
**NEW BUS PARKING / EXTERIOR PLAZA & CURTAIN WALL
REPLACEMENT AT ABSEGAMI HIGH SCHOOL**

GREATER EGG HARBOR REGIONAL HIGH SCHOOL DISTRICT
MAYS LANDING - ATLANTIC COUNTY - NEW JERSEY



FVHD PROJECT #5369-5

FRENCH & PARRELLO ASSOCIATES, P.A.
CONSULTING ENGINEERS

January 23, 2024

SPECIFICATIONS

for

NEW BUS PARKING / EXTERIOR PLAZA & CURTAIN WALL REPLACEMENT AT ABSEGAMI HIGH SCHOOL

located at 201 S. Wrangleboro Road, Galloway, NJ 08205

for the

GREATER EGG HARBOR REGIONAL HIGH SCHOOL DISTRICT

Mays Landing, Atlantic County, New Jersey

FVHD PROJECT NO. 5369-5

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BID NOTICE
Greater Egg Harbor Regional High School District
Atlantic County, New Jersey

NOTICE IS HEREBY GIVEN THAT sealed bids will be received by the Greater Egg Harbor Regional High School District Board of Education for **New Bus Parking / Exterior Plaza & Curtain Wall Replacement at Absegami High School**, together with all work incidental thereto, in accordance with the requirements of the drawings and specifications prepared by Fraytak Veisz Hopkins Duthie, PC (FVHD), Architects-Planners, www.fvhdpc.com, **FVHD Project #5369-5**.

Bids will be received for: Single Overall Contract (DPMC: C009 with C032, C047)

Bid Documents for the proposed Work are on file at the office of the Architect, Fraytak Veisz Hopkins Duthie, P.C., 1515 Lower Ferry Road, Trenton, NJ 08618, tel. 609.883.7101. To obtain Bid Documents, complete the Bidder Registration form which can be download from <https://fvhdpc.com/bids/bidlisting> and email to info@fvhdpc.com, **Ref: FVHD-5369-5**. No fee electronically, \$25.00 DVD, \$250.00 hard copy. Check or money order payable to Fraytak Veisz Hopkins Duthie, P.C. If Contractor requests shipping, a direct shipping account number (FedEx or UPS) and preferred shipping speed must be provided and for paper sets, a separate fee of \$25.00 per set. All fees are non-refundable.

All requests for information (RFI) must be submitted in writing by **February 8, 2024**, and sent to info@fvhdpc.com or fax to 609-883-2694 or via common carrier to the Architect. All correspondence must include the Architect Project Name and Project Number referenced. The Architect is not responsible for misdirected or misrouted correspondence.

Sealed Bids are due **Wednesday, February 21, 2024, 2:00 PM**, to the Greater Egg Harbor Regional High School District Board of Education, 1824 Dr. Dennis Foreman Dr., Mays Landing, NJ 08330, and will be publicly opened and read immediately thereafter in the A-11 Meeting Room.

In accordance with the provisions of Chapter 114 of the Laws of 1977, any person desiring to submit a bid by mail or to submit a bid prior to the time of receipt of bids as set forth in this notice, should address or deliver the same to Thomas P. Grossi, Business Administrator c/o Greater Egg Harbor Regional H.S.D. Board Office, 1824 Dr. Dennis Foreman Drive, Mays Landing, NJ 08330-2640, who will retain the same until the time set forth for the receipt of bids.

Bid Proposal shall be submitted in duplicate (one original and one copy) in a separate sealed envelope, addressed to the Owner, bearing the name and address of the bidder, and clearly marked "BID" with the contract title and/or bid number on the outside of the envelope and must be accompanied by a Certified Check, Cashier's Check or Bid Bond drawn to the order of the Owner in the amount of ten percent (10%) of the amount of the bid, but in no case in excess of \$20,000; and must be delivered to the above place on or before the hour named. The Board of Education and the Architect assume no responsibility for bids mailed or misdirected in delivery.

If the bid exceeds \$20,000 bidder must be pre-qualified by the New Jersey Division of Property Management and Construction (DPMC), prior to the date that bids are received. Any bid submitted under the terms of New Jersey statutes not including a copy of a valid and active Pre-qualification/Classification Certificate shall be rejected as being non-responsive to bid requirements.

Pursuant to N.J.S.A. 18A:18A-25, each proposal shall be accompanied by a Consent of Surety from a Surety Company stating it will provide each bidder with separate Performance and Payment Bonds, each in the amount of 100% of the contract sum. Also, Surety agrees to furnish bidder with a Maintenance Bond in required form. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance with

N.J.S.A. 2A:44-143, and 2A:44-144 and with the three highest rating categories of rating companies nationally recognized.

All contractors and subcontractors must provide a Business Registration Certificate (BRC) per N.J.S.A. 52:32-44. The BRC must be on file prior to award of contract.

This project is subject to the New Jersey State Prevailing Wage Act, N.J.S.A. 34:11-56.27 et seq. Pursuant to "The Public Works Contractor Registration Act", N.J.S.A. 34:11-56.48 et seq., bidders and their subcontractors are required to be registered with the New Jersey Department of Labor and Workforce Development and to possess a current certificate by said Department indicating compliance with the Act prior to the time and date that bids are received.

All bidders must comply with N.J.S.A. 10:5-31 et seq., N.J.A.C. 17:27 et seq. and N.J.S.A. 10:2-1. An Initial Project Workforce Report will be required from the successful bidder (Form AA-201).

No bid may be withdrawn for a period of sixty (60) days after the date set for the opening thereof. The right is reserved to reject all bids pursuant to N.J.S.A. 18A:18A-22 and to waive minor informalities in the bidding in accordance with applicable law.

