved equal by Halsey Taylor, Oasis, or Haws. **This Elkay model is Owner Preferred Alternate OP-P1.**

2.13 ART SINK FAUCETS AND TRIM

- A. Sink to be custom made of stainless steel and provided by general contractor. Refer to architectural drawings for the details of its construction. Coordinate faucet and drain openings with G.C.
- B. Provide stainless-steel drain outlet. Provide angle supplies with stops, chrome plated forged brass or stainless-steel basket strainer with 1-1/2" x 4" tailpiece.
- C. Faucet A: Single hole single temperature deck mounted faucet with polished chrome plated brass body, 24" riser, 44" flexible stainless-steel hose with spring support, 1.15 GPM spray valve, ceramic cartridge with check valve, 4" wrist blade handle, 1/2" NPSM male inlet, and spray valve holder. Certified to ANSI/ASME A112.18.1/CSA B125.1, NSF 61-Section 9 and NSF 372, 2019 DOE PRSV – Class II compliant.
- D. Manufacturers and models of faucet A: Commercial grade T&S Brass Model B-2285-CR, or equivalent by Delta, Chicago Faucets, Moen, Kohler, American Standard, Just or equal.
- E. Faucet B: Single Handle Deck Mounted Faucet, Single Hole Sink Application, 2 - Function Pull Out Faucet; aerated stream or spray, swing spout, maximum 1.8 GPM @ 60 PSI, dual integral check valves in sprayer, ADA compliant. Certified to ANSI/ASME A112.18.1/CSA B125.1.

- F. Manufacturers and models of faucet B: Commercial grade Delta Model B4310LF, or equivalent by T&S Brass, Chicago Faucets, Moen, Kohler, American Standard, Just or equal.
- G. Solids Interceptor: Provide Zurn Solids Interceptor Z1180 (plaster trap) in drain line inside cabinet, or approved equal by J.R. Smith, Josam, or other.
- H. Janitor's Sink Faucet: Wall mounted faucet w/vacuum breaker, 8" centers, integral stops, top brace, pail hook, 3/4" hose thread on spout, T&S Brass Model B-0665-BSTR, or approved commercial grade equal by American Standard, Delta Teck, Stern-Williams, Fiat, American Standard, Chicago Faucets, or Kohler.

PART 3 - EXECUTION

3.1 WATER CLOSET INSTALLATION

- A. Cover supply pipe extending from wall with chrome plated sleeve and wall flange.
- B. Provide additional wall plates where each pipe extends through finished wall.
- C. Provide two rubber or plastic seat bumpers with metal holders and secure to the wainscot behind the fixture.
- D. Install centerline of the flush valve on the centerline of the fixture, and a minimum of 2-1/4 inches from the wall. Manual flush valve handles for handicap fixtures shall be mounted on the wide side of the toilet area and no more than 36 inches above the floor. All other flush valve handles shall be mounted 39 inches above the finished floor.
- E. Provide chrome-plated pipe support on the long flush pipe outlet and secure rigidly to the wall with suitable anchors.
- F. Install backflow preventer for the flush valve at the discharge of the valves.
- G. Rigidly support flush valve water piping concealed in the partition; provide piping between flush valve and wall with a factory- fabricated chromium-plated spacer sleeve and wall flange.
- H. Provide connections between soil pipes and floor connected water closets with cast-iron floor flanges. Slip floor flanges over the ends of the pipes and caulk in position. Use special short radius fittings where space does not permit the use of standard fittings below the flanges.

3.2 URINAL INSTALLATION

- A. Rigidly support flush valve and the water piping concealed in the partition. Cover supply pipe extending from wall with chrome-plated sleeve and wall flange. Provide additional wall plates where each pipe extends through finished wall.
- B. Install centerline of the flush valve for wall hung urinals on the centerline of the fixture, 45 inches above the finished floor and a minimum of 2 1/4 inches from the wall. Install centerline of the flush valve for handicap urinals 40 inches or less above the finished floor.

3.3 LAVATORY INSTALLATION

- A. Install lavatories for use by wheelchair handicapped persons with a rim height of 34 inches, a minimum vertical knee clearance of 27 inches from floor, and a minimum clear knee recess of 30 inches in width.
- B. Install trap on lavatory for use by wheelchair handicapped so as to provide maximum clearance under bowl. Insulate exposed waste, trap and hot water supply under lavatory in accordance with the requirements for domestic hot water piping.

3.4 DRINKING FOUNTAIN INSTALLATION

- A. Mount drinking fountain so that the bubbler orifice of higher side will be 38-3/8 inches above the finished floor.
- B. Mount drinking fountain for wheelchair handicapped with a maximum bubbler orifice height of 32-7/8 inches above the floor.

3.5 SETTING COMPOUNDS AND GASKETS

- A. Provide watertight and gas tight seals between flanges and fixtures with plumbing-fixture-setting compound. In sealing connections, use neither rubber gaskets nor putty. Seal watertight all voids between the flange and the floor below the fixture with plumbing-fixture-setting compound or other approved sealing material.

3.6 OUTLET FLANGES AND ENDS OF SOIL PIPES

- A. Provide outlet flanges and ends of soil pipes set the correct distance from the face of the floor or wall to make a joint with the gasket and fixture. Obtain approval for the setting of the flange prior to setting any fixture in place.

3.7 WATER SUPPLY BRANCH PIPING

- A. Provide all exposed water supply branch piping (including valves and fittings) not more than 6 feet above the floor in toilet rooms and all piping below lavatories finished and chromium-plated.
- B. Do not bury water pipe in floor construction of any toilet room.
- C. Where water piping is not sized on the drawings, comply with the sizing requirements of the National Standard Plumbing Code.
- D. Provide each hot and cold-water supply to each service sink and lavatory with a ball or angle valve or compression stop in an accessible location near the fixture.
- E. Provide a ball valve on the connection to each wall hydrant, lawn faucet, and water cooler.
- F. Do not use stop cocks in lieu of valves.
- G. Run risers and drops supplying toilet rooms in chases, furred spaces, or shafts where possible.

3.8 FIXTURE HEIGHTS

- A. Water Closet: 15 to 16 inches to rim.
- B. Water Closet for Physically Handicapped Persons: 17 to 19 inches to top of seating surface. The flush valve handle shall be located on the "wide side" of the stall or room.
- C. Lavatory for Physically Handicapped Persons: Refer to paragraph 3.3.

3.9 SILICONE SEALANT

- A. Provide a bead of 100% white silicone sealant between the top and side edges of each water closet, urinal, service sink, lavatory, drinking fountain, and the wall to which it is adjacent.

3.10 SPARE PARTS

- A. Provide 4 spare diaphragm kits for water closet flush valves.

- B. Provide 4 spare diaphragm kits for urinal flush valves.
- C. Provide 4 spare cartridge kits for each type of lavatory faucet.
- D. Provide 1 spare cartridge kit for stainless steel sink faucet.
- E. Provide 1 spare cartridge kit for each type of art sink faucet.
- F. Provide 1 spare cartridge kit for janitor's sink faucet.
- G. Provide a minimum of one set of special tools required to remove vandal-proof items to the owner.
- H. These spare parts shall be turned over to the Owner within 30 days of final acceptance. The contractor shall obtain a signed receipt from the Owner which details what was turned over and the date it was turned over. A copy of this receipt shall be included in the project closeout documentation.

END OF SECTION 22 40 00

WATER HEATING SYSTEMS
PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections and other Division 22 specification sections, Division 23, Division 26, and Division 31 specifications apply to work of this section.

B. Section 220110 - Plumbing General Requirements

C. Section 220150 - Basic Materials and Methods

D. Section 220700- Plumbing Insulation

E. Section 224000 - Plumbing Fixtures

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.

1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- | | |
|----------------|--|
| a. ANSI B16.18 | Cast Copper Alloy Solder Joint Pressure Fittings |
| b. ANSI B16.23 | Cast Copper Alloy Solder-Joint Pressure Fittings - DWV |
| c. ANSI B31.9 | Building Services Piping Code |

2. AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR- CONDITIONING ENGINEERS (ASHRAE)

- | | |
|----------------------|--|
| a. ANSI/ASHRAE 90.1B | Energy Conservation in New Building Design |
|----------------------|--|

3. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- | | |
|-------------------------|---|
| a. ANSI/ASME Code | Boiler Pressure Vessel Code |
| b. ANSI/ASME Code Sec.9 | Boiler and Pressure Vessel Code -Welding and |
| | Brazing Qualifications |
| c. ANSI/ASME B16.1 | Cast Iron Pipe Flanges and Flanged Fittings, |
| | Class 25, 125, 250 and 800. |
| d. ANSI/ASME B16.3 | Malleable-Iron Threaded Fittings, Classes 150 and 300 |
| e. ANSI/ASME B16.4 | Cast-Iron Threaded Fittings Class 125 and 250 |
| f. ANSI/ASME B16.22 | Wrought Copper and Copper Alloy Solder-Joint |
| | Pressure Fittings |
| g. ANSI/ASME B16.26 | Cast Copper Alloy Fittings for Flared Copper Tubes |
| h. ANSI/ASME B16.29 | Wrought Copper and Wrought Copper Alloy |
| | Solder Joint Drainage Fittings - DWV |
| i. ANSI/ASME B16.32 | Cast Copper Alloy Solder-Joint Fittings for |
| | Solvent Drainage Systems |

4. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- a. ASTM A 47 Ferritic Malleable Iron Castings
- b. ASTM A 53 Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless
- c. ASTM A 74; CIS{O 3-1, Cast Iron Soil Pipe and Fittings
ASTM A888
- d. ASTM A 234/A234M Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
- e. ASTM B 32 Solder Metal
- f. ASTM B 42 Seamless Copper Pipe, Standard Sizes
- g. ASTM B 43 Seamless Red Brass Pipe
- i. ASTM B 62 Cast Bronze Valves
- j. ASTM B 75 Seamless Copper Tube
- k. ASTM B 88 Seamless Copper Water Tube
- l. ASTM B 302 Threadless Copper Pipe (TP)
- m. ASTM B 447 Copper or Copper Alloy Tubing

5. AMERICAN WELDING SOCIETY (AWS)

- a. ANSI/AWS A5.8 Brazing Filler Metal

6. NATIONAL CERTIFIED PIPE WELDING BUREAU (NCPWB)

- a. NCPWB Procedure Specifications for Pipe Welding

7. NATIONAL FIRE PROTECTION ASSN (NFPA)

- a. NFPA 70 National Electrical Code

8. NATIONAL SANITATION FOUNDATION (NSF)

- a. NSF Std 5 Commercial Hot Water Generating and Heat Recovery
Equipment

9. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- a. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum)

10. UNDERWRITERS LABORATORIES (UL)

- a. UL 1453 Electric Booster and Commercial Storage Tank Water Heaters
- b. UL listed Product Directories

1.3 SUBMITTALS

- A. Submit under provisions of Division 01, and Division 22, "Plumbing General Requirements" the following: manufacturer's catalog data, installation, dimensions (including rough in dimensions) and operating and maintenance data for plumbing specialty items; catalog data and material certification for pipe materials and fittings. Provide for all items as listed in Specification Section 220110.

1.4 QUALITY ASSURANCE

- A. Equipment of the same general type shall be of the same make.
- B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment of material.

- C. All materials provided shall be new and shall be approved by the Underwriter's Laboratories, Inc. wherever that agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with a minimum of three years' experience.
- B. Installer: NC State licensed plumber specializing in performing the work of this section with minimum 3 years' experience.

1.6 REGULATORY REQUIREMENTS

- A. Installation and materials shall be in conformance with the North Carolina State Building Code 2018 Edition (Year 2015 Edition of the International Plumbing Code as modified and adopted by the North Carolina Building Code Council).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 01 and Division 220110, Plumbing General Requirements.

1.8 SYSTEM COMPLETION

- A. Provide all bolts, nuts, gaskets, sleeves, hangers, supports, miscellaneous valves and fittings, and specialties required for complete installation of the piping and equipment to be provided.

PART 2 - PRODUCTS

2.1 COMMERCIAL ELECTRIC WATER HEATER

- A. Automatic, electric-heated, vertical storage. Storage tank shall be Glass-lined welded-steel; thermally insulated with foam, encased in corrosion-resistant steel jacket; baked-on enamel finish. Storage, heat input, and minimum recovery rate as specified in the plans. Water heater shall meet the standby loss requirements of the U.S. Department of Energy and current edition of ASHRAE/IESNA 90.1.
- B. Manufacturers: State Water Heaters, A.O. Smith, American, Bradford White, Rheem, or Ruud.
- C. The heater shall have 150 psi working pressure and be equipped with an extruded high density anode rod. The drain valve shall be located on the front of the unit ease of maintenance. Provide ASME-rated temperature-and-pressure-relief valve.
- D. Electric heating elements shall be medium-watt density with zinc plated copper sheath. Each element shall have an automatic thermostat with high temperature cut-off switch. An electrical junction box with heavy duty terminal block shall be provided.
- E. Heater tank shall have a three-year warranty.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify the concrete equipment pad has been installed and is appropriate size and ready for the heater to be installed on it.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install all equipment in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever joining dissimilar metals. Protect insulating material if heat is applied to fitting.
- C. Route piping in orderly manner. Grade piping to low points and provide drain valves.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide Sleeves for all pipes passing through floors, walls and ceilings, of sufficient size to receive insulation and of proper length to terminate 1" outside finished surfaces. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.
- H. Pipe Penetrations through fire partition walls and through floors shall be made by UL penetration detail as indicated with caulking with UL listed fireproof caulking.
- I. Provide clearance for installation of insulation and access to valves and fittings.
- J. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with those specified in Division 05.
- K. Changes in pipe sizes shall be made with reducing fittings.
- L. Make copper piping joints with 95-5 solder, and no corrosive solder paste. Flux and solder combinations are not permitted.
- M. Provide valves at inlet and outlet of each piece of equipment, at each fixture, on branch lines and where indicated on the drawings.
- N. Install valves with stems upright or horizontal, not inverted.
- O. Pipe relief from water heaters to nearest drain.
- P. Install unions downstream of valves and at equipment or apparatus connections.
- Q. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- R. Install ball valves for shut-off and to isolate equipment, part of systems, vertical risers, throttling, bypass, or manual flow control services.

3.4 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to 1/8 or 1/4 inch per foot, as required. Maintain gradients. Slope water piping and arrange to drain at low points.

END OF SECTION 22 48 00

DIVISION 23

MECHANICAL

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL**1.1 REFERENCES & INTENT**

- A. All work of this Division shall comply with the requirements of the Drawings, General Conditions, Supplementary General Conditions and Division 01 Specifications section.
- B. Study all drawings and specifications before submitting bids.
- C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.
- D. Drawings are diagrammatic. Drawings are not intended to be absolutely precise and do not specify or show every offset, fitting, and component. The purpose of the drawings is to indicate a system concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational. Contractor shall route piping or provide offsets to avoid interference with structural elements, equipment, electrical panels and junction boxes, etc. Verify locations, dimensions, flow directions, etc. before construction.
- E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.
- F. Brand names and catalog numbers included with equipment or materials specifications are used to indicate quality, rating, or operating characteristics of the equipment or material.
- G. Jobsite Conditions. The Contractor shall visit the site and familiarize himself with the existing conditions before submitting his bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.2 WORK INCLUDED

- A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
 - 1. All mechanical scope of work specified herein and as shown on the plans. Contractor should review all drawings and include all items that are a part of his scope.
 - 2. All associated wiring, cutting and patching.

- B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

1.3 STANDARDS AND CODES

- A. All equipment with electrical components shall bear the UL label.
- B. Standards by the following organizations shall be complied with wherever applicable:

1. ANSI American National Standards
2. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
3. ASTM American Society for Testing Material
4. NEC National Electric Code
5. NEMA National Electrical Manufacturers Association
6. NFPA National Fire Protection Association
7. OSHA Occupational Safety and Health Act
8. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.
9. North Carolina State Building Code
10. Any Other Applicable local and State Codes

- C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.5 PERMITS AND FEE

- A. Make application for all necessary permits and pay applicable fees.

1.6 STRUCTURAL STEEL AND CONCRETE

- A. Structural members may not be pierced without prior written approval of the Engineer.

1.7 WATERPROOFING

- A. Waterproofed floors and walls may not be cut.

1.8 WORK SCHEDULE:

- A. Work schedule shall be in accordance with Division 01.
- B. The existing facilities shall remain in use during some phases of construction under this Contract – refer to Specification 01 10 00 Summary of the Work for the proposed schedule. The Contractor shall cooperate with the Owner in every way possible to keep interruption of, and interference with, normal functions, activities, and operations to a minimum. Where construction or attendant work interrupts normal functions in any area, a schedule of work shall be submitted for approval of the Owner and after approval, strictly followed. Modification to existing work shall be done as required. All work shall be performed in such a manner as to prevent any interruption of any service or utility. Where it is necessary to interrupt service for cut-in or changeover, the work shall be scheduled well in advance of the interruption and the

interruption approved by the Owner. If required by Owner, changeover work shall be done during night, weekends, holidays, or other off-peak period as approved. Existing piping, ductwork, etc., shall be modified as indicated on the drawings and/or as required by new and modified construction. Existing piping, ductwork, etc., modified as required, shall be put in first class operating condition. Existing equipment, piping, and sheet metal work to be removed shall become the property of the Contractor and be removed from the site and disposed of in a legal means unless otherwise indicated. No equipment shall be disconnected without approval by the Engineer. Existing piping buried in building construction shall be left in place and capped behind new finish. All temporary relocation of equipment, temporary piping, sheet metal work, etc. required for temporary operation of the facility shall be provided.

- C. Any demolition or installation work producing excessive dust or noise deemed to be disruptive or possibly unsafe to building operations must be, at the Owner's discretion, performed after normal working hours.

1.9 PROTECTION OF EQUIPMENT

- A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.
- B. Provide protection against theft, physical damage and the entry of dirt, water or corrosive fumes into the material and equipment. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes in a dry, heated space.

1.10 FIRE SAFETY

- A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting, or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10-pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.
- B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.
- C. Burn Permit: For all cutting, burning and welding operations a burn permit is required. This permit may be obtained from the Owner at no cost.

1.11 GUARANTEES

- A. Furnish written guarantee in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.12 SHOP DRAWINGS

- A. It shall be noted that shop drawing submittals processed by the Engineer are not change orders; that the purpose of shop drawing submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the

fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop drawing submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The Engineer may also require the contractor to submit samples of proposed or specified equipment for approval with the samples to be returned to the contractor upon request. During the submittal process, if the contractor submits equipment which is not EXACTLY like the equipment specified, the contractor shall provide a list of those differences to the engineer for his review and approval. If the contractor's list is incomplete, and the submittal is approved, the approval does not waive the differences that were not submitted for review.

- B. The design documents indicate the products that were used as the basis of design. This establishes the product parameters and other systems interacting with the product (size, power requirements, pipe sizes, pump capacity, etc.) The contractor shall specifically bring to the designer's attention any changes in other systems required when products other than those used as the basis of design, are used. The contractor shall bear all costs, including design, for the changes.
- C. Prior to procurement or manufacturing, submit for approval appropriate shop drawings and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, material, etc., for all items under this Division including the following:
 - 1. Exhaust Fans
 - 2. Supports, Anchors, and Vibration Isolation
 - 3. Mechanical Identification
 - 4. Insulation
 - 5. Air Outlets and Inlets
 - 6. Ductwork and Dampers
 - 7. Testing and Balancing
- D. The contractor shall visit the site and familiarize himself with the project requirements and the field conditions before preparing shop drawings and ordering equipment. Field verify the characteristics of all specified or existing equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc. Where existing equipment is re-used, he shall verify dimensions, capacities, horsepower, etc. and bring any discrepancies to the attention of the Engineer.
- E. Where different products have to work together, it is the Contractor's responsibility to select manufacturers whose products are visually and/or technically compatible.
- F. Prepare listing of all equipment and materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented.
- G. Submittals of shop drawings and manufacturer's data, etc. shall be provided to the Designers electronically in PDF format. The Designer will review the submittals and return them electronically. The exception would be color samples or other material that cannot be adequately represented electronically, and these should be submitted as five (5) hard copies. The Designer will review them and return three (3) copies.

1.13 RECORD DOCUMENTS

- A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Designer maintenance manuals and colored scans of the marked-up prints in PDF format indicating any installed work that is different from what is shown on the drawings.

PART 2 – PRODUCTS

2.1 QUALITY OF MATERIAL

- A. Equipment of the same general type shall be of the same make. Reference is made to relays, motors, valves, motor starters, contactors, etc.
- B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.
- C. All materials provided shall be new and shall be approved and labeled by the Underwriter's Laboratories, Inc., or other accredited third-party agency, wherever such agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.
- D. All components, equipment and systems shall comply with the latest edition adopted by the State of North Carolina of ASHRAE 90.1, ASHRAE 62.1, ASHRAE 15 and any other applicable ASHRAE standard.

PART 3 - EXECUTION

3.1 CLEARANCE AND RESTORATION OF SITE

- A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.2 RATED ASSEMBLIES

- A. Installation of any equipment shall not compromise fire ratings of rated assemblies. All penetrations shall be sealed per UL guidelines for penetration protections. Provide fire dampers or combination fire and smoke dampers where required by code.

3.3 COORDINATION

- A. Install all work to permit removal of equipment without damage to the equipment or the building. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the Engineer of any conflict.
- B. Coordinate equipment locations as well as piping and conduit routing with Owner's representative to optimize all present and foreseen future space usage and clearance requirements.

- C. Do not rough prior to receipt of approved shop drawings.

3.4 EQUIPMENT INSTALLATION AND SUPPORT

- A. Install all equipment where indicated, in accordance with manufacturer's published installation instructions, and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes. Consult with Engineer if said instructions or practices conflict with the drawings/specifications.
- B. The manufacturer's installation instructions shall be available on the job site at the time of inspection and start-up as required by NC Mechanical Code 304.1.
- C. Support plumb, rigid and true to line all work and equipment furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, piping, ductwork, etc., are to be supported, mounted or suspended. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.
- D. Any system component which may require maintenance, such as control valves, manual valves, strainers, etc. shall not be installed over electrical equipment, machinery, control panels or floor openings.

3.5 FINAL ADJUSTMENT AND TESTING

- A. General - Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship shall be corrected.
- B. Working Tests - Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.6 LABELS, IDENTIFICATION AND TAGS

- A. All components or equipment shall be identified using permanent engraved nameplates, permanently attached with pin-head screws to device or to wall or mounting panel above device. Stick-on type labels will not be acceptable.
- B. Label and identify all piping installed under this contract. Install plastic pipe markers or stenciling after finish painting has been completed.
- C. Refer to Section 23 05 90 – Mechanical Painting and Identification.

3.7 OWNER'S RIGHT TO TEST SYSTEMS

- A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exists as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine

whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.8 CLEANING UP

- A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.
- B. The building will be occupied during some of the demolition and installation of new work as described in Division 01. Furniture and other school equipment and supplies will remain in the building throughout the construction period. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

3.9 INSPECTION CERTIFICATES

- A. Obtain all inspections required by law, ordinances, rules, and regulations of the Authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.10 DESIGNER INSPECTIONS

- A. The designer will make regular site visits during construction and will keep a deficiency log of all observed exceptions. The contractor shall resolve these noted deficiencies as expediently as possible.

3.11 FINAL REVIEW

- A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative and shall be at such times as are convenient to the Engineer. Final tests shall show conclusively that all equipment performs its specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

3.12 EQUIPMENT DELIVERY AND PROTECTION

- A. All material shall be delivered and unloaded by the Contractor within the project site as directed by the Owner.
- B. The Contractor shall protect all material and equipment from breakage, theft or weather damage.

3.13 OPERATING INSTRUCTIONS

- A. The Contractor shall provide a minimum of two (2) hours of personal instruction to Owner's personnel in the proper operation of all equipment specified and provided. The instruction

shall be provided by factory trained and certified competent personnel. The instruction shall include but not be limited to the following:

1. Instructions for the operation of the exhaust fans.

- B. If off-site instruction is required, the contractor shall include in his bid the cost of boarding, lodging and transportation of three people from Hillsborough to the training site. The cost shall also include all costs during the training period.

3.14 MAINTENANCE MANUALS

- A. Maintenance Manuals shall be submitted in three (3) hard copies in vinyl 3-ring binders, and three (3) copies in electronic format as PDF files on disks. Each manual shall have the following:

1. Service telephone number of the installing company, including an emergency number.
2. Contact person, phone number, and address of manufacturer or distributor where equipment was purchased.
3. The manufacturing company's operating and maintenance manuals for each piece of equipment.
4. Copies of all approved shop drawings.
5. Copies of warranties with their start dates.

SUPPORTS, ANCHORS AND VIBRATION ISOLATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections and other Division 23 specification sections.

1.2 QUALITY ASSURANCE:

A. Codes and Standards:

1. Code Compliance: Comply with applicable codes pertaining to product materials and installation of supports and anchors.
2. UL and FM Compliance: Provide products which are UL-listed and FM approved where required.
3. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS) Standard Compliance:
 - a. Provide pipe hangers and supports of which materials, design, and manufacture comply with MSS SP-58.
 - b. Select and apply pipe hangers and supports, complying with MSS SP-69.
 - c. Fabricate and install pipe hangers and supports, complying with MSS SP-89.
 - d. Terminology used in this section is defined in MSS SP-90.
 - e. Acceptable Manufacturers: Vibration Mountings and Controls, Inc., Grinnell, Modern, Mason Industries, Metraflex, or approved equal.

1.3 SUBMITTALS:

- A. Manufacturer's Data: Submit manufacturer's technical product data, including installation instructions for each type of support and anchor.

PART 2 - PRODUCTS

2.1 HORIZONTAL-PIPING HANGERS AND SUPPORTS:

- A. General: Except as otherwise indicated, provide factory- fabricated horizontal-piping hangers and supports complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide galvanized hangers, rods, support assemblies, connectors, etc., except provide copper-plated hangers and supports for copper-piping systems.
- B. Adjustable Steel Clevis Hangers: MSS Type 1.

- C. Yoke Type Pipe Clamps: MSS Type 2.
- D. Steel Double Bolt Pipe Clamps: MSS Type 3.
- E. Steel Pipe Clamps: MSS Type 4.
- F. Adjustable Swivel Pipe Rings: MSS Type 6.
- G. Adjustable Steel Band Hangers: MSS Type 7.
- H. Adjustable Band Hangers: MSS Type 9.
- I. Adjustable Swivel Rings, Band Type: MSS Type 10.
- J. Split Pipe Rings: MSS Type 11.
- K. Extension Split Pipe Clamps: MSS Type 12.
- L. U-Bolts: MSS Type 24.
- M. Clips: MSS Type 26.
- N. Pipe Slides and Slide Plates: MSS Type 35, including one of the following plate types:
 - 1. Plate: Unguided type.
 - 2. Plate: Guided type.
 - 3. Plate: Hold-down clamp type.
- O. Pipe Saddle Supports: MSS Type 36, including steel pipe base- support and cast-iron floor flange.
- P. Pipe Stanchion Saddles: MSS Type 37, including steel pipe base support and cast-iron floor flange.
- Q. Adjustable Pipe Saddle Supports: MSS Type 38, including steel pipe base support and cast-iron floor flange.
- R. Single Pipe Rolls: MSS Type 41.
- S. Adjustable Roller Hangers: MSS Type 43.
- T. Pipe Roll Stands: MSS Type 44.
- U. Adjustable Pipe Roll Stands: MSS Type 46.

2.2 VERTICAL-PIPING CLAMPS:

- A. General: Except as otherwise indicated, provide factory- fabricated vertical-piping clamps complying with MSS SP-58, of one of the following types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
- B. Two-Bolt Riser Clamps: MSS Type 8.

C. Four-Bolt Riser Clamps: MSS Type 42.

2.3 HANGER-RODS AND ATTACHMENTS:

A. General: Except as otherwise indicated, provide factory- fabricated hanger-rod attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide galvanized steel hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

B. Steel Turnbuckles: MSS Type 13.

C. Swivel Turnbuckles: MSS Type 15.

D. Malleable Iron Sockets: MSS Type 16.

2.4 BUILDING ATTACHMENTS:

A. General: Except as otherwise indicated, provide factory- fabricated building attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

B. Concrete Inserts: MSS Type 18.

C. Channel Clamps: MSS Type 20.

D. Welded Beam Attachments: MSS Type 22.

E. C-Clamps: MSS Type 23.

2.5 SADDLES AND SHIELDS:

A. General: Except as otherwise indicated, provide saddles, and shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

B. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.

2.6 ROOF CURBS AND PENETRATIONS:

A. Prefabricated roof curbs for penetrations shall be provided by this Division. The curbs shall be installed by the general contractor.

B. Curbs for the fans and air handling units may be the unit manufacturer's standard curb of the height indicated on the drawings. Refer to Section 23 34 23 HVAC Power Ventilators and Section 23 73 13 Air Handling Units for curb description.

2.7 MISCELLANEOUS MATERIALS:

A. Metal Framing: Provide products complying with NEMA STD ML 1.

- B. Steel Plates, Shapes and Bars: Provide products complying with ASTM A 36.
- C. Heavy-Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS standards.

2.8 VIBRATION ISOLATION:

- A. General: Provide vibration isolation where indicated in the plans. Equipment isolation shall be as designed and submitted by the equipment manufacturer.
- B. Equipment shall be isolated from the structure by means of resilient vibration and noise isolating supports. Supports shall be such that vibration is isolated and expansion and contraction is accommodated without creating excessive stresses in piping or equipment connections.
 - 1. All isolators shall be designed or treated for resistance to corrosion. Steel components shall be PVC coated, or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc chromate or metal etching primer. A finish coat of industrial enamel shall be applied over the primer. All isolators exposed to the weather shall have steel parts PVC coated, hot-dipped galvanized or zinc-electroplated plus coating of neoprene or bitumastic paint. Aluminum components for outdoor installation shall be etched and painted with industrial grade enamel. Nuts, bolts, and washers may be zinc-electroplated.
 - 2. Isolators shall be installed in such a manner that loaded deflections are compensated for initially.
- C. Vibration bases and/or isolators shall be provided for motors and motor-driven equipment, whether indicated on the drawings or not.
- D. Isolator Elements: Steel springs shall be open or housed type as specified with static deflection required and the capability of 30% over travel before becoming solid. Springs shall be designed for lateral stability with a stiffness ratio of 1 except where greater horizontal thrust required greater horizontal stiffness.
- E. Elastomers shall be rubber, neoprene, Buna N, silicone, or other material to meet specific service conditions and shall be molded in the range of 30 to 60 durometer. Material shall be of color-coded stock for easy identification of rated load capacity.
- F. Precompressed fiber glass shall consist of a high-density matrix of molded glass fiber encased in a waterproof neoprene jacket resistant to oil, acids and fungus and color coded for easy identification of rated load capacity.
- G. Isolator Types: Isolators shall be applied in accordance with the "types", as follows, where Type I isolators shall be utilized for centrifugal refrigeration machines installed on or below grade; Type II isolators shall be utilized with mounted equipment of 3 HP or less (unless otherwise specified); Type III isolators shall be utilized with mounted equipment of 5 HP or larger (unless otherwise specified); and Type IV isolators shall be utilized for all suspended pipe and equipment:
 - 1. Type I - Pad type mountings consisting of any one of the following constructions:
 - a. Two layers of ribbed or waffled neoprene pads bonded to a 16-gauge galvanized steel separator plate. Bolting not required. Pads shall be sized for approximately 20 to 40 psi load, or a deflection of 0.12 inch to 0.16 inch.

- b. Precompressed fiberglass properly sized for 5 to 60 psi loading depending on density with steel plates bonded to top of isolator.
 - c. Two layers of ribbed or waffled neoprene pads bonded to vibration cork sized for 10 to 60 psi loading.
2. Type II - Elastomeric mountings having steel baseplate with mounting holes and a threaded insert at top of the mounting for attaching equipment. All metal parts shall be completely embedded in the elastomeric material. Mountings shall be designed for approximately 1/4-inch deflection and loaded so that deflection does not exceed 15% of the free height of the mounting.
 3. Type III - Adjustable, freestanding, open-spring mountings with combination leveling bolt and equipment fastening bolt. Spring (or springs) shall be rigidly attached to mounting base plate and to the spring compression plate. A neoprene pad having a minimum thickness of 1/4 inch shall be bonded to the baseplate.
 4. Type IV - Spring hangers for isolation of noise and vibration consisting of a rectangular steel box, elastomeric element, coil spring, spring cups, neoprene impregnated fabric washer, and steel washer. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the top of the hanger box. The elastomeric element shall meet the design requirements for Type II mountings. The hanger box shall be capable of supporting a load of 200% of rated load without noticeable deformation or failure. For piping, provide combination spring and double deflection low dynamic stiffness hangers, same or equal to Mason Industries 30N.

H. Vibration Bases - Bases shall incorporate isolators as herein specified and shall be designed with ample rigidity to resist all starting and operating forces without supplemental hold-down devices.

1. Where height-saving brackets for side mounting of isolators and where recessed pockets for recessed mounting of isolators in inertia blocks are specified, the brackets and pockets shall be designed to provide for an operating clearance of 1 inch under the inertia base, and designed so that the isolators can be installed and removed when the operating clearance is 1 inch or less. When used with spring isolators having a deflection of 2-1/2 inches or more, the brackets and pockets shall be equipped with precompression devices to limit exposed bolt length between the top of the isolator and the underneath side of the bracket.
2. All bases supporting a given piece of equipment shall be arranged for approximately equal spring deflection.
3. Bases and isolators for equipment installed out-of-doors shall be designed to provide adequate restraint due to normal wind conditions and to withstand wind loads of 30 lbs/sq.ft. applied to any exposed surface of the equipment without failure.
4. All floor mounted equipment shall be provided with concrete housekeeping pads. Pads not otherwise indicated shall be a minimum of 4 inches high.
5. Vibration bases shall be utilized as follows:
 - a. Base-mounted pumps driven by motors 15 HP or less shall be mounted on 1 layer of ribbed or waffled neoprene pad material on a concrete housekeeping pad.
 - b. Base-mounted pumps (driven by motors greater than 15 HP) shall be mounted on concrete inertia bases, consisting of a perimeter steel pouring form, reinforcing bars welded in place, bolting templates, and height-saving brackets for side mounting of the isolators. The perimeter steel members shall be structural channels having a minimum depth of 1/12 of the longest span, but not less than 6 inches deep. The base shall be sized a minimum overlap of 4 inches around the base of the equipment, and in the case of belt-driven equipment, 4 inches beyond the end of the drive shaft.