Thomas P. Grossi
Business Administrator/Board Secretary

BIDDING INFORMATION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1.1 INVITATION TO BID

- A. All Bidders are required to prepare bids in accordance with all plans and specifications (Bid Documents) prepared by Fraytak Veisz Hopkins Duthie, P.C.
- B. **DISCLAIMER:** Bidders should only rely on original digital and paper versions of the bidding contract documents obtained directly from the Architect's office. Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is not responsible for any unauthorized copies made of the digital or paper bidding contract documents obtained from sources other than the Architect's office. All information provided by Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is intellectual property and is protected under copyright laws. It is not to be used for any purpose other than for the indicated project. Any other use or manipulation of the information is strictly prohibited.
- C. Bids for Contracts, as listed in the Advertisement for Bids or Invitation to Bid as hereinafter described, will be received for the performance of the Project. The bids shall cover all costs of any nature, incident to and growing out of the work. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, materials, equipment, transportation and cost of all else necessary to perform and complete the Project in the manner and within the time required, all incidental expenses in connection therewith, all costs on account of loss by damage or destruction of the Project caused by the Contractor, or Contractor's Agent, to the extent that the cost of such loss is not recovered from insurance carried by the Owner and the Contractor, and any additional expenses for unforeseen difficulties encountered, for settlement of damages and for replacement of defective work and materials.
- D. Before submitting a Bid, the Bidder shall become familiar with the Drawings, Specifications and other documents that will form the Contract, shall investigate the site of the Project and make such examination thereof as may be necessary to determine the character and amount of work involved. The Bidder shall also determine that they can secure the necessary labor and equipment and that the materials proposed to use will comply with the requirements specified therefore and can be obtained by the bidder in the quantities and at the time required.
1. **Site visit(s) can be arranged upon request by contacting the architect: (thopkins@fvhdpc.com / jdubowitch@fvhdpc.com / info@fvhdpc.com).**
- E. The Owner reserves the right to accept or reject all bids including Alternate Bids, if any, pursuant to applicable law under any Contract for a period up to sixty (60) days after receipt of bids.

1.2 ETHICS IN PURCHASING

A. School District Responsibility

1. Recommendation of Purchases

- a. It is the desire of the Board of Education to have all Board employees and officials practice exemplary ethical behavior in the procurement of goods, materials, supplies, and services.
- b. School district officials and employees who recommend purchases shall not extend any favoritism to any vendor. Each recommended purchase should be based upon quality of the items, service, price, delivery, and other applicable factors in full compliance with N.J.S.A. 18A:18A-26-33 et seq.
- c. Solicitation/Receipt of Gifts - Prohibited:
 - 1) School district officials and employees are prohibited from soliciting and receiving funds, gifts, materials, goods, services, favors, and any other items of value from vendors doing business with the Board of Education or anyone proposing to do business with the Board of Education.

2. Vendor Responsibility:

- a. Offer of Gifts, Gratuities – Prohibited
 - 1) Any vendor doing business or proposing to do business with the Board of Education, shall neither pay, offer to pay, either directly or indirectly, any fee, commission, or compensation, nor offer any gift, gratuity, or other thing of value of any kind to any official or employee of the Board of Education or to any member of the official's or employee's immediate family.
- b. Vendor Influence – Prohibited:
 - 1) No vendor shall cause to influence or attempt to cause to influence, any official or employee of the Board of Education, in any manner which might tend to impair the objectivity or independence of judgment of said official or employee.

3. Vendor Certification:

- a. Vendors or potential vendors will be asked to certify that no official or employee of the Board of Education or immediate family members are directly or indirectly interested in this request or have any interest in any portions of profits thereof. The vendor participating in this request must be an independent vendor and not an official or employee of the Board of Education.

1.3 OBLIGATION OF BIDDER

- A. At the time of the opening of bids, each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Drawings, Specifications and all other Contract Documents, including all Addenda and Bulletins. The failure or omission of any Bidder to receive or examine any form, instrument or document or to visit the site and acquaint themselves with conditions there existing, shall not relieve Bidder from any obligation with respect to their bid.

- B. Any and all discrepancies between the drawings and specifications or between trades shall be brought to the attention of the Architect prior to the Contractor's bid submission.

1.4 CHALLENGES TO BID SPECIFICATIONS (N.J.S.A. 18A:18A-15)

- A. Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the School Business Administrator/Board Secretary no less than three (3) business days prior to the opening of bids. Challenges filed after that date shall be considered void and having no impact on the Board of Education or the award of a contract.

1.5 NOTICE OF CLASSIFICATION OF BIDDERS (CONTRACTORS AND SUBCONTRACTORS)

- A. Pursuant to N.J.S.A. 18A:18A-26 et seq., as amended, and N.J.A.C. 17:19-2.1 through N.J.A.C. 17:19-2.7, Bidders on any Contract on public work for a Board of Education in the State of New Jersey in which the entire cost of the Contract exceeds \$20,000.00, must have a classification from the Division of Property Management and Construction (DPMC), as to character and amount of public work on which they may submit bids. Bidder must submit, a "Notice of Classification" setting forth the type of work and the amount of work for which the bidder has been qualified, that there has been no material adverse change in their qualification information, the total amount of uncompleted work on contracts at the time and the date of the bid due date. Any bidder who does not possess a valid and active "Notice of Classification" shall be ineligible to bid on this project, and any bid submitted by such bidder shall be rejected as non-responsive. (Forms for this purpose are available from the Director of the Division of Property Management and Construction - DPMC, Trenton, New Jersey 08625.)

1. Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.
 - a. Calculations shall be based on Bidder's base bid amount at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.

- B. In accordance with N.J.S.A. 34:11-56.48 et seq. and N.J.S.A. 18A:7G-37, each bidder must be properly registered with the New Jersey Department of Labor and Workforce Development at the time of the bid. The Contractor shall enter into subcontracts only with subcontractors who are registered pursuant to N.J.S.A. 34:11-56.48 et seq.

1. No Contractor/Subcontractor will be permitted to bid on or engage in any contract for public work, as defined in the "New Jersey Prevailing Wage Act," N.J.S.A. 34:11-56.26 et seq., unless that Contractor/ Subcontractor is registered with the New Jersey Department of Labor and Workforce Development at the time of the bid.

- C. The Owner may make such additional investigations as it deems 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 the Owner 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 they are properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

1.6 TOTAL AMOUNT OF UNCOMPLETED CONTRACTS

- A. Uncompleted Contracts (For Contracts Exceeding \$20,000) (N.J.A.C. 17:19-2.13(a))
 - 1. The Board requires that each bidder (and their Subcontractors) submit with his/her bid, a certified Total Amount of Uncompleted Contracts form as prescribed by the cited regulation. (Form DPMC 701). Failure to submit this document will lead to having the bid being rejected as non-responsive.

1.7 CHANGES TO BID DOCUMENTS, INTERPRETATIONS AND ADDENDA

- A. Changes to the Bid Documents may be required to be issued via Addenda. FVHD will issue notice of the publication of all Addenda to prospective bidders, who have obtained bid documents from FVHD. **All bidders are to check the FVHD website www.fvhdp.com and download addenda if any are issued for the project.**
 - 1. All Addenda issued become a part of the Bid Documents and will be part of the Contract Documents as though originally incorporated into the Project Manual.
 - 2. A notification of Addenda changes to the bid documents will be faxed to all bidders who have received bid documents from FVHD Architects. Bidders will be responsible to download the applicable Addendum(s) from the Architects website at www.fvhdp.com/bids/bidlisting.aspx.
 - 3. Bidders must acknowledge receipt of all Addenda on the Bid Form or the bid may be deemed non-responsive by the Owner's Attorney.
- B. Pre-bid Request for Information: No oral interpretations will be made to any Bidder as to the meaning of the drawings and specifications. **All requests for information (RFI's) must be submitted in writing by February 8, 2024 and sent by faxing to 609-883-2694; by emailing info@fvhdpc.com; or sent via common carrier to the Architect. All correspondence must include the Architect's Project Name and Project Number. The Architect is not responsible for misdirected or misrouted correspondence.**

Fraytak Veisz Hopkins Duthie, P.C.

Architects / Planners

1515 Lower Ferry Rd., Trenton, NJ 08618

Electronic Facsimile (609) 883-2694

FVHD Project No. 5369-5

1. Every interpretation made to a Bidder will be in the form of an Addendum. During the bidding period, the Architect may furnish Addenda for additions to or alterations of the drawings and specifications, which shall be included in the work covered by the Bid Form(s).
2. Addenda, when issued, will be made available no later than seven (7) business days prior to the date for receiving bids, Saturday, Sunday or holidays excepted, to all persons who have obtained Bid Documents from the Architect.
3. Addenda will also be available for examination at the Architect's office.
4. It shall be the responsibility of the Bidder to ascertain that they have received and examined all Addenda and Bulletins issued, prior to submitting their bid. Failure of the Bidder to download and examine all Addenda shall not relieve the Bidder from any of the requirements of the Bid Documents.
5. All addenda will be issued in accordance with N.J.S.A. 18A:18A-21(c).

1.8 PREPARATION OF BIDS

- A. Enclose **two copies (one original and one copy)** of the Bid in a sealed envelope, identified on the outside of the envelope and clearly marked "BID" with the name and address of the bidder, name of the project and contract number in which the bidder is submitting.
- B. Bids shall be submitted on the form of Bid furnished by the Architect, properly filled out and duly executed. Bid forms shall not be altered or added to in any way. Lump Sum Bid or Base Bid prices shall be filled in, in ink or typewritten, in both words and figures. In case of discrepancy, the amount described in words shall govern.
 1. **Bids containing any conditions, omissions, unexplained erasure or alteration, items not called for in the Bid Form, attachment of additive information not required by the Specifications, or irregularities of any kind may be rejected by the Owner.**
 2. **Any changes, white-outs, strike-outs, etc. on the Bid Form must be initialed in ink by the person responsible for signing the Bid Form.**
- C. When the Bid is made by an individual, their post office address shall be stated and they shall sign the Bid. When made by a firm or partnership, its name and post office address shall be stated and the Bid shall be signed by one or more of the partners. When made by a corporation, its name and principal post office address shall be stated, and the Bid shall be signed by an authorized official of the corporation.
- D. Alternate Bids and Unit Prices for the various portions of work or Contract(s) shall be as stated in other Sections of the Specifications.

1. Attention is called particularly to the requirements for filling in all Alternate Bids called for on the Bid Form, as the Owner reserves the right to award a Contract based upon the possible inclusion of one or more such Alternate Bids.
2. The amounts of the Alternate Bids shall include any and all modifications to related, adjacent or surrounding work made necessary by use of such Alternate Bids.
3. The Alternate Bids must be stated as additions to or deductions from the Base Bid, unless otherwise noted.
4. **The term "No Bid" shall not be used with respect to Alternate Bids and Unit Prices requested on the Bid Forms. The Bidder who does not desire to make a change from the Base Bid under a particular Alternate Bid shall so indicate by using the words "No Change." Failure to bid or use of the term "No Bid" on any Alternate shall cause rejection of entire bid.**
5. Bidders must bid on every alternate bid. Additions to, or deductions from, the base bid shall be indicated in the appropriate blanks on the Bid form with additions to or deductions from the base bid filled in as appropriate. If a particular alternate bid does not result in an addition to or deduction from the base bid, the words "No Change" or N/C" shall be written in the blank for "No Change" on the Bid form, and the words "No Change" shall be written in the blank provided for the purpose of stating the numeric amount in words. Failure to bid on every alternate bid shall render the bid nonresponsive and shall cause the bid to be rejected.