- I. Piping Isolation: Flexible connectors in piping at equipment mounted on vibration isolators shall allow for movement between pipe and equipment. Flexible connectors shall have flanged or screwed ends to match pipe size of line. If screwed ends are used, flanges or unions must be installed to allow for removal of units.
 - 1. Rubber Construction: Single sphere neoprene rubber, large change in diameter, consisting of multiple plies of Kevlar tire cord and EPDM, rated at 225 internal pressure, with captive flanged connections. Provide as manufactured by Keflex, Metraflex, Flexicraft, Triflex, Mason Industries, or approved equal.
 - 2. Stainless Steel Construction and shall be as made by Keflex, Metraflex, Flexicraft, Triflex, Flex Hose Minnesota Flex, or approved equal. Units shall be designed for no less than 125 psi pressure and have a maximum operating temperature of 450 degrees F. Each unit shall be of the proper length to accept the movement involved and be fitted with a braided jacket.

- J. Pipe Expansion Products: Where indicated, provide pipe expansion products as follows.
 - 1. Pipe Expansion Joints. Provide steel expansion joints rated for 150 psi, factory preset for 2" total axial movement, multi-ply bellows construction, internal stainless-steel liner, shrouded, tie rods, with connection for pipe size indicated. Provide units with factory insulated integral pipe guides. Provide KEFLEX model GTI-M-311TR9-020 or equal by Flex Hose or Minnesota Flex.
 - 2. Flexible Expansion Loop. Provide flexible expansion loops of size and material noted on drawings. Flexible loops shall be designed to impart no thrust loads on the anchors. The loop shall consist of two flexible sections of hose and braid, two 90-degree elbows, and a 180-degree return. Loops shall be installed in a neutral, pre-compressed, or pre-extended condition as required for application. Loops shall have a working pressure of 100 psi.
 - 3. Loops installed hanging down shall have a drain plug. Loops installed straight up will be fitted with a manual air release valve to purge air from the high point of the loop. Loops installed in any position other than hanging down must have the 180-degree return supported. Install both upstream and downstream from a pipe guide or anchor in accordance with manufacturer's recommendations. Expansion loops shall be as manufactured by Flex Hose Co., Inc., Metraflex Company, or Tru-flex Metal Hose Corp.

- K. Pipe Guide: Factory fabricated and insulated guide assembly. No metal contact between pipe and guide body. Split construction for easy installation. Insulation vapor barrier sealed. Provide as manufactured by Keflex-Mave Series CP, type AG by Amber/Booth, or approved equal by Grinnell, Amtrol, Flex Hose, or Minnesota Flex.

- L. Duct Isolation: Flexible EPDM connectors between duct at equipment mounted on vibration isolators shall allow for movement between duct and equipment. Flexible connectors shall be weather sealed with gasketed ends to make connection to unit flange and duct.

PART 3 - EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS:

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure with maximum loading as shown below. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install

intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

- B. Provide all fascia boards, cleats, brackets, backing in partitions, toggle bolts, expansion shields, screws, clamps and rods, etc., for hanging of all piping and equipment included under this Division.
- C. Hangers and braces shall adequately support the piping system horizontally and vertically and shall allow for expansion and contraction without binding in sleeves or misalignment. Provide for expansion of piping with swing joints and ample sleeves.
- D. Vertical Piping: Supports for vertical piping 1-1/2 inches and smaller from wall with malleable split ring hanger. Nipples cut to fit each case. Two hangers per floor minimum. Use clamps on every floor for pipes 2 inches and larger. In crawl spaces, support stacks on base fitting placed securely on concrete piers or masonry blocks and with pipe clamps.
- E. Horizontal piping shall be supported with hangers as follows:

STEEL PIPE SIZE	ROD DIAMETER	MAXIMUM SPACING
Up to 1 inch	3/8 inch	7 feet
1-1/4" inches	3/8 inch	8 feet
1-1/2 inches	3/8 inch	9 feet
2 inches	3/8 inch	10 feet
2-1/2 inches	1/2 inch	11 feet
3 inches. & 3-1/2 inches.	1/2 inch	12 feet
4 inches and 5 inches	5/8 inch	14 feet
6 inches	7/8 inch	17 feet
8 inches	7/8 inch	19 feet
10 inches	7/8 inch	20 feet
12 inches	7/8 inch	23 feet

COPPER TUBE SIZE	ROD DIAMETER	MAXIMUM SPACING
1/2 & 3/4 inch	3/8 inch	5 feet
1 inch	3/8 inch	6 feet
1-1/4 inch	3/8 inch	7 feet
1-1/2 inches	3/8 inch	8 feet
2 inches	3/8 inch	8 feet
2-1/2 inches	1/2 inch	9 feet
3 inches & 4 inches	1/2 inch	10 feet

- F. Load carrying capacities of threaded steel rod based on allowable stress of 12,000 psi.

ROD SIZE - INCHES:	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4
ALLOW LOAD - LBS:	610	1130	1810	2710	3770	4960	6230	8000

- G. Generally, pipes shall be individually supported. Trapeze hangers may be used where approved. Piping shall be individually bolted to trapeze with U bolts.
- H. Piping Along Wall - From approved wall brackets fastened to wall with Phillips anchors or inserts. Installation - Provide pipe bars, angles, etc. as required. Anchor piping to localize

expansion and prevent undue strain on piping and branches. Provide spring type hangers for vibration isolation where shown on plans and as specified in vibration isolation section.

- I. Locate hanger not more than 4 feet from elbow or tee on screwed piping. Space hangers on 3-foot center on horizontal piping 1-1/2 inch and smaller exposed at corridor ceilings and less than 8 feet from floor in finished rooms.
- J. Support from Concrete Construction - All main piping runs shall be supported from hangers secured to cast-in-place concrete inserts. Branch piping hanger supports may be field drilled using self-drilling type expansion shields equal to Phillips concrete fasteners or approved equal. Expansion shields shall not cut or unduly displace reinforcement.
- K. Support from Precast Concrete - Use toggle bolts mounted in core sections of precast concrete. Absolutely no ramset or any other power-driven fasteners will be allowed in precast planks.
- L. Support from Existing Concrete - Piping may be attached to the structure using power driven fasteners. All fasteners into concrete shall penetrate the slab for a distance equal to 6 to 8 times the diameter of the shank. Power driven fasteners will not be used in concrete encased steel beams.
- M. Test drill existing concrete to ensure rebar is not cut or damaged when installing anchors.
- N. Support from Structural Steel - Make use of existing steel members for pipe support. Provide additional structural steel members where required to accommodate hangers.
- O. Anchors - Anchor piping as shown or required to isolate expansion and prevent pipe strain due to expansion. Anchors shall be separate from other supports.
- P. Expansion Joints and Pipe Guides – Install in accordance with manufacturers recommendation. Locate additional guide within recommended distance of the first guide integral to the expansion joint.
- Q. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- R. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.

3.2 PROVISIONS FOR MOVEMENT:

- A. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- B. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3.3 PIPE EXPANSION:

- A. Provide pipe expansion products where specifically shown on drawings to make allowance for expansion and contraction of pipe. Provide bellows type or flexible expansion loop as required. See Section 23 05 50.

B. Insulated Piping: Comply with the following installation requirements.

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields.

3.4 PIPE GUIDES AND ANCHORS:

- A. Provide pipe guides where specifically shown on drawings to accommodate expansion loops and compensators. Vibration isolator manufacturer shall provide pipe guides consisting of a telescopic arrangement of two sizes of steel tubing separated by a minimum, half inch thickness of heavy-duty neoprene isolation material.
- B. Provide anchors where specifically shown on drawings to accommodate expansion loops and compensators. Securely fasten to building construction as approved by Engineer.

3.5 EQUIPMENT SUPPORTS:

- A. Provide concrete housekeeping bases for all floor-mounted equipment furnished as part of the work of Division 23. Unless otherwise noted, size bases to extend minimum of 4" beyond equipment base in any direction; and 4" above finished floor elevation. Construct of reinforced concrete roughen floor slab beneath base for bond and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.
- B. Provide structural steel Stands to support equipment does not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands. Provide shop drawings for structural steel stands for Engineer's approval.
- C. Provide Concrete Pads for floor-mounted equipment installed indoors or outdoors per notes or details in drawings. Provide concrete bases and pads where required in compliance with section 23 05 45 of these specifications.

3.6 GALVANIZING:

- A. All hangers, supports, and connections shall be galvanized coated.

END OF SECTION 23 05 29

ELECTRICAL PROVISIONS FOR MECHANICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections, other Division 23 specification sections, and Division 26 Sections apply to work of this section.

- B. This section is a Division 23 Basic Mechanical section and is a part of each Division 23 section making reference to electrical provisions of Mechanical work specified within.

1.2 DESCRIPTION OF WORK

- A. Extent of electrical provisions to be provided as mechanical work is indicated in other Division 23 sections, on drawings, and as further specified in this section.

- B. All work on this project will be done through a single prime contract. All power and control wiring and other electrical work shown is the responsibility of the prime contractor. These include but are not necessarily limited to the following:

1. Motors for mechanical equipment.
2. Starters for motors of mechanical equipment whether or not starter is specifically indicated to be furnished with the mechanical equipment. Unless otherwise noted, the mechanical contractor shall provide all motor starters, and combination starters/disconnects required for mechanical equipment. Motors being equipped with adjustable speed drives (ASD's) will not require starters. The mechanical contractor shall provide the ASD's.
3. All electrical equipment and devices (panels, disconnects, circuit breakers, etc.).
4. All interlock and control wiring required for sequence of operation of mechanical devices provided for mechanical systems.
5. All power wiring for mechanical equipment and all power and low voltage wiring for the DDC controls.
6. Any power wiring required for mechanical equipment not specifically shown on electrical drawings or specified in Division 26.
7. Duct smoke detectors, if provided per NFPA 90A requirements, shall be furnished and wired by Division 26, installed by Division 23. Fire alarm AHU shut down circuits shall be wired from the fire alarm control panel to a termination point, adjacent to the AHU control, under Division 26. AHU control wiring from the termination point to the equipment shall be under Division 23.

- C. Refer to other Division-23 sections for specific individual mechanical equipment electrical requirements.

- D. Refer to Division-26 sections for any electrical equipment not included in this section and for materials and methods of other electrical components.

1.3 QUALITY ASSURANCE

- A. Coordination with Electrical Work: Wherever possible, match elements of electrical provisions of mechanical work with similar elements of electrical work specified in Division 26 sections. Comply with applicable requirements of Division 26 sections for electrical work of this section which is not otherwise specified.

- B. Standards: For electrical equipment and products, comply with applicable NEMA standards, and refer to NEMA standards for definitions of terminology herein. Comply with National Electrical Code (NFPA 70) for

workmanship and installation requirements. Electrical work shall be done in accordance with Codes listed and also requirements of Division 26.

1.4 SUBMITTALS

- A. Listing, Motors of Mechanical Work: Concurrently with submittal of mechanical products listing (Basic Mechanical requirements), submit separate listing showing rating, power characteristics, application (connected equipment), and general location of every motor to be provided with mechanical work. Submit updated information promptly when and if initial data is revised.
- B. Include in listing of motors, notation of whether motor starter is furnished or installed integrally with motor or equipment containing motor.
- C. Product Data of Motor Control Equipment
- D. Product Data of Motor Safety Disconnect Equipment.
- E. Product Data of ASD Cables

PART 2 - PRODUCTS

2.1 MOTORS

- A. Manufacturer: Except where item of mechanical equipment (which otherwise complies with requirements) must be integrally equipped with motor produced by another manufacturer, provide motors for mechanical equipment manufactured by one of the following:
 - 1. Baldor Electric Co.
 - 2. General Electric Co.
 - 3. Reliance Electric Co.
 - 4. U.S. Electric Motor Co.
- B. Motor Characteristics: Except where more stringent requirements are indicated, and except where required mechanical equipment cannot be obtained with fully complying motor, comply with the following requirements for motors of mechanical work:
 - 1. Temperature Rating: Rated for 40 deg.C environment with maximum 50 deg.C temperature rise for continuous duty at full load. Insulation shall be Class F.
 - 2. Starting Capability: Provide each motor capable of making starts as frequently as necessary by automatic control system, and not less than 5 starts per hour for manually controlled motors.
- C. Phases and Current Characteristics: Unless otherwise noted, provide squirrel-cage induction polyphase motors for 1/2 hp and larger, and provide capacitor-start single-phase motors for 1/3 hp and smaller, except 1/6 hp and smaller may, at equipment manufacturer's option, be split-phase type. Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 23 requirements. For 2-speed motors provide 2 separate windings on polyphase motors. Unless otherwise noted all polyphase motors shall be suitable for 240-volt, 3 phase, 60 Hz service.
- D. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.
- E. Motor Construction: Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque. For motors controlled by variable speed drives, provide inverter duty motors that comply with NEMA MG1-Part 31 Definite Purpose Inverter-Fed Polyphase Motors.
- F. Frames: NEMA No. 56 or Type T(unless otherwise noted)
- G. Bearings: Ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed

where motor is normally inaccessible for regular maintenance.

- H. Motor shaft grounding: Provide low impedance shaft grounding rings and brushes for ASD controlled motors as a path for induced shaft currents.
- I. Where belt drives and other drives produce lateral or axial thrust, in motor, provide bearings designed to resist thrust loading. Refer to individual sections of Division 23 for fractional-hp light-duty motors where sleeve-type bearings are permitted.
- J. Enclosure Type: Except as otherwise indicated, provide TEFC motors. Refer to individual sections of Division 23 for other enclosure requirements.
- K. Overload Protection: Provide built-in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.
- L. Noise Rating: Provide "Quiet" rating on motors.
- M. Efficiency: All permanently wired motors of 1 HP or more shall have a nominal full load motor efficiency not less than that required by ASHRAE 90.1. Unless otherwise specified, provide premium efficiency motors.
- N. Name Plate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

2.2 EQUIPMENT FABRICATION

- A. General: Fabricate mechanical equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mountings as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable, and OSHA compliant removable guards for motor drives, arranged for lubrication and similar running-maintenance without removal of guards.

2.3 MOTOR STARTERS

- A. Manufacturers: Subject to compliance with requirements, provide motor starters of one of the following (for each type and rating of motor starter):
 - 1. Eaton Corp.
 - 2. General Electric Co.
 - 3. Square D Co.
 - 4. Siemens
- B. General: Except as otherwise indicated, provide motor starters and ancillary components which comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installation.
- C. Type and size of starter shall be as recommended by motor manufacturer and the driven equipment manufacturer for applicable protection and start-up condition.
- D. Motor Starter Characteristics:
 - 1. Enclosures: NEMA 1, general purpose enclosures with padlock ears, except in wet locations shall be NEMA 3R with conduit hubs, or units in hazardous locations which shall have NEC proper class and division.
 - 2. Manual switches shall have pilot lights and extra positions for multi-speed motors.
 - 3. Overload protection: Electronic solid state overload relays with integral phase loss protection.

E. Magnetic Starters:

1. Maintained contact push buttons and pilot lights, properly arranged for single speed or multi-speed operation as indicated.
2. Trip-free thermal overload relays, each phase.
3. Interlocks, pneumatic switches and similar devices as required for coordination with control requirements of mechanical equipment. Multi-Speed starters shall be provided with integral time delay transition between "FAST" and "SLOW" speeds.
4. Built-in control circuit transformer, fused on line and load side to match coil voltages of controls elements. Train wiring to maintain separation of line, load and controls voltage conductors.
5. Externally operated manual reset.
6. Under-voltage release or protection.

F. Motor Connections: Liquid-tight flexible conduit not to exceed 4'-0" in length, except where plug-in electrical cords are specifically indicated.

G. Combination Non-Reversing Starters: Provide full voltage alternating-current combination non-reversing starters, consisting of starter and disconnect switch mounted in common enclosure, of types, sizes, ratings, and NEMA sizes as required. Equip starters with electrical interlocks for interfacing with other starters. Equip starters with block type manual reset overload relays and with circuit breakers or non-fusible disconnect switches.

H. Provide ground bus bars or double-barrel ground lugs to maintain low impedance ground path from motor.

I. Provide operating handle for disconnect mechanism with indication and control of switch position, with enclosure door either opened or closed, and capable of being padlocked in OFF position. Construct and mount starters and disconnect switches in single NEMA Type 1 enclosure: coat with manufacturer's standard color finish.

J. AC Fractional HP Manual Starters: Provide single-phase fractional HP manual motor starters, of sizes and ratings required. Equip with manually operated quick-make, quick-break toggle mechanisms; and with one-piece melting alloy type thermal units. Starter to become inoperative when thermal unit is removed. Provide starters with double break silver alloy contacts, visible from both sides of starter; green pilot lights and switch capable of being padlocked OFF. Enclose starter unit in NEMA Type 1 general purpose enclosure suitable for flush mounting; coat with manufacturer's standard color finish.

2.4 WIRING

A. Wiring shall be 600 volt rated thermoplastic insulated listed for the use and conditions they are installed in.

B. Low voltage wiring shall be AWG no. 16 or larger as needed to accommodate voltage drop, color coded wire or cable. Line voltage wiring shall be not smaller than no. 12 AWG. All wire shall be run in rigid conduit with outlet boxes and fittings in a manner specified in the electrical specifications. All ground wire shall be insulated green run inside raceway system with current carrying conductors. All wire shall be pulled to every pump, disconnect, starter motor etc. Conduit shall not be used as ground.

C. All raceway, wiring and electrical installations shall comply with Division 26.

2.5 DISCONNECTS

A. Non Fused.

1. Wall mounted, standard duty, single throw in NEMA-1 enclosure or NEMA 3R enclosure, weatherproof for exterior locations. Single pole or three pole as required with insulated solid neutral double-barrel lug/bar and bonded ground double-barrel lug/bar. External handle lockable in the open position. Disconnect switches shall be provided wherever the code requires local disconnecting means.
2. Make - Square D, EATON, General Electric or Siemens.