1.9 BID GUARANTEE

- A. The Bid, when submitted, shall be accompanied by a Bid Guarantee in the form of a Certified Check, Cashier's Check or acceptable Bid Bond made payable unconditionally to the Owner, in the sum of ten percent (10%) of the Bid, but in no case in excess of \$20,000.00 and as per Bid Bond Form included:
 1. Bid Bond Form: Bid Bond shall be as per bid form included and shall include an effective and current Power of Attorney authorizing the Attorney-in Fact to bind the surety, on Bid Date and Time, for the full amount of the Bond.
 2. Bid shall be accompanied by a Proposition of Surety in accordance with paragraph 1.10.
- B. Pursuant to N.J.S.A. 18A:18A-36, all Bid Guarantees, except those of the three apparent lowest responsible bidders, will be returned, if requested, after ten (10) days from opening of bids, Sundays and holidays excepted. Within three (3) days after the awarding of the contract and the approval of the Contractor's performance bond and payment bond, the bid security of the remaining unsuccessful bidders will be returned, Sundays and holidays excepted.

- C. The Bid Guarantee shall be forfeited if successful Bidder fails to execute the Agreement between Owner and Contractor identified in paragraph 1.13 hereof and furnish the Performance-Payment Bond within ten (10) days after notification of award of Contract to him/her (Sundays and holidays excepted).
1. Any failure by the successful bidder to perform its obligations regarding the time, manner, and substance of compliance with Bidding Documents in relation to the Award of a Contract, shall constitute an Event of Default, entitling the Owner to:
 - a. Demand, from said guarantor, immediate payment of the entire Bid Bond amount, as liquidated damages, not as a penalty, for the delay which is acknowledged and agreed that the Owner will sustain in connection with said Default; and in addition thereto,
 - b. Recovery of any and all other Losses incurred by the Owner, to which the Owner shall, to the fullest extent permitted by Applicable Law, be entitled to recover, including without limitation Special Damages.

1.10 CONTRACT BONDS

- A. Prior to start of guarantee period and before the final payment is made, the Contractor shall provide the Owner with a Maintenance Bond in the amount of ten percent (10%) of Final Contract Amount, to insure the replacement or repair of defective materials or workmanship during the one-year guarantee period. Pursuant to N.J.S.A. 18A:18A-25, Bids shall be accompanied by a Proposition of Surety in form as bound in these documents, assuring that satisfactory arrangements have been made between the surety and the Bidder by which surety agrees to furnish within ten (10) days after notification of award, Sundays and holidays excepted, of contract to him/her, furnish and deliver a Performance Bond and Payment Bond; each in the amount of 100% of the amount bid. Also surety agrees to furnish Bidder with a Maintenance Bond in form as bound herein.
1. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance N.J.S.A. 2A:44-143.
 2. If, at any time after execution and approval of a Contract and Performance-Payment Bond required by Contract Documents, such Bond shall cease to be adequate security for the Owner, the Contractor shall, within five (5) days after notice to do so, furnish a new or additional Bond, in form, sum and signed by such Sureties as shall be satisfactory to the Owner. No further payment shall be deemed due nor shall any further payment be made to the Contractor unless and until such new or additional Bond shall be furnished and approved.
- B. Prior to start of guarantee period and before the final payment is made, the Contractor shall provide the Owner with a Maintenance Bond in the amount of ten percent (10%) of Final Contract Amount, to insure the replacement or repair of defective materials or workmanship during the **one-year** guarantee period.

- C. The cost of all Bonds shall be paid for by the Contractor and shall be included as a part of Contractor's bid price.

1.11 POWER OF ATTORNEY

- A. Attorneys-in-fact who sign Bid Bonds, Performance and Payment Bonds, Maintenance Bonds and Proposition of Surety forms must accompany each bond or proposition with a certified and effectively dated copy of their power-of-attorney.

1.12 FORM OF AGREEMENT

- A. The form of agreement shall be AIA Document A101 Standard Form of Agreement between Owner and Contractor, (Stipulated Sum) 2017 Edition, and in accordance with AIA Document A201 General Conditions of the Contract, 2017 Edition as amended, and all other documents referenced herein.

1.13 CERTIFICATE OF AUTHORITY

- A. All bidders are to submit their Sworn Contractor Certification, a current valid "Certificate of Authority" as issued by the New Jersey Department of Treasury. Reference-N.J.S.A. 18A:7G-37.

1.14 AWARD OF CONTRACT

- A. Award, if made, will be to the lowest responsive and responsible bidder for the Single Overall Building Contract selected to include Alternate Bids, if any, which the Owner chooses to accept, that results in the lowest aggregate total sum pursuant to N.J.S.A. 18A:18A-4.
- B. Award made to a Bidder not a resident of the State of New Jersey is conditioned upon Bidder designating a proper agent in the State of New Jersey on whom service can be made in the event of litigation.
- C. If the successful Bidder is a corporation not organized under the laws of New Jersey, the award of Contract and payment of consideration thereunder shall be conditioned upon the Corporation procuring a "certificate" of authority to transact business in the State of New Jersey pursuant to N.J.S.A. 14A:13-3 and complying with the provisions of N.J.S.A.14A:13-4.
- D. NJ Business Registration Certificate:
 - 1. Pursuant to N.J.S.A. 52:32-44, Greater Egg Harbor Regional High School District ("Contracting Agency") is prohibited from entering into a contract with an entity unless the bidder/proposer/contractor, and each subcontractor that is required by law to be named in a bid/proposal/contract has a valid Business Registration Certificate on file with the Division of Revenue and Enterprise Services within the Department of the Treasury.

2. Prior to contract award or authorization, the contractor shall provide the Contracting Agency with its proof of business registration and that of any named subcontractor(s).
 3. Subcontractors named in a bid or other proposal shall provide proof of business registration to the bidder, who in turn, shall provide it to the Contracting Agency prior to the time a contract, purchase order, or other contracting document is awarded or authorized.
 4. During the course of contract performance:
 - a. the contractor shall not enter into a contract with a subcontractor unless the subcontractor first provides the contractor with a valid proof of business registration.
 - b. the contractor shall maintain and submit to the Contracting Agency a list of subcontractors and their addresses that may be updated from time to time.
 - c. the contractor and any subcontractor providing goods or performing services under the contract, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:32B-1 et seq.) on all sales of tangible personal property delivered into the State. Any questions in this regard can be directed to the Division of Taxation at (609)292-6400. Form NJ-REG can be filed online at <http://www.state.nj.us/treasury/revenue/busregcert.shtml>.
 5. Before final payment is made under the contract, the contractor shall submit to the Contracting Agency a complete and accurate list of all subcontractors used and their addresses.
 6. Pursuant to N.J.S.A. 54:49-4.1, a business organization that fails to provide a copy of a business registration as required, or that provides false business registration information, shall be liable for a penalty of \$25 for each day of violation, not to exceed \$50,000, for each proof of business registration not properly provided under a contract with a contracting agency.
 7. Emergency Purchases or Contracts
 - a. For purchases of an emergent nature, the contractor shall provide its Business Registration Certificate within two weeks from the date of purchase or execution of the contract or prior to payment for goods or services, whichever is earlier.
- E. The Owner reserves the right to reject all bids, or to waive minor informalities or non-material exceptions in a bid, pursuant to applicable law.
- F. In accordance with requirements of the N.J.S.A. 18A:18A-36(b), execution of the Contract by all parties will be done within 21 days of the notification of the award date, Sundays and holidays excepted, after making the award.

1. The Bidder to whom the contract is awarded shall be required to execute said Contract within fourteen (14) calendar days of the notification of the award to him/her, Sundays and holidays excepted, after making the award.
- G. Upon award of the Contract, the Contractor shall execute and return to the Owner the "Contractor Certification and Consent Upon Award of Contract," attached to the Contract as an Exhibit.
- H. The award of the contract is subject to availability and appropriation of sufficient funds.

1.15 BID PROTESTS AND CONTRACTOR'S RESPONSIBILITY

- A. Vendors or contractors may contact the Purchasing Agent in writing, when they feel it necessary to challenge a procurement specification item or to protest an award of contract. All challenges and protests will be reviewed by the Purchasing Agent, the District Administrator of the contract and the Board Attorney. All determinations shall be made in writing to the vendor or contractor. The Purchasing Agent pursuant to N.J.S.A. 18A:18A-2 (b) is the School Business Administrator.
- B. A bid protest filed shall:
 1. Include the name, street address, electronic mail address, and telephone and facsimile numbers of the protester;
 2. Be signed by the protester or its representative;
 3. Identify the bid or solicitation number and date of bid or solicitation;
 4. Include a detailed statement of the legal and factual grounds of protest including copies of relevant documents;
 5. Set forth all information establishing that the protester is an interested party for the purpose of filing a protest;
 6. Set forth all information establishing the timeliness of the protest; and
 7. Provide any or all information pertaining to the bid protest.

1.16 BIDDING DOCUMENTS

- A. The Bidding Documents consist of, but are not limited to, the following:
 1. Instructions to Bidders in accordance with this Section,
 2. General Conditions, AIA Document A201, and as supplemented in the Supplementary General Conditions; Section 00800,

3. Bid Form including attachments as per Bidder's Checklist,
4. Erratum, Addenda, if issued,
5. Specifications: As outlined in the "Index" included in the Project Manual,
6. Drawings: As per List of Drawings indicated on Project Title Sheet and in accordance with Section 00850,
7. Agreement Between Owner & Contractor, AIA Document A101 and as amended by the Project Specifications.

B. Note: The above list is not intended to establish an order of precedence.

1.17 TIME OF COMPLETION AND LIQUIDATED DAMAGES

A. Refer to Section 01800, "Time of Completion and Liquidated Damages."

1.18 LISTING OF STOCKHOLDERS, PARTNERS OR MEMBERS (N.J.S.A. 52:25-24.2)

A. Statement of Ownership

1. No business organization, regardless of form of ownership, shall be awarded any contract for the performance of any work or the furnishing of any goods and services, unless, prior to the receipt of the bid or accompanying the bid of said business organization, bidders shall submit a statement setting forth the names and addresses of all persons and entities that own ten (10%) percent or more of its stock or interest of any type at all levels of ownership.
2. The included Statement of Ownership shall be completed and attached to the bid proposal. This requirement applies to all forms of business organizations, including, but not limited to, corporations and partnerships, publicly-owned corporations, limited partnerships, limited liability corporations, limited liability partnerships, sole proprietorship, and Subchapter S corporations. Failure to submit a disclosure document shall result in rejection of the bid as it cannot be remedied after bids have been opened.
3. Not-for-profit entities should fill in their name, check the not-for-profit box, and certify the form. No other information is required.

1.19 NON-COLLUSION AFFIDAVIT

A. The bidder shall submit the Non-Collusion Affidavit, on form as bound herein, must be submitted with the bid. Failure to submit this document will lead to having the bid being rejected as non-responsive.