B. Fused Disconnect Switches

1. Fused disconnect switches shall be used only where fuse ratings are established on equipment nameplates in lieu of MOCP ratings. Use enclosed circuit breakers where possible.
2. Single throw, quick-make, quick-break Number of poles as required by load. NEMA-1 general purpose enclosure indoors in dry locations, NEMA 3R weatherproof enclosure outside. Standard fuse clips, lockable in open position. Rating 250 or 600 VAC as required.
3. Accessories: Provide a shield and a strap for removing the fuse.
4. Make - Square D, EATON, General Electric or Siemens.

2.6 MOLDED CASE CIRCUIT BREAKERS (MCCB)

A. Manufacturers: Subject to compliance with requirements, provide MCCB's of one of the following:

1. EATON Corp.
2. General Electric
3. Siemens
4. Square D

B. General: MCCB's shall be industrial grade (bolt-on) with ratings and special features as scheduled on drawings. Trips shall be thermal magnetic with inverse time delay and instantaneous time-current characteristics. 225 ampere frame and larger MCCB's shall have interchangeable trips and adjustable magnetic feature. MCCB's used outdoors shall have ambient compensating trips. MCCB's used for switching lights shall be rated for switching duty and shall be so labeled. MCCB's used for overcurrent protection for HVAC equipment shall be rated "HACR" type and shall be so labeled. MCCB's to be installed in existing panelboards shall be of the same manufacturer as the panelboard and listed for the use.

C. Ganged use of single-pole breakers for multi-pole applications is not acceptable.

2.7 ENCLOSED CIRCUIT BREAKERS (ECB)

A. Manufacturers: Subject to compliance with requirements, provide ECB's of one of the following:

1. EATON Corp.
2. General Electric
3. Siemens
4. Square D

B. General: ECB's shall be used where possible for motor and mechanical equipment disconnect switches. Fused disconnect switches shall only be used where fuse ratings and no MOCP ratings are shown on the nameplate.

C. ECB ratings shall be per NEC and manufacturer's documentation, in that order where conflicts may exist.

D. Ganged use of single-pole breakers for multi-pole applications is not acceptable.

2.8 ADJUSTABLE SPEED DRIVES

A. Refer to Section 230571 Adjustable Speed Drives.

B. Wiring between Adjustable speed drives and motors shall be ASD rated premanufactured cable with twisted motor leads in raceway to reduce EMF.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, securely anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws, except motors of 1/3 hp and less may be secured with Allen set screws on flat surface of shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.
- B. Install motor starters, in accordance with equipment manufacturer's written instructions and with recognized industry practices; complying with applicable requirements of NEC, UL and NEMA standards, to ensure that products fulfill requirements.
- C. Coordinate with other work including motor and electrical wiring/cabbling work, as necessary to interface installation of motor starters with other work.
- D. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.

3.2 ADJUSTING AND CLEANING

- A. Inspect electrical starter's operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.
- B. Touch-up scratched or marred surfaces to match original finish.

3.3 FIELD QUALITY CONTROL

- A. Subsequent to connecting wires/cables, energize motor starter circuitry and demonstrate functioning of equipment in accordance with requirements; where necessary correct malfunctioning units, phase rotation at the motor to maintain distribution system phase color sequence and then retest to demonstrate compliance.

END OF SECTION 23 05 30

MECHANICAL PAINTING AND IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections and other Division 23 specification sections apply to work of this section.

1.2 SCOPE

A. Identify the following:

1. New Exhaust Fans
2. All new electrical equipment associated with mechanical equipment, including disconnects, etc.
3. New Ducts.

1.3 SUBMITTALS:

- A. Manufacturer's Data: Submit manufacturer's technical product data and installation instructions.

1.4 QUALITY ASSURANCE:

- A. All painting shall be performed by a company regularly engaged in painting using full time painting employees.

PART 2 - PRODUCTS

2.1 ENGRAVED PLASTIC-LAMINATE SIGNS AND EQUIPMENT MARKERS:

- A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes indicated, 1/16" thick, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

- B. Fasteners: Self-tapping stainless steel screws.

PART 3 - EXECUTION

3.1 PAINTING:

- A. All equipment, except where otherwise specifically noted, shall be furnished in prime coat. All uninsulated black steel piping shall be prime coated and finish painted in light gray unless otherwise required by schedule below to be color coded. All welds, on both insulated and

uninsulated piping, shall be painted with one coat of primer. All miscellaneous black steel items such as machinery supports, breechings and stacks, etc., shall be prime coated and finish painted in light gray. All hangers, rods, supports and connections shall be galvanized coated. Exposed surfaces of insulation shall be sealed. All metal surfaces shall be thoroughly cleaned of rust and dirt and shall be degreased before application of primer. All prime coated equipment shall be touched up where prime coats are chipped, scratched, or otherwise damaged. All prime coated equipment shall be thoroughly cleaned and left ready for finish painting. Where cast iron accessories or galvanized pipe, or equipment surfaces are to receive finish painting, the item shall be properly primed.

B. Ferrous surfaces shall be painted with the following coats:

1. 1 coat of primer equivalent to Bruning Silathane 520-14 grey-green primer, Benjamin Moore 06- 20 red oxide alkyd primer or Richards SR-1399 red metal primer.
2. 2 coats of finish equivalent to Bruning Silathane Gloss Enamel 520-32 quarry gray, Benjamin Moore Gloss Enamel 22-38 or Richards Gloss Enamel 1003 Series.

C. The interiors of ductwork visible through grilles, registers, diffusers, or other duct openings, and/or interiors that can reflect light shall be painted flat black.

3.2 GENERAL MECHANICAL IDENTIFICATION:

A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finishes, including valve tags in finished mechanical spaces, install identification after completion of covering and painting.

3.3 MECHANICAL EQUIPMENT IDENTIFICATION:

A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

1. New Exhaust Fans.
2. ASDs, starters, disconnects and similar electrical components associated with mechanical equipment.

3.4 MECHANICAL DUCT IDENTIFICATION:

1. Provide labeling of new ducts indicating type of service, such as "EXHAUST", by stenciling with 2" high black letters.

END OF SECTION 23 05 90

TESTING AND BALANCING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-01 Specification sections, other Division 23 specification sections, and Division 26 specifications apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. The Testing and Balancing (TAB) work shall be done by an agency certified by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). The Agency shall show proof of having successfully completed at least five projects of equal size and scope within the previous three years. If the contractor is not so qualified, he shall subcontract the work to a qualified subcontractor.
- B. Immediately after the award of a contract, the contractor shall perform a Design Review of the mechanical plans and specifications. He shall identify any omissions or discrepancies that will preclude the proper balancing of the systems and report same to the Owner's representative in a formal report.
- C. Test and balance HVAC air systems as shown and specified on the schedules and Contract Documents and make submittals as described in this Section.

1.3 SUBMITTALS - Submit the following to the Owner's Representative for approval:

- A. Inspection reports (prior to and during testing and balancing).
- B. Other tests, records, certifications and reports as specified in this Section.
- C. Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) Certification.
- D. List of instruments actually used for each test. Include instrument calibration dates.
- E. TAB report including preliminary and final balance data sheets (see Paragraph 3.5). Also submit to Engineer for record.

1.4 REFERENCE STANDARDS

- A. Unless shown or specified otherwise, the TAB work shall comply with the following:
 - 1. AABC National Standards or National Environmental Balancing Bureau (NEBB) Standards for Field measurements and Instrumentation.
 - 2. HVAC Systems Testing, Adjusting, and Balancing, Sheet Metal & Air Conditioning Contractor's National Association, Inc. (SMACNA), 1993.

1.5 QUALITY ASSURANCE

- A. The organization performing the TAB work shall be certified by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB).
- B. The work shall be performed by regular employees specifically trained in the total balancing of air systems. The work shall be continuously conducted under the direct supervision of a Professional Engineer registered in the State of North Carolina who is a certified Test and Balance Engineer by AABC or NEBB and is

experienced in testing and balancing of HVAC systems.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 GENERAL

- A. Adjust, test and confirm air flow rates, pressure drops, pressures, supply and return air systems, transfer air systems, exhaust air systems, including all associated fans, dampers, all terminals, and performing accessories. This shall include all new components.
 - 1. Rebalancing of existing supply diffuser and exhaust grille air flows is included within all renovation spaces.
 - 2. Measurement of return air flows is included.
 - 3. Testing and setting the speed of the new exhaust fans is included.
 - 4. Kitchen Hood test and balance is excluded.
- B. Provide preliminary and final (2 phases) testing and balancing. Initiate preliminary testing and balancing immediately after certification of fan (before controls, ceilings, walls, etc. are completed). Confirm macro level performance of devices. The preliminary phase shall be followed by a submitted written report of system shortcomings which prohibit final balancing. Following preliminary testing and balancing, if balancing or control devices are not operating correctly, report these conditions to the Owner's Representative, who shall coordinate required corrections so that balancing can continue.
- C. Perform the work using methods and test forms published by AABC National Standards for Field Measurements and Instrumentation (No. 71679, 2nd edition or any later edition) or corresponding NEBB methods and forms.
- D. Do not start final testing and balancing until each system has been certified to be complete.
- E. Using controls and devices installed, test and balance air conditioning systems with maximum attainable internal load (lights and equipment), or simulated maximum load using automatic temperature controls, whichever is closest to design operating conditions.
- F. Do the final testing and balancing of air handling systems with finished ceilings and partitions in place and doors closed.
- G. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- H. Vary total system air quantities by adjustment of fan speeds. For fans having adjustable speed drives, record adjustable speed drive settings required to achieve the proper air flow. For fans having ECM controllers, record voltage signal required to achieve proper air flow. Vary branch air quantities by damper regulation. Minimize use of balancing devices to "throttle" flow. When balanced, all volume control devices in the path to the terminal with the highest pressure drop shall be fully open.
- I. Have on the job site the AABC or the National Environmental Balancing Bureau (NEBB) standards referred to herein, and make them available to the Mechanical Contractor and the Owner's Representative.
- J. The Owner's Representative shall be given the opportunity to witness final testing and balancing of all systems. The Testing and Balancing Contractor shall notify the Owner's Representative ten (10) working days prior to each system being tested and/or balanced.

- K. Repair or replacement of finished products damaged as a result of testing, balancing and inspection work shall be the responsibility of the Contractor.

3.2 INSTRUMENT CALIBRATION

- A. Provide written certification of the accuracy of all instruments furnished or used for Testing and Balancing. Show date and method of calibration. All instruments shall have been calibrated within six (6) months prior to the estimated completion date of balancing work.

3.3 BALANCING PROCEDURES AND RELATED WORK

- A. Balancing shall achieve design air flow rate, within a tolerance of -5% to +10% on major equipment (AHU's, Fans) and +/- 10% at terminal points (air outlets, inlets, transfer air quantities, etc.).
- B. Where solid-state variable speed controls or ECM controls have been provided, adjust and mark controls for proper setting to produce the design flow.
- C. Protect read-out instruments from damage and return them in good working order to the Mechanical Contractor.
- D. Balance air system minimum and maximum damper positions for correct operation at both maximum design outside air and minimum outside air, maximum and minimum return air, etc.
- E. Balance air systems in all modes of operation, including unoccupied, occupied, warm-up, and cool-down. Report on a room-by-room basis on the total flow of each room. Confirm flow at occupied and unoccupied modes.
- F. Provide required openings for duct traverses. Seal test holes in ducts with snap-in plugs. In addition, plugs shall be airtight type and/or sealed airtight in 1% and dust collection leak class systems. Tape is not permitted. Repair insulation where damaged. Mark insulation where readings were taken.
- G. Record the test data for each motor and fan. Apply temperature, barometric and other correction factors for non-standard conditions and record in report.

3.4 TEST AND RECORDS

- A. Submit a separate test report for each air system outlining actual temperatures, pressure drops and flow rates at all terminal devices (e.g., air terminals, etc.) And compare totals to the flow measurements taken at the source (e.g., fans) and to the design parameters.
- B. In addition, record test data where applicable on the following test forms defined in Chapter 26 of the AABC National Standards or corresponding NEBB forms.
 - 1. Air Moving Equipment Test Sheet - Form No. 82030.
 - 2. Exhaust Fan Data Sheet - Form No. 82031.
 - 3. Duct Traverse Readings - Form No. 82035.
 - 4. Duct Traverse Readings - Form No. 82036.
 - 5. Air Distribution Test Sheet – Form No. 82040.
- C. In addition to data required on National Environmental Balancing Bureau (NEBB) or AABC forms, the following additional information is required for all scheduled equipment:
 - 1. Motors - Type, frame, number, serial number, and calculated brake horsepower and efficiency at final condition.

3.5 TESTING AND BALANCING REPORTS

- A. Submit preliminary and final testing and balancing reports for approval.
- B. Arrange recorded data by system, using the appropriate designations as established in the Contract Documents. Submit three signed, bound and indexed copies of both preliminary and final reports to the Owner's Representative. Also submit the reports electronically in pdf format.
- C. Where actual measurements recorded for the final balance show deviation of more than the specified tolerance from the design, and the deviation cannot be corrected by balancing with the installed layout and elements, note this deviation in the final report with recommendations for corrective action.
- D. In those cases where recorded data can be reasonably interpreted to be inaccurate, inconsistent or erroneous, the Owner's Representative may request additional testing and balancing. The Testing and Balancing Contractor shall, at no additional cost to the Owner, perform such re-testing and re-balancing as directed by and in the presence of the Owner's Representative.
- E. Where, in the opinion of the Testing and Balancing Contractor, there is excessive vibration, movement or noise from any piece of equipment, ductwork, or piping, these conditions should be noted in the final report with recommendations for corrective action.

END OF SECTION 23 05 94

PART 1 – GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections, other Division 23 specification sections, and Division 26 specifications apply to work of this section.

1.2 RATING

- A. All insulation systems, including jackets and adhesives shall be U.L. rated and FM approved. All insulation for indoor use shall have a maximum permanent flame spread rating of 25 or less and a smoke developed rating of 250 or less, except insulation installed in an air plenum shall have a maximum permanent flame spread rating of 25 or less and a smoke developed rating of 50 or less, as tested by ASTM E 84 (NFPA 255) method. Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 450. Submit smoke and flame ratings for every material proposed for use.

1.3 SCOPE

A. Furnish and install insulation for the following:

1. All supply air ductwork.
2. Underside of curb caps.
3. Repair any existing insulation damaged during construction.

1.4 QUALITY ASSURANCE

- A. Insulation shall be installed by a contractor who specialized in the mechanical insulation trade and worked on projects of similar size and complexity over the past five years.
- B. Insulation contractor shall be member of either the National Insulation Association (NIA) or the Southeastern Insulation Contractors Association (SEICA).

1.5 SUBMITTALS

- A. Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation.
- B. Submit, if requested by Designer, manufacturer's sample of each piping insulation type required, and of each duct and equipment insulation type required. Affix label to sample completely describing product.

PART 2 - PRODUCTS

2.1 DUCT INSULATION

A. Mineral Fiber Blanket Insulation:

1. Manufacturer: Subject to compliance with the requirements, provide products from one of the following manufacturers:
 - a. Knauff
 - b. Johns Manville
 - c. Owens Corning
 - d. Certainteed
2. Material: Mineral or glass fiber, duct wrap 1 lb. density with FSK facing complying with ASTM C1290. Maximum K-factor of .31 at 75°F. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic.

B. Mineral Fiber Board Insulation:

1. Manufacturer: Subject to compliance with the requirements, provide products from one of the following manufacturers:
 - a. Knauff
 - b. Johns Manville
 - c. Owens Corning
 - d. Certainteed
2. Material: Mineral or glass fibers bonded with thermosetting resing complying with ASTM C612, Type I. 3 lb. density with maximum K-factor of 0.23 at 75°F mean temperature. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All insulation shall be applied by experienced pipe coverers and journeymen in accordance with best trade practice. Work shall be as recommended by manufacturer's latest printed installation directions. Test, inspect, and clean all surfaces to be insulated before applying insulation. Take all possible precautions to protect work of other trades. Provide protective covering as required to accomplish this and be responsible for returning all equipment and material to its original new condition and appearance where damage occurs due to neglect.

3.2 DUCT INSULATION SHALL BE APPLIED AS FOLLOWS:

Area	Duct System (including plenums)	Insulation	Thickness	Jacket
Roof	Underside of Curb Caps	Mineral Fiber Board	2"	None
Concealed Interior	Single wall supply	Mineral Fiber Blanket	2"	None

3.3 SPECIFIC REQUIREMENTS

A. Mineral Fiber Blanket Insulation:

1. Mineral fiber blanket insulation shall be applied over clean, dry sheetmetal duct. Before applying the insulation all joints and seams shall be sealed air tight. Duct wrap shall be

installed to allow maximum fullness at corners. Minimum thickness at corners is one inch. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation should be removed from lap prior to stapling. All seams shall be stapled approximately 6 inches on center with outward clinching staples, then sealed with a foil vapor barrier tape, or vapor barrier mastic. Where ducts are over 24 inches in width, the duct wrap shall be additionally secured to the bottom of rectangular ducts with mechanical fasteners spaced on 18 inch centers (maximum), to prevent sagging of insulation. Seal penetrations so as to provide a vapor-tight system.

- B. Insulation shall be installed according to manufacturer recommendations. Insulation over the expansion joint and the flexible section shall be loose and of adequate length to permit the movement of pipe or duct.

3.4 DO NOT INSULATE

- A. Vibration eliminators.
- B. Equipment nameplates.

END OF SECTION 23 07 00

DUCTWORK AND DAMPERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 23 specification sections, and Division 26 specifications apply to work of this section.

1.2 QUALITY ASSURANCE:

A. Codes and Standards:

1. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" and NFPA 90B "Standard for the Installation of Warm Air Heating and Air Conditioning Systems".
2. SMACNA HVAC Duct Construction Standards – Metal and Flexible - 2005
3. SMACNA Duct Leakage Test Procedures – 1985

- B. Noise and vibration control are of high importance and should be given priority during the fabrication and installation of the ductwork.