1.20 FALSE MATERIAL REPRESENTATION / TRUTH IN CONTRACTING

- A. A person commits a crime if the person knowingly makes a material representation that is false in connection with the negotiation, award or performance of a government contract. If the contract amount is for \$25,000.00 or above, the offender is guilty of a crime of the second degree. If the contract amount exceeds \$2,500.00, but is less than \$25,000.00, the offender is guilty of a crime of the third degree. If the contract amount is for \$2,500.00 or less, the offender is guilty of a crime of the fourth degree. Bidder should be aware of the following statutes that represent "Truth in Contracting" laws:
1. N.J.S.A. 2C:21-34, governs false claims and representations by bidders. It is a serious crime for the bidder to knowingly submit a false claim and/or knowingly make material misrepresentation.
 2. N.J.S.A. 2C:27-11 provides that a bidder commits a crime if said person, directly or indirectly, confers or agrees to confer any benefit not allowed by law to a public servant.
 3. Bidder should consult the statutes such as N.J.S.A. 18A:7G-39 or legal counsel for further information.

1.21 EQUIVALENT PRODUCTS

- A. The use of manufacturers' band names, catalogue numbers and similar proprietary identifying data in the Contract Documents are not intended to eliminate from consideration products that are equivalent in quality, appearance and function to those specified.

1.22 CONTRACT

- A. As indicated in the Advertisement for Bids, it is intended to receive sealed bids and to award and administrate contract for the work required by the Contract Documents as follows:

Single Overall Contract

- B. The Bidder shall be a firm classified by the State of New Jersey - Division of Property Management and Construction for the following classification(s):

Prime General Contractor

C009 - General Construction/Alterations and Additions

and have subcontractor(s) for the following classification(s) of work:

Subcontractors:

C030 - Plumbing

C047 - Electrical

- C. Pursuant to N.J.S.A. 18A:18A-26, the Bidder shall be in possession of the required DPMC Classification for the specified work.
1. In the case of a Combined Single Overall Bid, if the contractor possess the DPMC Classification in one category, but not in all of the required categories, the Contractor must list the Prime Subcontractor(s) bidding the scope of work for the other categories. The Subcontractor(s) must possess the DPMC Classification(s) in that category.

END OF SECTION 00100

3. Bidder hereby acknowledges receipt of the following Addenda:

No Addenda Issued

Addendum No. __,	issued _____	received _____ (initial)
Addendum No. __,	issued _____	received _____ (initial)
Addendum No. __,	issued _____	received _____ (initial)
Addendum No. __,	issued _____	received _____ (initial)

4. In submitting this bid, it is understood that the right is reserved by the Board of Education to accept or to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of sixty (60) days from the date set of the opening thereof.

5. Bid Security in the sum of _____ (\$ _____) in the form of _____ (Certified Check, Cashier's Check, or Bid Bond) is submitted herewith in accordance with the requirements of the specifications.

6. The undersigned is an individual ()
a partnership ()
a corporation () under the laws of the State of _____,

having principal office in the _____ of _____, County
of _____, and State of _____.

Respectfully Submitted,

(Company Name, if Bidder is a company)

BIDDER'S SIGNATURE

(Company Officer, if Bidder is a Corporation or LLC)

(Seal, if Corporation)

Printed or Typed Name Title of Officer (if the Bidder is a Company)

Address

City, State, Zip Code

Dated

Phone & Fax

Email Address

NOTE: SEE BIDDERS CHECKLIST

Submitted by: _____
(Firm Name)

BIDDER'S CHECKLIST

The following checklist must be signed and submitted with the bid package to the owner as part of the bid documents. Failure to submit documents marked (*) mandatory may be cause for rejection of the bid. Items that are not marked (*) mandatory are encouraged to submit with bid but must be provided prior to the contract award.

	<u>ITEM</u>	✓
	Reviewed the Contract Documents (Including the Permits Obtained by the Board), Work Site, Locality, and All Local Conditions and Laws and Regulations That in Any Manner May Affect Cost, Progress, Performance or Furnishing of Work	
	Reviewed General Bond Requirements	
	Reviewed Agreement (Owner/contractor)	
(*)	Bidder's Proposal	
(*)	Bid Bond, Certified Check, Cashier's Check or Any Combination Thereof in an Amount of Ten Percent (10%) of the Total Amount of Bid, Not to Exceed \$20,000 (Twenty Thousand Dollars) with Power of Attorney	
(*)	Consent of Surety for 100% of the Contract Amount with Power of Attorney to Provide Performance Bond and Labor and Material Payment Bond	
(*)	Subcontractor Identification Statement	
(*)	Statement of Ownership Disclosure Certification	
(*)	Non Collusion Affidavit	
(*)	Equipment Certification	
(*)	Sworn Contractor Certification; Qualifications and Credentials (Contractor and Subcontractors)	
(*)	Division of Property Management & Construction (DPMC) Form 701 - Total Amount of Uncompleted Contracts, N.J.S.A. 34:11-56.48 et Seq. - All Contractor(s) and Subcontractor(s)	
(*)	Division of Property Management & Construction (DPMC) Current Notice of Classification - All Contractor(s) and Subcontractor(s)	
	Public Works Contractors Registration Act Certificate (N.J.S.A. 34:11-56.48) All Contractor(s) and Named Subcontractor(s) Encouraged to Submit with Bid but Required Prior to Contract Award	
	Business Registration Certificate - All Contractor(s) and Subcontractor(s) Encouraged to Submit with Bid but Required Prior to Contract Award	
	Federal and State Non-debarment Certifications - All Contractor(s) and Subcontractor(s) Encouraged to Submit with Bid but Required Prior to Contract Award	

BIDDER'S CHECKLIST

	Certification of non Debarment for Federal Government Projects Shall Be Submitted Prior to Award of Contract - All Contractors Encouraged to Submit with Bid but Required Prior to Contract Award	
	Disclosure of Activities in Iran (Contractor and Subcontractors) Encouraged to Submit with Bid but Required Prior to Contract Award	
	Trade License - All Contractor(s) and Subcontractor(s) Encouraged to Submit with Bid but Required Prior to Contract Award	
	HVACR Master License (HVACR Contractors) Encouraged to Submit with Bid but Required Prior to Contract Award	
	Compliance with New Jersey Prevailing Wage Act Encouraged to Submit with Bid but Required Prior to Contract Award	
	Lowest Responsible Bidder by 10% or More Certification of Prevailing Wage Rates and Acknowledgment of Penalties Form Encouraged to Submit with Bid but Required Prior to Contract Award	
	Certification of Insurance Statement Encouraged to Submit with Bid but Required Prior to Contract Award	
	Political Contribution Disclosure Form Encouraged to Submit with Bid but Required Prior to Contract Award	
	Stockholder Disclosure Certification	
	Certification of No Material Change of Circumstances - All Contractor(s) and Subcontractor(s) Encouraged to Submit with Bid but Required Prior to Contract Award	
	Status of Present Contracts	
	Performance Record Certification	
	Contractors shall participate in an "apprenticeship training program" and shall submit evidence of same and/or a description of the contractor's apprenticeship training program prior to the award of the contract.	

By signing below, I acknowledge having read and fully understand all the requirements of each of the documents referenced herein.

BIDDER (Signature)

Dated: _____

BIDDER (Print Name)

BID BOND

THE UNDERSIGNED BIDDER and "**Surety**", a corporation duly authorized to transact business in the State of New Jersey, are held and firmly bound unto _____ (the "**OWNER**") for the full and just sum of:

_____ Dollars (\$ _____),
(10% of the Bid Price not to exceed \$20,000.00: words) **(figures)**

The payment of which sum the **BIDDER** has submitted a Bid to perform certain Work described in Bidding Documents entitled:

TITLE: _____

CONTRACT NO.: _____

The **Surety** hereby agrees to pay the full face value of this Bond to the **OWNER**, as Liquidated Damages, and not as a penalty, unless this Bond is void.

This Bond shall only be void if the **BIDDER** well, truly and faithfully performs all requirements contained in the Bidding/Contract Documents incident to an Award of the Contract including, but not limited to, proper execution and submission of the Contract Forms and all other required documentation.

On this _____ day of _____ 20____, the **BIDDER** and **Surety** hereby bind themselves herein:

FOR THE BIDDER:

FOR THE SURETY:

(Name of **BIDDER**)

(Name of **Surety**)

By: _____
(Print Name-**BIDDER's** Authorized Representative)

By: _____
(Print Name of Attorney-in-Fact)

By: _____
(Signature-**BIDDER's** Authorized Representative)

By: _____
(Signature of Attorney-in-Fact)

IMPORTANT – ATTACH AND SUBMIT WITH THE BID:

- **A POWER OF ATTORNEY FOR THE ATTORNEY-IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE ENTIRE AMOUNT OF THE BOND**

FORM OF CONSENT OF SURETY

PERFORMANCE BOND, PAYMENT BOND and MAINTENANCE BOND

For and in consideration of the sum of one dollar (\$1.00) lawful money of the United States, the receipt is hereby acknowledged, paid to the undersigned surety, and for other valuable consideration, the undersigned surety, authorized to transact business in the State of _____, certifies and agrees that if the Contract entitled: _____

CONTRACT _____,
(NUMBER) (TITLE)

is awarded to: _____
(BIDDER'S NAME)

the undersigned hereby warrants that it is in all respects qualified to provide the required Bonds as set forth in the Contract Documents, and that it will provide and execute the **Performance Bond** in the full amount of awarded contract in the event that said contractor is awarded a contract for the above project, the **Payment Bond**, and the **Maintenance Bond** in the form and as otherwise required by the Contract Documents.

(Print Name of Surety)

(Print Name of Attorney-in-Fact)

(Signature of Attorney-in-Fact)

ATTACH AND SUBMIT WITH THE BID: A POWER OF ATTORNEY FOR THE ATTORNEY -IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE TOTAL AMOUNT OF ALL BONDS.

Consent of Surety must be signed by an authorized agent or representative of a surety company and not by the individual or company representative submitting the bid.

NOTE: IF SUBCONTRACTORS ARE LISTED ON BID FORM, N.J.S.A. 18A:18A-18 REQUIRES THAT EVIDENCE OF PERFORMANCE SECURITY AS TO SUBCONTRACTORS BE SUBMITTED WITH THE BID, EITHER BE THE BIDDER ON ITS OWN BEHALF AND ON BEHALF OF ALL LISTED SUBCONTRACTORS, OR BY EACH SUBCONTRACTOR, OR ANY COMBINATION THEREOF, PROVIDED THAT THE PERFORMANCE SECURITY IN TOTAL EQUALS, BUT DOES NOT EXCEED, THE TOTAL AMOUNT OF THE BID.

SUBCONTRACTOR IDENTIFICATION STATEMENT

The following information is to be provided in the case of all subcontractors who will furnish labor of the various trades governed by N.J.S.A. 18A:18A-18 (b) (General Construction, Steel, Plumbing, HVAC, Electric) and all DPMC Specialty Trades, where applicable.

TRADE	Contractor's Name/Address/Telephone	NJ License No.

If work of the types designated by the above referenced law will be performed by the Bidder, the Bidder shall state below and shall enclose copies of licenses covering each trade.

TRADE	N.J. License No.