1.3 SHOP DRAWINGS:

- A. Prior to procurement or manufacturing, submit for approval appropriate shop drawings and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, material, etc., for all items under this Division including the following:

1. Duct construction materials and joining systems
2. Duct sealants
3. Flexible ductwork
4. Turning vanes
5. Flexible duct connections
6. Backdraft dampers
7. Duct test holes
8. Volume Control Dampers
9. Access doors

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS:

- A. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel, lock forming quality; with G 90 zinc coating in accordance with ASTM A653 or ASTM A924.

- B. Stainless Steel Sheet: Where indicated, provide stainless steel complying with ASTM A 240; Type 302, 304, or 316; with No. 4 finish where exposed to view in occupied spaces, No. 1 finish elsewhere. Protect finished surfaces with mill-applied adhesive protective paper, maintained through fabrication and installation.
- C. Aluminum Sheet: Where indicated, provide aluminum sheet complying with ASTM B 209, Alloy 3003, Temper H14.

2.2 FABRICATION:

- A. Type of duct to use for various applications:
 - 1. Rectangular supply ducts exposed to view shall be double wall insulated with paint-grip finish. Liner shall be solid unless within 20' of a fan, in which case it shall be perforated.
 - 2. The duct dimensions shown indicate the inside clear dimensions for single or double wall ducts. Sheet metal sizes are to be adjusted to allow for duct liner where it is required.
 - 3. Rectangular ducts not exposed to view can be single wall, and insulated where required by specifications.
 - 4. "Exposed to view" shall mean any space outside of a mechanical room, but inside the building, that does not have a continuous ceiling.
- B. General:
 - 1. All low velocity sheetmetal ductwork shall be constructed in accordance with recommendations of Low Pressure Duct Construction Standard, of Sheet Metal and Air Conditioning Contractors National Association, Inc., Third Edition, 2005, AIA File No. 30-D-4, hereafter abbreviated SMACNA-I and latest recommendations of the ASHRAE Handbook "HVAC Systems and Equipment." Duct systems shall be complete including all duct fittings, turning vanes, hangers, and supports shown on drawings and in SMACNA-I. Reference to plate numbers and figure numbers apply to this Duct Manual.
- C. Shop fabricated ductwork in maximum 8-ft lengths, unless otherwise indicated. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.
- D. Shop fabricate ductwork of gages and reinforcement complying with SMACNA "HVAC Duct Construction Standards" (Third Edition, 2005).
- E. Cross-break all flat panels between bracing except where rigid insulation is applied.
- F. Elbows shall be standard radius or square with air foil double vanes, round duct elbows shall be of five piece construction.
- G. Transitions shall be made with maximum angle of 15 degrees with straight duct for diverging flow, 20 degrees for converging flow.
- H. Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining adhesive,

and fasten with mechanical fasteners. Note that duct sizes on the drawing are "net" and must be increased to allow for duct liner unless ductwrap type insulation is allowed in accordance with Section 23 07 00.

- I. In the rectangular duct construction, tie rods for return air, supply air, and exhaust air will not be allowed.

2.3 FLEXIBLE DUCTWORK

A. Type B - Round - Low Pressure

1. Factory insulated with vapor barrier and factory attached clamps. Do not exceed 8 foot length. Not to exceed manufacturer recommendations for minimum bend radius. Flexible duct good for 1-1/2 inch W.G. internal S.P. and shall meet the Class I requirements of NFPA 90A.
2. Flame spread rating of 25 and smoke developed rating of 50 or under.
3. Each end shall be banded (draw type) for connection to duct fitting and mixing boxes.
4. Insulating value shall be R6.0.
5. Make: Flexmaster USA Type 5B, Owens-Corning, Jenflex, Wiremold, or approved equal.

2.4 TURNING VANES:

- A. Vanes shall be manufactured from minimum 26-gauge electro-galvanized steel and sides shall be manufactured from minimum 24-gauge electro-galvanized steel with assembly slots located on design centers of 2.4 inches. Turning vanes shall be high-efficiency profile type (H.E.P.) as manufactured by AERO DYNE Sound Control Co., or approved equal by Duro Dyne, or Ductmate Industries, Inc. Submit shop drawing for approval.

2.5 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Connector: Fabric crimped into metal edging strip.
 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric
 2. to NFPA 90A, minimum density 30 oz per sq yd.
 3. Net Fabric Width: Approximately 6 inches wide.
 4. Metal: 3 inch wide, 24 gage galvanized steel.

2.6 BACKDRAFT DAMPERS

- A. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 16 gage thick galvanized steel or extruded aluminum, with center pivoted blades of maximum 6-inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.7 DUCT TEST PORTS

- A. Permanent Test Ports: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

PART 3 - EXECUTION

3.1 INSTALLATION OF METAL DUCTWORK:

A. General:

“Exposed” shall mean any duct outside of a mechanical room that is not above a continuous ceiling.

1. Assemble and install ductwork to achieve airtight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Rigid metal ducts shall be installed with support systems in accordance with SMACNA HVAC duct construction standards. Horizontal ducts shall have a support within two feet of each elbow and within four feet of each branch intersection. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.
2. Tape all return and supply duct joints with UL listed tape. Make shall be HARDCAST Foil-Grip 1403-181BFX, Shurtape Mastic SF-685, or Avery Dennison, except where Ductmate System is used.

B. Duct Joints

1. Transverse duct joints in rectangular ducts subject to less than 2" pressure shall be made as recommended in SMACNA-I.
2. Transverse duct joints in rectangular ducts subject to 2" or higher pressure shall be made with the Ductmate System or an approved equal. The Ductmate System components shall be of standard catalog manufacture as supplied by Ductmate Industries, Inc., of Pittsburgh, PA or Stockton, CA., Automated Ductwork Mfg. Co., McGill Airflow Corp.
3. The installation of the Ductmate System shall be in accordance with the manufacturer's printed instruction and installation manual. Ductmate joints are equivalent of SMACNA Angle Reinforced Standing Seam (T-16).
4. The Ductmate angle shall be securely fastened to the duct walls using spotwelding, self-drilling screws or rivets. Fasteners spacing shall be as recommended in the manufacturer's installation manual for the applicable pressure class.
5. A continuous strip of closed cell gasket tape, size 1/4 inch x 3/4 inch shall be installed between the mating flanges of the companion angles at each transverse joint and joint shall be made up using 3/8-inch diameter x 1 inch long plated bolts and nuts. Drive-on or snap-on cleats shall be used at spacing as recommended in the manufacturer's installation manual.

C. Round Duct

1. Ductwork shall be installed according to manufacturer's recommendations.

D. Flexible Duct

1. Install flexible ducts in accordance with Section III of SMACNA's HVAC Duct Construction Standards."
2. Flexible ducts shall be one size larger than the neck of the diffuser (U.O.N) and shall not exceed 8 feet in length. They shall only be used at supply diffusers, not return or exhaust grilles.

E. Volume Control Dampers: Provide where specified above, where indicated on drawing and in all branches or at all supply, return air, exhaust or transfer openings required to balance system whether or not specifically shown on drawings.

1. Dampers shall be locking quadrant type, manual balancing clamps.
2. Blades: 22 gauge minimum galvanized sheet steel for rectangular 20 gauge for round.
3. Frames: 22 gauge minimum galvanized sheet steel for rectangular, 20 gauge for round
4. Bearings, synthetic.
5. Control shaft/hand quadrant. 3/8" square axle shaft, extending beyond frame with factory supplied locking hand quadrant for field mounting.
6. Provide 2" hand quadrant standoff bracket for dampers installed on duct wrapped with external insulation.
7. Accessibility: All dampers shall be adjustable after building is completed. Where dampers are hidden behind furred spaces, damper rods shall be adjustable from flush mounted boxes similar to the Young concealed damper regulator.
8. Make: Ruskin MD25 for rectangular and MDRS25 for round, or equivalent by Arrow United Industries, NCA, Pottorff, or Vent Products Co., Inc. Shop built dampers will also be acceptable if constructed per SMACNA with quality of materials and features indicated above.

F. Access Doors: Required as shown on plans and to provide access for all fire dampers, smoke detectors, coils, damper motors, dampers, bearings, etc. Sizes shall be approximately 24 inches' square wherever possible except in apparatus casing. Construction shall be double wall "sandwich style", insulated where adjoining duct or casing is insulated, in accordance with SMACNA-I construction details. Pressure rating shall be in accordance with the duct where it is installed. Provide 24 x 24 inch where possible, or largest possible size where 24 x 24 inch will not fit. Provide zero leakage access doors on supply ductwork construction of 2" pressure or higher. Zero leakage doors shall be Ductmate style "The Sandwich Door D or DR", or approved equal by C.L. Ward, C&S Air Products, or Pottorff.

G. Flexible Duct Connections: Install at all fans, ventilating units and ducts crossing building expansion joints and where condensation may occur.

H. Trim Collars: Wherever duct passes exposed to view through walls, the opening shall be framed with 1 inch x 1 inch x 1/8 inch angles on both sides of partitions with corners mitered, welded and ground smooth.

I. Turning Vanes: Shall be installed in all square elbows.

3.2 ADJUSTING AND CLEANING:

- A. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.
- B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed. Similarly, provide temporary closure of ends of all prefabricated ductwork in storage.

END OF SECTION 23 31 00

HVAC POWER & GRAVITY VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:

A. Related Documents

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections, other Division 23 specification sections, and Division 26 specifications apply to work of this section.

1.2 QUALITY ASSURANCE:

- A. AMCA Compliance: Provide power ventilators which have been tested and rated in accordance with AMCA standards, and bear AMCA Certified Ratings Seal.
- B. U.L. or CSA Approval: All power ventilators shall be U.L. Listed or C.S.A. approved.

1.3 SUBMITTALS:

- A. Manufacturer's Data: Submit manufacturer's technical data for power and gravity ventilators, including specifications, capacity ratings, fan curves, sound data, dimensions, weights, materials, accessories furnished, and installation instructions.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Furnish and install all fans in accordance with capacities indicated below complete with motors and drive assemblies, motor control equipment, disconnect switches, dampers and all accessories noted.
- B. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

2.2 POWER VENTILATORS:

- A. Centrifugal Direct Drive Rooftop Downblast Exhaust Fans: Provide centrifugal rooftop type power ventilators of type, size, and capacity as scheduled, and as specified herein.
 1. Type: Centrifugal fan, direct driven, downblast type as scheduled.
 2. Housing: Provide heavy gauge aluminum weatherproof housing. Discharge air shall be directed toward the mounting surface. Curb cap shall have pre-punched mounting holes to ensure correct attachment and rigid internal support structure.
 3. Housing Supports and Drive Frame: Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators.
 4. Motor: Motor enclosure to be ODP. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not

acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors. Motors shall be permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by a potentiometer dial mounted at the motor. Motor shall be a minimum of 85% efficient at all speeds.

5. Electrical: Provide factory wired non fusible type disconnect switch at motor in fan housing. Provide thermal overload protection in fan motor. Provide conduit chase within unit for electrical connection.
6. Wheel: Provide aluminum, non-overloading, backward inclined centrifugal wheel, statically and dynamically balanced in accordance to AMCA Standard 204-05.
7. Bird Screens: Provide removable bird screens, 1/2" mesh, 16 ga aluminum or brass wire.
8. Dampers: Provide gravity actuated louvered damper in roof curb where called for in the equipment schedule.
9. Provide curb adaptors where required for mounting fans on existing curbs. Adaptors shall be constructed of 18 gauge galvanized sheet metal.
10. Manufacturer: Greenheck G-097-VG, Loren Cook, Penn Barry, Carnes, Twin City Fan or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF VENTILATORS:

- A. Coordinate ventilator work with work of roofing, walls, and ceilings, as necessary for proper interfacing.
- B. Install in accordance with manufacturer's instructions.

3.2 FIELD QUALITY CONTROL:

- A. Testing: After installation of ventilators has been completed, test each ventilator to demonstrate proper operation of units at performance requirements specified.

END OF SECTION 23 34 23

AIR OUTLETS AND INLETS

PART 1 - GENERAL**1.1 RELATED DOCUMENTS AND RELATED WORK SPECIFIED ELSEWHERE:****A. Related Documents**

1. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-01 Specification sections, and other Division 23 specification sections apply to the work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

B. Types of air outlets and inlets required for project include the following:

1. Grilles & Registers – Louvered
2. Square Ceiling Diffusers

C. Codes and Standards:

- D. ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 "Standard for Air Outlets and Inlets".

- E. ASHRAE Compliance: Test and rate air outlets and inlets in accordance with ASHRAE 70 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets".

- F. The grilles shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

- G. NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data for air outlets and inlets including the following:

- B. Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size, and accessories furnished.

- C. Data sheet for each type of air outlet and inlet, and accessory furnished; indicating construction, finish, and mounting details.

- D. Performance data for each type of air outlet and inlet furnished, including aspiration ability, temperature and velocity traverses, throw and drop, noise criteria ratings, and minimum one-year warranty. Indicate selections on data.

- E. Shop Drawings: Submit manufacturer's assembly-type shop drawing for each type of air outlet and inlet, indicating materials and methods of assembly of components.
- F. Maintenance Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Deliver air outlets and inlets wrapped in factory-fabricated fiberboard type containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.

PART 2 – PRODUCTS

2.1 GRILLES & REGISTERS - LOUVERED

- A. General: Aluminum and steel supply and transfer grilles and registers shall be for the sizes and mounting types as shown on the plans and outlet schedule. The deflection blades shall be available parallel to the long or short dimension of the grille or register. Outer borders shall be assembled and interlocked at the four corners and mechanically staked to form a rigid frame. Screw holes shall be countersunk for a neat appearance. Grilles adjacent to fire dampers in walls or ceiling radiation dampers in ceilings shall be steel.
- B. Blades shall be constructed of heavy-duty metal and shall be designed to meet published performance data. Hollow blades are not acceptable. Blades must be solid.
 - 1. Price 520(steel) double deflection supplies or approved equal: Blades shall be individually adjustable roll-formed with 3/4” spacing. Borders shall be all-welded construction with reinforced precision mitered corners.
- C. Finish: The grille finish shall be B12 White Powder Coat except where noted otherwise on the drawings. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM D117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film.
- D. The manufacturer shall provide published performance data for the grille.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering Grilles and Registers which may be incorporated in the work include, but are not limited to, the following:
 - 1. Price Industries, Inc.
 - 2. Titus Products Inc.
 - 3. Carnes Company
 - 4. Metalaire
 - 5. Nailor Industries, Inc.
 - 6. Krueger
 - 7. Tuttle & Bailey

2.2 SQUARE CEILING DIFFUSERS

- A. General: Provide square ceiling diffusers, with fixed air pattern, 2 cones, aluminum or steel construction in sizes and mounting types designated by the plans and air distribution schedule.
- B. Diffusers shall consist of a precision formed back cone of one-piece seamless construction that incorporates a round inlet collar of sufficient length for connecting rigid or flexible duct. An inner cone assembly shall consist of 2 cones which drop below the ceiling plane to assure optimal VAV air diffusion performance. The inner cone assembly shall be completely removable from the diffuser face to allow for full access to any dampers or other ductwork components located near the diffuser neck.
- C. Finish shall be B12 white powder coat except where noted otherwise on the drawings. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.
- D. Condensation Prevention: All supply diffuser backpans shall be factory insulated with molded heavy-duty foil/scrim vapor barrier with an R-value of six, which meets the requirements of NFPA 90A and UL181. All seams and joints shall be sealed with coated cloth tape.
- E. The manufacturer shall provide published performance data for the diffuser.
- F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering Square Ceiling Diffusers which may be incorporated in the work include; but are not limited to, the following:
 - 1. Price Industries, Inc.
 - 2. Titus Products Inc.
 - 3. Carnes Company
 - 4. Metalaire
 - 5. Nailor Industries, Inc.
 - 6. Krueger
 - 7. Tuttle & Bailey

2.3 PERFORATED RETURN/RELIEF/TRANSFER GRILLES

- A. General: Provide square ceiling return type grilles of extruded aluminum construction in sizes and mounting types designated by the plans and air distribution schedule.
- B. Grilles shall consist of an extruded aluminum border and mounting frame which shall provide a flush mount in ceiling grids. Frame shall be suitable for attachment to duct work. Faceplate shall be removable perforated type with quick-release spring latches.
- C. Finish shall be B12 white powder coat except where noted otherwise on the drawings. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.
- D. The manufacturer shall provide published performance data for the grille.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering Perforated Ceiling Returns which may be incorporated in the work include; but are not limited to, the following:

8. Price Industries, Inc.
9. Titus Products Inc.
10. Carnes Company
11. Metalaire
12. Nailor Industries, Inc.
13. Krueger
14. Tuttle & Bailey

2.3 OPPOSED BLADE DAMPERS

A. Provide manufacturer's standard opposed blade dampers on backs of air outlets and inlets only where called for on the Air Distribution Schedule. Dampers in the ducts upstream of air outlets and inlets are preferred for less sound generation.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that products serve intended functions.
- B. Contractor shall provide transitions from air outlets and inlets to ductwork as needed.

END OF SECTION 23 37 15

DIVISION 26

ELECTRICAL

GENERAL PROVISIONS**PART 1 - GENERAL****1.1 RELATED SECTIONS**

- A. The provisions of The Supplement to Advertisement, The Instructions to Bidders, Supplement to Instruction to Bidders, General Conditions, Supplementary Conditions and all other sections of Division 1 of these Specifications shall govern the work under this Division or Section the same as if incorporated herein.

1.2 SCOPE

- A. The Contractor shall provide and install complete electrical systems including all conductors, raceways, fittings, protective devices, wiring devices, fixtures, supports, and all miscellaneous hardware necessary. All of the above equipment shall be completely installed and left in proper operating condition. All electrically powered equipment whether furnished by others or by the Contractor shall be wired by the Contractor.
- B. Complete Power distribution and utilization system shall be installed, including panelboards, utilization devices and equipment as indicated on drawings.
- C. The Contractor shall install power, wiring and/or disconnects as shown on drawings for wiring systems for mechanical systems specified in Division 23. Temperature control wiring, equipment control and interlock wiring are not included in this division unless specifically noted in these specifications or shown on the plans. Coordinate all disconnects with mechanical drawings.

1.3 REQUIREMENTS

- A. Field verification of scale on electrical plans is directed since actual locations, distances and levels will be governed by actual field conditions.
- B. In case of conflicts or discrepancies between plans, plans and specifications and/or actual field conditions, Contractor shall notify the Engineer before work is continued. Coordinate with other trades to avoid conflicts.
- C. Permits, Inspections and Tests - The Contractor shall procure and pay for all permits, fees, inspections, and licenses required. Perform all tests to ensure all systems are in good operating condition.
- D. Review of Material; Specific reference in the specification to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, with or without the words "or equal", shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.
- E. Bidders shall base bids on the material specified or on equals receiving approval 10 days prior to Bid Opening. Any increase in the cost of work resulting from substitution of any product specified is part of this contract and shall be accomplished in an approved manner at no extra cost to the Owner.

- F. Substitutions. No substitution will be considered unless written request for approval has been received by the Engineer at least 10 days prior to the date of receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute would require shall be included; failure to do so does not alleviate the Contractor of his responsibility to make any and all necessary changes required for installation of the approved substitution. The burden of proof of the merit of the proposed substitute is upon the proposer. The Engineer's decision of approval or disapproval of a proposed substitution shall be final.
- G. All materials shall be new and of current manufacturer. Where more than one of a type of device is used, all shall be by the same manufacturer. All materials shall conform to the grade, quality and standards of those specified.
- H. Shop drawings shall be submitted in accordance with the General Conditions. Forward all shop drawings at one time. Each item shall bear project name and identifying symbol from plans. Shop Drawings required are as follows:
 - 1. Lighting Fixtures
 - 2. Wiring Devices
 - 3. Panelboards
 - 4. Disconnect Switches
 - 5. Motor Starters
 - 6. Transformers
 - 7. Fire Alarm System Equipment
 - 8. Seismic Supports
- I. Interferences - The drawings are generally diagrammatic in nature, and accordingly the Contractor shall coordinate his work with that of all other trades to avoid interferences. The Contractor shall examine the complete set of drawings and specifications for the job before installation of electrical work, coordinating locations and routings with other trades to avoid interferences. Work installed by the Contractor which does interfere with another trade shall be removed and reinstalled at the Contractor's expense when directed by the Architect.
- J. Workmanship shall be of the highest quality and all work shall be done by workmen skilled in the trades involved.
- K. The Contractor shall guarantee all work under this contract for one year and shall be responsible for the maintenance of all electrical equipment furnished and installed under this contract, excluding lamp replacement, for a period of one year from the date of substantial completion.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 APPLICABLE CODES AND STANDARDS

Note: The materials and installation shall conform to the minimum requirements and latest outstanding issues and revisions of the following codes, standards, and regulations wherein they apply:

NFPA No. 70, National Electrical Code

IBC, IECC, IECC, IFC

American National Standard, National Electrical Safety Code, (2021).

Applicable Publications of NEMA, ANSI, IEEE and IPCEA.

Underwriter's Laboratories, Inc. Standards

City, State and Local Codes and Regulations having jurisdiction.

OSHA requirements.

ADA requirements.

END OF SECTION 26 05 00

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Materials specified in this section shall comply with all applicable requirements of SECTION 26 05 00, GENERAL PROVISIONS.

1.2 SCOPE

- A. Contractor Furnished. Unless otherwise noted on the drawings, equipment list, or specifications, the Contractor shall furnish and install all materials, devices, and apparatus necessary for the complete electrical system. All materials and equipment shall be of types and manufacturer specified wherever practical. Should materials or equipment so specified be unobtainable, the Contractor shall submit the description and manufacturer's literature, reason for the substitution request and shall secure the approval of the Engineers before substitution of other material or equipment. This specification establishes performance requirements and the quality of equipment acceptable for use and shall in no way be construed to limit procurement from other manufacturers.
- B. Equal or Equivalent. The term "or equal" and similar terms as used on the drawings or specifications shall be interpreted to mean "equal or equivalent" in the opinion of the Engineers.
- C. Manufacturer's Prints. Where the Contractor furnishes equipment other than standard construction items, he shall furnish manufacturer's prints and reproducibles of all such equipment to the Engineers.
- D. U.L. Listing. All equipment and materials shall be new and conform to the requirements of this specification. All equipment and materials shall be listed by the Underwriter's Laboratories, Inc., and shall bear their label whenever standards have been established and label service is regularly furnished. All equipment and materials shall be of the best grade of their respective kind for the purpose.

PART 2 - PRODUCTS AND EXECUTION

2.1 TRANSFORMERS FOR GENERAL LIGHTING AND POWER

- A. Contractor Furnished. The contractor shall furnish and install all general-purpose transformers for supplying miscellaneous lighting, appliances, receptacles, and general power and control circuitry. The transformers shall have rated capacity and voltage and shall be the type as specified or shown on the drawings.
- B. Unless otherwise indicated, transformers located indoors shall be the dry, self-cooled type rated for 150° rise above 40° ambient temperature. The transformer core shall be visibly grounded to the enclosure by means of a flexible copper grounding conductor sized in accordance with applicable standards. Acceptable manufacturers are Square D, General Electric, Cutler-Hammer and Siemens.

- C. All transformers shall have sound levels which do not exceed the NEMA standard sound levels. The transformers shall be installed with sound absorbing isolation pads or devices to further reduce noise levels. Transformers shall not be mounted directly against walls.
- D. Suitable mounting supports, brackets, and other hardware shall be furnished and installed by the contractor to provide a quality installation.

2.2 PANELBOARDS

- A. Contractor Furnished. The contractor shall furnish all lighting, service, and power distribution panelboards required. All panelboards shall be of deadfront construction and shall incorporate all switching and protective devices of the type, quantity, number of poles, rating and type specified or shown on the drawings. The drawings and schedules indicate the ampere rating of mains, main breaker or disconnect, main lugs, voltage rating, phases, neutral and type of devices and enclosures. Enclosures for panelboards may be flush or surface type as designated on the drawings.
- B. Boxes. Boxes shall be constructed of code gauge galvanized sheet steel and provided with not less than 7" wiring gutters at the sides and 5" at top and bottom. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment (loop feeds), the box shall be sized to include this wiring space. This wiring space shall be in addition to the minimum gutter space specified above and the limiting width may be increased accordingly. Knockout type boxes may be used on flush mounted installations where conduits are routed concealed. Surface mounted boxes shall be furnished without factory stamped knockouts and the contractor shall punch the box for the conduit group desired. Conduit hubs shall be T&B Series 370 "Bullet" hubs or approved equal.
- C. Doors. Hinged doors covering all switching device handles shall be included in all panel trims, except that panelboards having individual metal clad externally operable deadfront units may be supplied without such doors. Doors shall have flush or semi-flush type, corrosive resistant, cylinder lock and catch, except that doors over 48" in height shall have a vault handle and 3-point latch, complete with lock, arranged to fasten door at top, bottom and center. Door hinges shall be concealed. Two keys shall be supplied for each lock. All locks shall be keyed alike for all panelboards supplied. Trims shall be fabricated of code gauge sheet steel. Trims for flush panels shall overlap the box by at least 3/4" all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screw-driver without the need for special tools. Trims shall be properly cleaned and finished with a gray paint over a rust inhibiting primer coating. The finish coat shall be the type that will permit adherence of field applied paint.
- D. Directory. A directory holder with glass or heavy plastic plate and metal frame shall be mounted inside of each door with a neatly typed directory properly identifying each circuit as shown on panel schedule drawings.
- E. Nameplate. The contractor shall furnish and install an engraved, laminated plastic nameplate on the trim. The nameplate shall identify the panel by power source designation, panel designation, voltage rating and phase. Nameplate shall be black engraved letters on white background.
- F. Bus Bars. Bus bars and other conductive parts shall be copper and sized in accordance with Underwriter's Laboratories standards, full size insulated neutral bars shall be included. Bussing shall be braced equal to or greater than the highest rated practice governing short circuit stresses in panelboards. Phase bussing shall be full height without reduction. Cross connectors shall be copper.
- G. Neutral Bus. Neutral bussing on 3-phase panels shall have a suitable lug for each outgoing feeder requiring a neutral connection.

- H. Ground Bus. All panels shall be furnished with a bare equipment ground bus. The ground bus shall be of copper and 1/4" x 2" minimum size, properly bonded to the housing. Suitable lugs shall be provided for termination of each equipment ground conductor.
- I. Phase Sequence. Bus bar connections to the branch circuit shall be the "distributed phase" or "phase sequence" type. Single-phase, three-wire panelboard bussing shall be such that any two adjacent single-pole units are connected to the opposite polarities in such a manner that two-pole units can be installed at any location. Three-phase, four wire bussing shall be such that any three adjacent single-pole units are individually connected to each of the three different phases in such a manner that two or three-pole units can be installed in any location.
- J. Circuit Numbering. Panelboard circuit numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left-hand side and even numbers shall be used in sequence down the right-hand side.
- K. Terminals. Terminals for feeder conductors to the panelboard mains and neutral shall be U.L. listed as suitable for type of conductor specified and shall be T&B 54000 Series where possible. Terminals for branch circuit wiring, both breaker and neutral, shall be U.L. listed as suitable for the type of conductor specified.
- L. 277/480V Panels. All lighting/service panels rated 277/480 volt, shall be equal to Square D Company, Type NF equipped with bolt-on branch breakers the type and rating specified on the drawings.
- M. 120/208V Panels. All lighting/service panels rated 120/208 volt, shall be equal to Square D Company, Type NQOD equipped with bolt-on branch breakers of the type and rating specified on the drawings.
- N. Circuit Breaker Type Distribution Panels. Circuit breaker type distribution panels for the various voltages shall be similar to Square D I-Line type, equipped with I-Line breakers of the type and rating specified in paragraph titled Circuit Breakers, and on the drawings. Panels shall be approved for use as service entrance equipment.
- O. Panels and Panelboards are designed around Square D equipment. Acceptable alternate manufacturers are Cutler-Hammer, Siemens, and General Electric Company. All alternate or substitution requests shall meet all performance requirements of specified equipment, as well as space and dimension requirements noted on drawings.

2.3 CIRCUIT BREAKERS

- A. Contractor Furnished. The contractor will provide breakers unless specifically designated to be "Owner Furnished" on the drawings, equipment list, or within the specifications.
- B. As Specified. Breakers shall be of the type, rating, number of poles, size, and interrupting capacity, specified or required for the environment, location, application, and load served.
- C. Molded Case Circuit Breakers. Molded case circuit breakers shall be circuit interrupting devices which will operate both manually for normal switching functions and automatically under overload and short circuit conditions. Circuit breakers shall provide circuit protection when applied within rating.
- D. Operating and Switching Mechanism. The operating mechanism shall be entirely trip-free so that the contacts cannot be held closed against an abnormal over-current or short circuit condition. The switching mechanism shall be quick-make, quick-break type.
- E. Overload and Short Circuit Protection. The operating handle of the circuit breaker shall open and close all poles of a multi-pole breaker simultaneously. The breakers shall meet applicable NEMA and U.L.

specifications. Each circuit breaker shall have a trip unit to provide overload and short circuit protection. The trip unit for each pole shall have elements providing inverse time delay under overload conditions and instantaneous magnetic tripping for short circuit protection. The trip element shall operate a common trip bar which shall operate all poles in case of an overload or short circuit through any one pole. Automatic tripping shall be clearly indicated by handle position.

- F. Rating. The molded case circuit breakers shall be rated for fault duty as specified on the plans. Series ratings are not allowed. The Contractor shall verify available fault current with the Utility Company for the actual installation and forward to the Engineer.

2.4 SAFETY SWITCHES

- A. Contractor Furnished. The contractor shall provide all safety disconnect switches required. The switches shall be of the type, voltage, ampere, and horsepower rating, number of poles, fusible or nonfusible, as specified or required for the environment, location, application, and load served.
- B. Description. All safety switches shall be NEMA premium heavy duty, horsepower rated, industrial type, and shall be Underwriters' Laboratories listed. Fusible switches shall be complete with fuses of the type and rating specified (refer to paragraph "Fuses") and as indicated on the drawings or within these specifications. All switches shall have switch blades that are fully visible in the OFF position when the door is open and shall be of dead front construction with arc suppressors. The mechanism shall be quick-make, quick-break type. The door shall be interlocked (defeatable type) with the handle or mechanism to prevent unauthorized opening of the door in ON position. Pad-locking provisions shall be provided for padlocking in the OFF position with one or more locks or lockable hasps. Grounded switches in a common enclosure shall be mounted in enclosure types specified elsewhere. Individually mounted switches shall be mounted in enclosures suitable for the location and environment as specified on the drawings.
- C. Nameplate. All switches shall be provided with an engraved laminated phenolic nameplate showing the power source (Unit No. or other), and title of equipment served. Nameplates to be black letters on white background.
- D. Manufacturer and Enclosures. All switches furnished shall have enclosures as specified on the drawings. Acceptable manufacturers shall be Square D, Eaton, and Siemens.

2.5 FUSES

- A. Contractor Furnished. The contractor shall furnish and install fuses in all fusible devices and equipment that are furnished by the contractor.
- B. Manufacturer and Listing. Fuses shall be as manufactured by Bussman Manufacturing Division, however, equivalent products by Chase Shawmut Division shall be acceptable.

2.6 MISCELLANEOUS CONTROL DEVICES

- A. Furnished by Others. Miscellaneous control devices such as duct switches, air flow switches, thermostats and temperature control devices, and similar equipment shall normally be furnished under another division. Any such device that is to be furnished under this division shall be specifically designated on the drawings.

- B. Enclosures. All devices furnished shall be suitable for the control requirements and shall have voltage rating and adequate capacity for the application. They shall be housed in enclosures suitable for the location and environment as indicated on the drawings.

2.7 RECEPTACLES – OUTLETS

- A. Contractor Furnished. The contractor shall furnish and install all convenience (and power type) receptacles and outlets shown on the drawings. Suitable boxes, covers and matching plugs as specified shall be provided and the installation shall conform to typical details, drawings, and as described elsewhere in this specification. See electrical symbol drawings for additional descriptive data. Contractor shall match existing receptacle color and stainless steel covers.
- B. Single Manufacturer. Receptacles of similar usage and rating shall be those of a single manufacturer.
- C. Usage and Manufacturer. General use and convenience outlets shall be as specified by symbol on the drawings and as listed on the symbols drawing.
- D. Ground Fault Protection. Note that all convenience receptacles to be installed as ground fault interrupting type are so noted on drawings.

2.8 BOXES

- A. Contractor Furnished. The contractor shall furnish and install all electrical boxes required for the proper installation of the electrical systems. Boxes shall be of the NEMA type suitable for the location. Boxes shall be installed as specified on the drawings and as described under "Wiring Methods", and other applicable sections of this specification for wiring devices such as switches, receptacles, and similar devices. In order to maintain fire ratings, boxes installed "back-to-back" in fire walls shall not be located in the same space between studs, but shall have a stud located between them.
- B. Concealed. Fixture, outlet, and switch boxes installed concealed in walls or ceiling areas shall be galvanized or cadmium plated sheet steel of not less than the minimum size as recommended in the National Electrical Code and shall be furnished with appropriate covers as specified in other applicable sections of these specifications or on the drawings. All boxes shall be accessible for maintenance purposes.
- C. Exact locations of all floor boxes shall be coordinated in the field with the architect unless specific dimensions are shown on the drawings. Also, see Section 16500 of these specifications.
- D. Surface Mounted. Fixture, outlet, and switch boxes installed surface mounted in plant, shop, operating, and unfinished areas shall be threaded, cast alloy iron or malleable iron. Iron type shall have a cadmium/zinc electroplate, or galvanized finish with appropriate lacquer. Boxes shall be of the approved type for the outlets, switches, and fixtures served and shall be made of the material and finish compatible with the conduit system and location. Surface mounted boxes shall be only as noted on the plans.
- E. Splice and Tap Boxes. Splice and tap boxes for power circuits shall be used only where designated on the drawings and shall be of the type and size indicated. Otherwise all power wiring shall be continuous, splice and tap free, between equipment. On lighting and convenience receptacle circuitry, wiring may be spliced and boxes shall be provided for concealed or surface mounting as previously specified or may be JIC oil-tight of size and type indicated on the drawings or minimum size as specified in the National Electrical Code.
- F. Pull Boxes. Pull boxes for interior, or outdoor exposed power wiring shall be provided where shown or required to facilitate the installation of the wiring. Pull boxes shall not be located in finished rooms and

shall be accessible for maintenance use. For conduit sizes 3/4 and 1 inch, conduit fittings of the "C", "LB", "TB" and similar types may be used for "Pulling In." Unless designated otherwise, all pull boxes shall be the straight-through type and changes in direction shall not be made in the box. The boxes shall be of the minimum size and type as required by the National Electric Code or as sized on the drawings.

- G. Exterior and Underground. For exterior exposed work, pull boxes shall be of NEMA 3R construction and shall be threaded hub type with gasketed cover.

2.9 COVERS AND DEVICE PLATES

- A. Contractor Furnished. The contractor shall furnish and install the appropriate cover on all boxes, conduit fittings, panels, cabinets, switches, receptacles, and similar wiring devices and other equipment that is Contractor furnished. Conduit outlet fitting covers shall be the type specified under "Conduit Fittings."

2.10 ENCLOSURES

- A. Enclosures and housings for all Contractor furnished electrical equipment and devices shall be suitable for the location and environmental conditions and shall be of NEMA type as shown on symbol sheet drawing.

END OF SECTION 26 05 01

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Materials specified in this Section shall comply with all applicable requirements of SECTION 26 05 00, GENERAL PROVISIONS.

1.2 SCOPE

- A. This specification covers the requirements for all wire and cable to be used in the installation of the electrical systems for the project, including all power, lighting, control and instrumentation systems.
- B. Wire and cable will normally be furnished by the Contractor for installation. Drawings will indicate where cable is not to be furnished.
- C. All cable is to be "Contractor-furnished", the Contractor shall submit for approval by the Owner any deviations anticipated or proposed with respect to the cable manufacturer, cable type, or specification contained herein.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All wire and cable shall be Underwriters' Laboratories (UL) listed. In addition to other standard labeling, all wire and cable shall be marked UL on the outer surface indicating Underwriters' Laboratories, Inc. certification.
- B. Grounding conductors, where insulated, shall be colored solid green. Conductors intended as a neutral shall be colored solid white.
- C. For all circuits 600 volt and less, wires and cables shall have code grade, 600-volt type THWN-THHN, 75 degrees C., wet or dry locations, moisture and heat resistant thermoplastic insulation. Insulation thickness shall be per National Electrical Code, Table 310-13.
- D. Conductor sizes are expressed in American Wire Gage (AWG) or in circular mils. Conductors shall be annealed copper wire, minimum size #12 AWG, except that #14 AWG may be used for control. All conductors shall be stranded except that solid conductors may be used for #12 AWG lighting and receptacle branch circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Separation of Usage. Lighting and power wiring shall be routed in conduits, or other raceways as shown on the drawings. Lighting and power wiring shall not be routed in a common raceway except where shown on drawings. Push-button wiring shall be routed in separate raceways even though related to a particular motor circuit.
- B. Pulling. Where mechanical assistance is used for pulling conductors, patented wire pulling compounds having inert qualities that do not harm the wire insulation or covering shall be applied to the conductors as they are pulled into raceways. Interior of all raceways shall be free from grease, filings or foreign matter before conductors are pulled in.

3.2 IDENTIFICATION

- A. Wire, Cable, Raceways, and Conduits.
- B. Circuit identification numbers shall be placed on each end of the conductor involved by using self-laminating marker tags, T&B Company E-Z Code Type WSL or equal. Circuit numbers shall be as shown on the plan and panel schedule drawings.
- C. Phase Identification. Phase sequence throughout the installation shall be standardized wherever practical in all electrical power equipment as follows:

	<u>Phase A</u>	<u>Phase B</u>	<u>Phase C</u>
Position Occupied	Front	Center	Rear
	Top	Center	Bottom
	Left	Center	Right
Color Code: 208/120V, 3-phase	Black	Red	Blue
480/277V, 3-phase	Brown	Orange	Yellow

3.3 SPLICES AND TERMINATIONS

- A. Lighting Conductors. Splices in lighting conductors shall be made with splicing caps with metal inserts only, such as 3M Company's "Scotchlock" spring connectors. The splices shall be firmly and neatly taped to prevent entry of moisture.
- B. Power Conductors shall be continuous from outlet to outlet. No power cable shall be spliced except on explicit instructions of the Owner's Representative.

3.4 LUGS

- A. All lugs shall be furnished and installed by the Contractor where required.
- B. Lugs for copper power wiring, Sizes No. 12 and No. 10 AWG, shall be T&B "Sta-Kon" uninsulated ring type lugs. Lugs for copper power wiring from No. 10 AWG to size 1/0 AWG shall be T&B 1-hole Type 54100 Series. Size 2/0 AWG and larger lugs shall be 2-hole type 54200 series (except where 1-hole is required to match motor lead lugs). Sizes above 1/0 are to be applied using hydraulic pump tool.
- C. Where motor leads are furnished without lugs, T&B 54500 Series 2-way connectors (splicing sleeves) shall be used. Splice sleeves may be desirable where limited space for termination exists.

- D. The proper lugs will normally be furnished with equipment in all Owner-furnished equipment. All other lugs shall be furnished and installed by the Contractor. No mechanical type lugs shall be used except in panelboards. If any mechanical type lugs are furnished with Owner-furnished equipment, the Contractor shall replace them with proper compression type lugs where practical.

3.5 TAPING

- A. All voids, sharp corners and bolt projections shall be made smooth by filling with Okonite or Scotch Fill before applying the laps of tape required for insulation. All loose strands of wire shall be removed before taping. Duxseal will not be permitted.
- B. Joints and other sections of wiring requiring tape shall be half lap and at least two layers. Taping shall be neatly done and shall form a permanent insulation equal in mechanical and electrical strength to the insulation of the conductor. Taping shall be as follows:
 - 1. 600 Volt insulation - A minimum of 1-1/2 lap layer varnished cambric and 2-1/2 lap layers of 3M No. 33 vinyl plastic electrical tape.
- C. All taping, splicing and termination materials shall be furnished by the Contractor.

END OF SECTION 26 05 19

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Materials specified in this Section shall comply with all applicable requirements of SECTION 26 05 00, GENERAL PROVISIONS.

1.2 WORK INCLUDES

- A. As Required By the NEC. In general, fixtures, outlets, the enclosing cases, mounting frames, etc., of all switches, circuit breakers, control panels, motors and any other electrically operated or electrical equipment, conduit, trays, and other raceways shall be effectively and permanently grounded with a separate copper grounding conductor of cross-section as required by the National Electrical Code and drawings. It shall be of capacity sufficient to ensure continuity and continued effectiveness of the ground connections to carry fault currents. Ground conductors must be as short and straight as possible, protected from mechanical injury and if practicable without splice or joint. The grounding conductor shall be run from a ground established at the source of supply to the equipment to be grounded. Ground wires from below grade shall be protected by galvanized conduit and the conductor shall be brazed to conduit sleeve on each end. All grounding conductors shall be copper.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Power Conductors Supplying Equipment. A copper grounding conductor must be run inside the conduit or raceway, enclosing the power conductors supplying the equipment, or in case of a multi-conductor power cable must be located within the sheath.
- B. Connect at Source. Ground conductors in power cable or ground wire in conduits shall always be connected directly to station ground at the source end, and to motor frame or equipment enclosure and/or equipment ground bar.
- C. System Neutral. The equipment grounding conductor in all circuits shall be connected to the frame and ground lug in the panelboards and not the neutral bus. Equipment ground connections to a system neutral are not permitted.
- D. Fuses. In all cases of grounded circuits, fuses must be omitted from the grounded neutral conductor throughout the entire installation.

- E. Equipment Frames. Frames of all electrical apparatus will be connected to the grounding system. Neutrals of service transformers shall be connected to the grounding system.
- F. Metallic Raceways. All metallic conduits and wiring channels must be connected at each end to the grounding conductor with a good electrical contact.
- G. Identification. The grounding conductor shall be stranded and covered with a green jacket.
- H. In all cases the white wire should be used for the current-carrying neutral only and never as a grounding conductor or other purpose.

END OF SECTION 26 05 26

ELECTRICAL RACEWAYS

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Materials specified in this Section shall comply with all applicable requirements of SECTION 26 05 00, GENERAL PROVISIONS.

1.2 SCOPE

- A. Contractor Furnished. The contractor shall provide all conduit, fittings, and supports required and not otherwise shown on plans as furnished by others.
- B. The types of electrical raceways required for the project include the following:
 - 1. Electrical Metallic Tubing
 - 2. Flexible Metal Conduit
 - 3. Liquid-Tight Flexible Metal Conduit
- C. Type MC cable is not allowed except for fixture whips. Not to exceed 6' in length.
- D. The minimum raceway size shall be 3/4".
- E. Product Delivery, Storage, and Handling. Contractor is to provide color-coded end-cap thread protectors and handle conduit and tubing carefully to prevent damage. Store pipe and tubing inside whenever possible. When necessary to store outdoors, elevate well above grade and enclose with durable, watertight wrapping.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. Electrical Metallic Tubing. Galvanized, thin wall tubing, fittings shall be hex-nut, expansion gland type, zinc plated, and U.L. listed as "raintight." No crimp, spring, or set-screw type fittings will be accepted.
- B. Flexible Metal Conduit. Galvanized single steel strip, flexible, interlocked.
- C. Liquid-Tight Flexible Metal Conduit. Galvanized single steel strip, flexible, interlocked, double wrapped, with liquid-tight PVC jacket.
- D. Conduit, tubing and duct accessories including straps, hangers, expansion and deflection fittings as recommended by conduit, tubing, and duct manufacturers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Electrical Metallic Tubing. Branch circuits run in hollow dry walls and above ceilings. Not to be exposed.
- B. Flexible Metal Conduit. Connection of motors and for other electrical equipment where subject to movement and vibration and located in a dry, interior location. Flexible conduit is not to exceed 60" in length for any one application.
- C. Liquid-tight Flexible Metal Conduit. Connection of motors and for other electrical equipment where subject to movement and vibration, and also subjected to one or more of the following conditions: Exterior location; moist or humid atmosphere where condensate can be expected to accumulate; corrosive atmosphere; subjected to water spray; subjected to dripping oil, grease or water. Flexible conduit is not to exceed 60" in length for any one application.

3.2 INSTALLATION

- A. Install conduit and tubing in accordance with NEC and National Electrical Contractors Association's "Standard of Installation", and with recognized industry practices. Where NECA and NEC standards differ, use the more stringent requirement.
- B. Complete the installation of raceways before starting installation of wires.
- C. Wherever possible, install horizontal raceway runs above water and steam piping.
- D. Care shall be taken to keep the interior of conduits clean, and each conduit run shall be thoroughly cleaned and dried before any cable is pulled through.
- E. Unless indicated otherwise on drawings, all exposed conduits shall be run parallel with or perpendicular to building structural members.
- F. Conduits entering sheet metal enclosures shall be made up with double locknut and insulating bushing. Locknut shall be of the type which will bite into the metal of the box.
- G. Conduits entering threaded openings in equipment enclosures, boxes, etc., shall have at least five full threads engaged. In outdoor and underground locations, threaded joints shall be made up with a thin application of conducting joint compound. The inside of the fitting shall be thoroughly cleaned of any excess compound.
- H. Power operated bending machines shall be used on conduits 1-1/4" and larger. Heating with torches will not be permitted.
- I. All conduit runs shall be continuous from outlet to outlet with all joints and connections pulled tight to insure an electrically continuous and mechanically secure raceway system.
- J. All raceways in "finished areas" such as offices, corridors, etc., shall be concealed.

3.3 CONDUIT AND TRAY OPENINGS

- A. Contractor's Responsibility. The Contractor shall be responsible for all sleeves and openings through walls and floors necessary for passage of electrical conduits and raceways. Where contractor must provide openings and/or drill concrete floors and/or walls, he shall be responsible for the repair of these openings. Structural members and reinforcing shall not be cut, burned or damaged in any way. All openings in walls and floors, and under switchgear and panels where electrical cables and conduits are installed, shall be closed up by the Contractor to prevent dust, dirt and water from entering.

- B. Sealing. The Contractor shall be responsible for sealing all wall and floor openings and all floor and wall sleeve openings utilized by the contractor whether furnished by Others or by the Contractor.
- C. Sleeves and openings shall be sealed with materials that will withstand fire and heat to the same rating as the wall, floor, or ceiling through which the conduit or tray passes and shall not be less than a 30-minute barrier. See architectural drawings for rated walls and locations.

END OF SECTION 26 05 39

GENERAL

1.1 RELATED SECTIONS

- A. Materials specified in this Section shall comply with all applicable requirements of SECTION 26 05 00, GENERAL PROVISIONS.

1.2 WORK INCLUDED

- A. Contractor Furnished. The Contractor shall furnish, install and wire all lighting fixtures and the complete lighting system as shown on the drawings. The contractor shall furnish all appropriate mounting hardware as required for installation of the fixtures in the various ceiling types. The contractor shall coordinate the various ceiling types with the architect's reflected ceiling plan and construction details. All fixtures shall be the type and manufacturer specified, with UL label. Recessed incandescent downlights shall have thermal protection.
- B. Typical Details, Drawings and Symbols. The Contractor shall install lighting fixtures complete with lamps and as shown on drawings. Refer to symbol drawings for additional descriptive and installation data. The Contractor shall check the location of all fixtures in relation to the structure and the work of other crafts and shall obtain approval of the Owner's representative to relocate fixtures, if required, to avoid interferences.

PRODUCTS

1.3 WIRING DEVICES

- A. Wiring Devices. All wall switches for lighting shall be those of a single manufacturer and shall be as specified by the symbol on the drawings and as listed on the symbols drawings.

1.4 LIGHTING FIXTURES

- A. All lighting fixtures shall be as specified on the fixture schedule on the drawings.
- B. LED fixtures shall be furnished with electronic Drivers with LED Chip Sets. All drivers shall have universal voltage input ratings and surge suppression devices.
- C. All outdoor fixtures shall be UL listed for wet locations unless mounted recessed in building overhangs, in such cases fixtures which are UL listed for damp locations may be permitted if specifically noted on the drawings.

EXECUTION

1.5 FIXTURE OUTLETS

- A. Fixture outlets shall be installed in the locations shown on the drawings. The Contractor shall study the general building plans in relation to the spaces surrounding each outlet in order that his work may fit the other work required, as well as the work of other trades. When necessary, the Contractor shall relocate outlets so that when fixtures or other fittings are installed, they will be symmetrically located according to room layout and will not interfere with other work or equipment.

1.6 LIGHTING SWITCHES

- A. Lighting Switches. The Contractor shall furnish and install all lighting switches shown on the drawings. The switches shall be installed in the ungrounded lines and shall be mounted in the appropriate boxes for flush or surface mounting as specified under "Boxes". The appropriate coverplates as specified under "covers" shall be installed. Switch mounting shall be as described on the symbol drawings and as described elsewhere in this specification.
- B. Local Switches. Local switches shall be located on the strike side of the doors, keeping approximately 3" away from the door trim or corner, wherever possible. Switch handles shall be set to operate vertically; wall receptacles shall be set with the long dimension vertical where possible. Switches suitable for use in mullions of glass partitions shall be used where noted on plans.
- C. Neutral Conductor. The neutral conductor of lighting systems shall be of the same size as the phase conductors. On three and four wire systems the load shall be divided as evenly as possible on each "outside" or phase conductor. Neutral conductors shall be identified throughout by using a white or gray (as specified in "Color Code" section) insulated wire. A green ground wire shall be run in raceway to ground all lighting fixtures, receptacles, boxes and wiring devices.

1.7 FINAL INSPECTIONS

- A. At the conclusion of the job, the Contractor shall see to it that all fixtures are cleaned, lamped and in good operating condition. Upon final inspection all covers shall be installed.

END OF SECTION 26 51 00

DIVISION 27

COMMUNICATIONS

VOICE AND DATA COMMUNICATION CABLING

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general requirements of the Contract, including all Division 1 specification sections, apply to work specified in this section.

1.2 SCOPE OF WORK

- A. Description of Work: This section includes furnishing all labor, materials, equipment, and testing for the installation of the data communication wiring system for this project.

Voice and data communications cabling system shall be end-to-end Category 6 solution with 25-year warranty with owner's designated vendor.

- B. Contractor shall provide a complete universal cabling wiring system including outlets, cabling, raceway, patch panels, and terminations for the installation of a high-speed data communication network for outlets added.

As part of the shop drawing submittal, the Contractor shall provide detailed rack and closet layout diagrams with part numbers for approval by the Owner.

- C. Data/Telecommunications Cabling Requirements

- 1. All drops shall terminate in the telecommunications closet nearest the drop jack.
- 2. Each cable shall be Category 6 for both voice and data and voice shall be installed and terminated on to Category 110 to RJ-45 Category 6 patch panels in the IDF located closet to the drop on the same floor as the drop.
- 3. All termination configurations shall be EIA-568-B. Verify with Owner's IT.
- 4. Conduit shall be provided from each telecommunications outlet to a cable tray.
- 6. Pull strings will be provided in all conduits by the general contractor.

- D. Proper NEC Listing

- 1. All cables shall be properly listed as plenum rated cable with the appropriate NEC cable listing for installation within buildings.

PART 2 - PRODUCTS**2.1 HORIZONTAL COPPER CABLE**

- A. Horizontal copper cable shall be Category 6, CMP rated with blue jacket, plenum rated, P/N 219567-6.

- B. Voice and data cable will be the same color (blue), installed, terminated and tested in the same manner. The use of the cable for either voice or data will be determined at the time the cable is put in to service. When selecting a jack for a telephone application, it shall be the top left jack in a multi-jack faceplate.
- C. All copper cable shall be terminated using the EIA-568B configuration.

2.2 JACKS

- A. All copper cabling termination jacks shall be AMP Category 6, almond color. P/N 1375055-1.
- B. Faceplates:
All jacks will terminate in 110 Connect, almond color. Part numbers as follows:
 - 557505-1 2-Port
 - 558088-1 4-Port
 - 557691-1 6-Port
 - 1479152-1 1-Port Wall Phone
 - 1116412-1 Blank Port Cover

No ports shall be left unpopulated. Blank ports shall be filled with AMP mini-com blank module inserts. P/N CMBIW-X.

Provide stainless steel covers.

2.3 PATCH PANELS

- A. All copper cabling in the Telecom closets shall terminate on rack mounted 110-style punch down to modular patch panels.
- B. Only 24 port and 48 port patch panels shall be used for terminations.
 - AMP 1375014-1 24-Port Cat. 6 Patch Panel
 - AMP 1375015-1 48-Port Cat. 6 Patch Panel

2.4 PATCH CORDS

- A. Patch cords shall be provided for closet cross connects and for station.
- B. A 5' and 10' patch cord shall be provided for every Category 6 horizontal cable link placed.
- C. The patch cords shall be:
 1. AMP Cat. 6 Patch Cable, 10 feet, P/N 1-219886-0.
 2. AMP Cat. 6 Patch Cable, 5 feet, P/N 219886-5.

2.5 CROSS CONNECTS

- A. Closet end:
 1. Cross will be made for voice stations by using Silver Satin modular line cords in the closet end, patch panel to patch panel.

2. Use Silver Satin modular line cord RJ11/14, 6P4C, 7-long.

B. Switch end:

1. The voice trunk or riser cable will terminate at the switch end on wall mounted 110M1-50 blocks.
2. Cross connects will be made for voice stations at the switch by using 24-gauge cross connect copper jumper wire from the 110 M1-50 blocks of the riser termination field to the switch jack field.

PART 3 - EXECUTION

3.1 GROUNDING AND BONDING

- A. All metallic cable shields shall be grounded and bonded using approved cable bullet bonds and clamps.

3.2 FIRE STOPS

- A. The Electrical Contractor shall seal firewall penetrations used by the Cabling contractor including penetrations between floors. The penetration seals shall meet the fire rating of the walls and slab and shall meet the requirements set forth in ASTM E814 & UL1479.
- B. The electrical contractor shall be responsible for returning all fire rated walls, floors or partitions back to their original fire rating for both penetrations and membrane disruptions. Both sides of the disruption or partition must be fire stopped.
- C. Use only approved fire stop materials that meet the requirements of ASTM E814. Each should carry an Evaluation by UL according to Standard 1479 or equivalent.
- D. Follow all manufacturers' recommendations and practices when installing fire stop materials. If the Contractor is unsure of the fire rating of a particular partition, he should return the structure that has been penetrated to the highest rating possible for the type of structure to be restored.
- E. Non-fire rated materials are not allowed and shall not be used to restore fire rated barriers.

3.3 HANDLING OF THE CABLES

- A. Contractor shall install J-Hooks for support of cables above ceiling. Supports shall be spaced no greater than 5' apart.
- B. During the installation of the cables, the pulling tension shall not exceed 25 lbs per cable.
- C. All cables shall be in continuous runs with no splicing or bridge taps allowed.
- D. Cables shall not contain kinks or bends smaller than 4 times the cable outside diameter at any point in the cable run and termination area.
- E. Horizontal distribution cables shall be bundled in groups of no more than 50 cables.

- F. Care shall be taken to avoid kinking or excessive bending of the cable. If necessary, cable pulleys and lubricants shall be used to reduce the pulling tension during cable installation.
- G. Note: Even when cables have passed testing requirements, the contractor may be required to replace cables with damaged outer sheaths which have excessive cuts or gouges and general signs of mishandling. This decision will be left up totally to the Owner and/or its representative and the contractor will bear the total expense to replace such cables.
- H. If the any cable must be unreeled during the installation, use the figure-eight configuration to prevent the cable from kinking or twisting.
- I. Care shall be used when terminating the drop cables to the jacks to not violate the cable end radius of 4 times the cable diameter. Excess slack shall be neatly dressed in the box and not twisted or forced when installing the faceplate.
- J. All blank or unused sections of cabinets will be filled with blank cover filler plates and not left void and open.
- K. Cap the front and back of all unused positions on the termination panels.

3.4 DRESSING OF CABLES IN THE TC

- A. All cables will be properly dressed and neatly bundled together from the point of entry in to the room and in to the rack for termination.
- B. Velcro material shall be used to dress the horizontal station cables into the rack for termination.
- C. Provide “D” rings or ladder rack as a means of support within the TC from the point of entry in to the room, along the wall(s) to the rack.
- D. All cable slack shall be neatly coiled above the ceiling or as specified. Care shall be taken to not coil cable too tightly to cause attenuation.

3.5 TERMINATION OF UTP COPPER CABLES

- A. Do not violate the minimum bend radius of the cable (four times the outside diameter).
- B. Do not untwist the cable pairs more than a maximum of ½ inch.
- C. Remove only as much jacket is necessary to complete the termination.
- D. Lace the pairs in to the retention slots of the 110 on the patch panel, maintaining a maximum of ½ inch of untwisted wire for each pair.
- E. Maintain 3’ of slack in the TC end of the cable and 12 to 16 inches at the station end.
- F. Use only Velcro type cable ties in closets. In other areas, do not tightly cinch cable ties.
- G. No splicing of cables.
- H. Avoid stretching and excessive pulling tension on the cables. Do not exceed 25 lbs per cable during installation.

- I. Do not allow excessive sagging of the cable. Within the closets, the cable shall be supported at all times enroute to the point of termination by either cable tray or other means. Provide "D" rings or other means of support if the cable tray or conduit is not available.

3.6 STATION CABLING

- A. All drops shall terminate in the telecommunications closet nearest the drop jack. The jacks located within all common areas, such as the media center, computer labs and administration areas shall all terminate within the same closet.
- B. Each cable shall be Category 6 for both voice and data and voice shall be installed and terminated exactly as the data drops on to Category 110 to RJ-45 Category 6 patch panels in the IDF located closet to the drop on the same floor as the drop.
- C. Horizontal distribution cables shall be bundled in groups of no more than 50 cables.
- D. All tie-wraps shall be loose and easily moved so as to not disfigure the cables and cause attenuation.
- E. Care shall be used when terminating the drop cables to the jacks to not violate the cable bend radius of 4 times the cable diameter. Excess slack shall not be stored in the outlet box.
- F. All cables shall be labeled with self-adhesive printed labels on each end for ready identification. Reference ANSI/TIA/EIA-568-606 administration standard. Cable labels shall be located so that they can be viewed without removing the cable bundle ties at the patch panel end and by the removal of the faceplate at the station end. See the "Labeling" section of this document for an example format of labeling scheme.

3.7 LABELING

- A. All data communication cables shall be labeled with self-adhesive printed labels on each end. Cable labels at the patch panels shall be located so that they can be viewed without removing the cable bundle ties. At the faceplate, all cable labels shall be applied in locations so that they can be seen by removing the faceplate.
- B. All Patch panels and faceplates shall be labeled per ANSI/EIA/TIA 606 administration standards for labeling.
- C. Sample Labeling Scheme – for horizontal cables

Floor #	Closet ID -	Alpha panel ID	panel port #
02	B	A	34
- D. Sample Label for Backbone Cables

Originating Floor	Closet ID /	Cable #
02	A	2
- E. All trunk cables shall be labeled with self-adhesive printed labels on each end.

3.8 INSPECTIONS

- A. On-going inspections shall be performed during construction by the Owner appointee
The cabling contractor shall assist the Owner as necessary with all inspections.

- B. The following items are an example of some of the check points for the on-site inspections. As deemed appropriate for each job site and location, other items may be included in inspections that have not been mentioned below.
1. All work shall be performed in a high-quality manner and the overall appearance shall be clean, neat and orderly.
- C. The following points will be examined and must be satisfactorily complied with:
1. Is the design documentation complete? Are all cables properly labeled from end-to-end?
 2. Have all terminated cables been properly tested in accordance with the specifications for the specific category as well as tested for opens, shorts, polarity reversals, and transposition?
 3. Is the cable type suitable for its pathway? Are the cables bundled in parallel?
 4. Have the pathway manufacturer's guidelines been followed? Are all cable penetrations installed properly and fire stopped according to code?
 5. Have the contractors avoided excessive cable bending?
 6. Have potential Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) sources been considered and avoided?
 7. Are hanging supports within 1.5 meters (5 feet)?
 8. Have patch panel instructions been followed for items such as?
 - a. Jacket removal point.
 - b. Termination positions.
 - c. All pair terminations tight with minimal pair distortions.
 - d. Twists maintained up to Index Strip.
 - e. Have 110 modular panel instructions been followed?
 - f. Cable dressing first.
 - g. Jackets remain up to the connecting block.
 - h. All pair terminations tight and undistorted.
 - i. Twists maintained up to the connecting block.
 - j. Are identification markings uniform, permanent and readable?

3.9 TESTING AND TEST RESULTS

- A. The owner and/or appointed representative shall be notified of test schedules and dates and reserves the right to be present during testing.
- B. All test documentation shall be submitted to the owner in printed form unless otherwise requested.
- C. The test documentation shall be:
1. Clearly labeled with the test point of origin and destination.
 2. Set up for feet and not meters.
 3. Bound in notebook form with tabs for separation of the results.
 4. Available on diskette or in printed form when requested, readable in Microsoft Word (version 6.0 or earlier version).
- D. Station Cable Testing
1. Category 6 horizontal cables shall be tested according to the test set manufacturers instructions utilizing the latest firmware and software.

- a. Complete, end to end test results, must be submitted to [customer].
 The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-B.1. The appropriate level III tester for Category 6 cabling systems.
 Any pairs not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to this district.

2. Follow the standards requirements for Category 5E and 6 performance requirements.

3. The tests required are:

Wire Map
 Length
 Insertion Loss

NEXT (near end crosstalk)

Return Loss

ELFEXT loss

Propagation Delay

Delay Skew

PSNEXT (Power sum near-end crosstalk loss)

PSELFEXT (Power sum equal level far-end crosstalk loss)

CHANNEL TRANSMISSION PERFORMANCE REQUIREMENTS

MHz.	Attenuation (dB)			Pr. -Pr. NEXT (dB)			PS NEXT (dB)			Return Loss (dB)		
	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6
1	2.5	2.5	2.2	>60	>60	72.7	---	>57	70.3	15	17	19
10	7.0	7.0	6.5	44.0	47.0	56.6	---	44.1	54.0	15	17	19
100	24.0	24.0	21.7	27.1	30.1	39.9	---	27.1	37.1	8	10	12
200	---	---	31.7	---	---	34.8	---	---	31.9	---	---	9
250	---	---	36.0	---	---	33.1	---	---	30.2	---	---	8
Freq.	Pr.-Pr. ELFEXT (dB)			PSELFEXT(dB)			Delay (ns)			Delay Skew (ns)		
MHz.	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6	Cat 5	Cat 5e	Cat 6
1	57	57.4	63.2	54.4	54.4	60.2	---	---	---	---	---	---
10	37	37.4	43.2	34.4	34.4	40.2	555	555	555	50	50	50
100	17	17.4	23.2	14.4	14.4	20.2	---	---	---	---	---	---
200	---	---	17.2	---	---	14.2	---	---	---	---	---	---
250	---	---	15.3	---	---	12.3	---	---	---	---	---	---

3.10 AS-BUILT DRAWINGS AND DOCUMENTATION

- A. The cabling contractor will be required to provide to the customer a complete set of as-built drawings at the close of this project.
- B. This documentation shall be provided as a part of the completion of the work and payment can be withheld until such documentation has been provided to the Owner.

- C. Handwritten over-layment of information on to existing building drawings will be sufficient. Hand writing and notations however, **MUST BE LEGIBLE** to be acceptable.

Note: It is the responsibility of the cabling contractor to be familiar with the documentation that will be required of him prior to the commencement of work so that notations and documentation can be compiled as the work progresses. A request for a change order to go back and compile this information after the job has been completed will not be accepted.

- D. At a minimum, provide:

1. A typed over-layment of jack numbers and jack location changes on to the site plan drawings.
2. A hand- drawn red line drawing showing fiber and back bone cable routes on the site plan drawings.
3. A drawing showing the location of any pull boxes along with any special notes to help with the location of these boxes.
4. A drawing illustrating the final layout of the equipment rooms showing the orientation of racks, ladder racking and wall field locations.
5. Any special notes beneficial to the customer for documentation of the project in a typed and neat format.

END OF SECTION 27 15 00

DIVISION 28

ELECTRONIC SAFETY AND SECURITY

ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL**1.1 SUMMARY OF WORK**

- A. The scope of work includes:
 - 1. Provide and install additional initiation devices to the existing fire alarm panel located in the main office mail room.
 - 2. Provide all required wiring and programming for the connection of the new devices to the existing fire alarm control panel.
 - 3. Removal, protection and reinstallation of all ceiling mounted devices in the new acoustical ceiling tiles installed in this project.

1.2 SUBMITTALS

- A. Submittals shall be approved by the Authority Having Jurisdiction and Engineer prior to installation of the work.
- B. Provide shop drawings:
 - 1. New devices shown on drawings.
 - 2. Plan of new devices being added.
 - 3. Wiring connections for new devices to existing signal loop circuits.
 - 4. Mounting heights for devices

1.3 CLOSEOUT SUBMITTALS

- A. Coordinate submittals with close out requirements from Division 1.
- B. Closeout documents shall comply with the “Records” section of “Inspection Testing and Maintenances” chapter in NFPA72
- C. Provide Record of Completion documents per NFPA72
- D. Wiring diagrams
- E. Recommendations for Maintenance
- F. Include warranty for added components and wiring.

PART 2 - PRODUCTS

- 2.1 The existing FACP is an EST Model io1000 installed in 2019. The panels were last inspected by ADT company on 08/16/23 and monitored by Security Central.
- 2.2 Manual Fire Alarm Pull Stations
 - A. Shall be compatible and approved by system manufacturer. Devices shall be covered with warranty.
 - B. General requirements for manual fire-alarm boxes: Comply with UL 38.
 - 1. Single-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 - 2. Station Reset: Key operated switch.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
- C. Manual Fire-Alarm Boxes:
 - 1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.
 - 2. Mount manual fire-alarm box on a background of a contrasting color.
 - 3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.

3.2 PATHWAYS

- A. Pathways shall be installed in EMT except where run on surface below ceilings, in which case pathways will Utilize metallic surface mounted raceways such as Wiremold or equal. Where run below ceilings, pathways shall be painted to match walls.
- B. EMT shall be painted red enamel.

3.3 CONNECTIONS

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals.

3.5 GROUNDING

- A. Verify ground at fire-alarm control unit and associated circuits; comply with IEEE 1100. Verify ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
 - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- D. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.7 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for one year.
- C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within one year from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

END OF SECTION 28 46 21

DIVISION 31

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions changes in the Work.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface.
- C. Protect and maintain erosion and sedimentation controls.

3.2 EXCAVATION

- A. Open trench excavation: Use unclassified excavation to subgrade elevations for quantities indicated on plans. Trench Rock and rock removal shall be per Allowance section 01 21 00.
- B. Directional boring pits: Use classified excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.

3.4 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Engineer.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.5 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.6 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

- C. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 16 Section 16045 "Electrical Related Work"
- D. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.
- E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape 6 inches (150 mm) below finished grade.

3.7 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use **#57 stone drainage** fill.
 - 4. Under building slabs, use **#57 stone drainage** fill.
 - 5. Under footings and foundations, use **#57 stone drainage** fill.

3.8 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.9 COMPACTION OF EXTERIOR SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.10 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).

3.11 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
 - 1. Shape subbase and base course to required crown elevations and cross-slope grades.
 - 2. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.12 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and hand-tamp drainage course under cast-in-place concrete slabs-on-grade.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 05 00

DIVISION 32

EXTERIOR REQUIREMENTS

PART 1 - GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Driveways.
 - 2. Curbs and gutters.
 - 3. Walks.

1.2 ACTION SUBMITTALS

- A. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301 unless otherwise indicated.

PART 2 - PRODUCTS**2.1 STEEL REINFORCEMENT**

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- D. Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.2 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: AASHTO M85 white portland cement Type I/II
 - a. Fly Ash: ASTM C 618, Class F, 20 percent by weight of required cement content with 1.2 lb Class F fly ash per lb of cement replaced.
 - b. Ground Granulated Blast-Furnace Slag: AASHTO M 302, Grade 100, 30-50 percent by weight of required cement content with 1.0 lb slag per lb of cement replaced.
- B. Normal-Weight Aggregates: ASTM C 33, and NCDOT Section 1014, uniformly graded. Provide aggregates from a single source.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: AASHTO M154.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
- F. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.3 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, new, clean burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: AASHTO M 171, white opaque polyethylene film
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: AASHTO M 148, Type 2, white pigmented.
- F. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.4 RELATED MATERIALS

- A. Joint Fillers: Non-bituminous joint filler that meets AASHTO < 153 for Types I/II or III, or a bituminous type that meets AASHTO M 213.

2.5 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, and approved by the North Carolina Department of Transportation (NCDOT) with the following properties:
 - 1. Compressive Strength (28 Days): 3000 psi.
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
 - 3. Slump Limit: 4 inches plus or minus 1 inch.
 - 4. Air Content: 5 percent plus or minus 1.5 percent.
- B. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to NCDOT Standard Specifications. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated on drawings. Transverse expansion joints in sidewalks and curb and gutter may not exceed 50' spacing.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated on drawings. Construct contraction joints for a depth equal to at least one-third of the concrete thickness.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- B. Comply with ACI 301 requirements for measuring, mixing, transporting, placing, and consolidating concrete.
- C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed paving surface with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium Broom Finish: Draw a stiff-bristle push broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, slip resistant texture.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.

- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these.

3.8 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 3/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/2 inch.
 - 4. Joint Spacing: 3 inches.
 - 5. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 6. Joint Width: Plus 1/8 inch, no minus.

3.9 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