BIDDER _____

STATEMENT OF OWNERSHIP DISCLOSURE

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Name of Organization: _____

Organization Address: _____

City, State, ZIP: _____

Part I Check the box that represents the type of business organization:

- Sole Proprietorship
- Non-Profit Corporation (skip Parts II and III, execute certification in Part IV)
- For-Profit Corporation (any type) Limited Liability Company (LLC)
- Partnership Limited Partnership Limited Liability Partnership (LLP)
- Other (be specific): _____

Part II Check the appropriate box

- The list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. **(COMPLETE THE LIST BELOW IN THIS SECTION)**
- OR**
- No one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be. **(SKIP TO PART IV)**

(Please attach additional sheets if more space is needed):

Name of Individual or Business Entity	Address (for Individuals) or Business Address

Part III DISCLOSURE OF 10% OR GREATER OWNERSHIP IN THE STOCKHOLDERS, PARTNERS OR LLC MEMBERS LISTED IN PART II

If a bidder has a direct or indirect parent entity which is publicly traded, and any person holds a 10 percent or greater beneficial interest in the publicly traded parent entity as of the last annual federal Security and Exchange Commission (SEC) or foreign equivalent filing, ownership disclosure can be met by providing links to the website(s) containing the last annual filing(s) with the federal Securities and Exchange Commission (or foreign equivalent) that contain the name and address of each person holding a 10% or greater beneficial interest in the publicly traded parent entity, along with the relevant page numbers of the filing(s) that contain the information on each such person. **Attach additional sheets if more space is needed.**

Website (URL) containing the last annual SEC (or foreign equivalent) filing	Page #'s

Please list the names and addresses of each stockholder, partner or member owning a 10 percent or greater interest in any corresponding corporation, partnership and/or limited liability company (LLC) listed in Part II **other than for any publicly traded parent entities referenced above.** The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established pursuant to N.J.S.A. 52:25-24.2 has been listed. **Attach additional sheets if more space is needed.**

Stockholder/Partner/Member and Corresponding Entity Listed in Part II	Address (for Individuals) or Business Address

Part IV Certification

I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder/proposer; that the _____ (**Owner**) is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the **Owner** to notify the **Owner** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the, permitting the **Owner** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

NON-COLLUSION AFFIDAVIT

STATE OF NEW JERSEY/ _____
(Specify, if Other)

COUNTY OF _____

I, _____, of the (City, Town, Borough) of _____ State of _____, of full age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____, the Bidder making the Proposal for the above named Projects, and that I executed the said Proposal with full authority to do so; that said Bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named Project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge, and the State of New Jersey relies upon the truth of the statements contained in this affidavit in awarding the contract for the said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____. (Name of Contractor)

By: _____
(Signature of Authorized Representative)

Subscribed and sworn to before me
this _____ day of _____, 20__.

(Seal) Notary Public of New Jersey/
Specify Other State
My Commission Expires _____, 20__.

THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED, AND SUBMITTED WITH BID

EQUIPMENT CERTIFICATION

Title of Bid: _____

Bid No. _____

Bid Date: _____
(Weekday, Month 00, 20__)

In accordance with N.J.S.A. 18A:18A-23, I hereby certify that

A) _____ (Name of Company) owns all the necessary equipment as required by the specifications and to complete the specified public work project.

or

B) _____ (Name of Company) leases or controls all the necessary equipment as required by the specifications and to complete the specified public work project.

PLEASE NOTE: If your company is not the actual owner of the equipment, **you shall submit with the bid**

1. A certificate stating the source from which the equipment will be obtained and
2. Obtain and submit with the bid a certificate from the owner and person in control of the equipment, definitely granting to the bidder the control of the equipment required during such time it may be necessary for the completion of that portion of the contract for which said equipment will be necessary.

Name of Company _____

Authorized Agent _____ Title _____

Authorized Signature _____

Sworn Contractor Certification; Qualifications and Credentials

Pursuant to N.J.S.A. 18A:7G-37, a pre-qualified contractor seeking to bid school facilities projects, and any subcontractors, that are required to be named under N.J.S.A. 18A:7G-1 et seq. shall, as a condition of bidding, submit this Sworn Contractor Certification regarding qualifications and credentials.

I, _____, the principal owner or officer of the company certify that the forging statements are true and our firm has the following qualifications and credentials:

1. A current, valid certificate of registration issued pursuant to "The Public Works Contractor Registration Act," N.J.S.A. 34:11-56:48 et seq. A copy of which is submitted with its bid;
2. A current, valid Certificate of Authority to perform work in New Jersey issued by the Department of Treasury, a copy of which shall be attached to the certification form and is submitted with its bid;
3. A current valid contractor trade license required under applicable New Jersey Law for any specialty trade or specialty area in which the firm seeks to perform work, a copy of which is submitted with its bid;
4. During the term of the school facilities project, I as principal owner or officer of the company or corporation, as contractor, will have in place a suitable quality control and quality assurance program and an appropriate safety and health plan.
5. Certify that, at the time of bidding, the amount of the bid proposal and value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit.

Name of Company _____

Name of Owner or Officer _____

Signature of Owner or Officer _____

Notarized before me this _____ day of _____, _____
Month Year

NOTARY PUBLIC SIGNATURE

Print Name of Notary Public

My commission expires _____, _____
Month Day Year

-SEAL-

To be completed, signed, notarized and returned with bid.

FEDERAL AND STATE NON-DEBARMENT CERTIFICATIONS

I, _____ of the city of _____, in the County of _____ and the State of _____, of full age, certify that the entity listed on the form and/or any person or company employed by this entity, are not presently on the following:

- New Jersey Department of Treasury – Consolidated Debarment Report
- New Jersey Department of Labor – Prevailing Wage Debarment List
- Federal Debarred Vendor List – System for Award Management (SAM.gov)

Company Name: _____

Authorized Agent: _____

Signature: _____

Date: _____

SECTION 004541 – CERTIFICATION OF NON-DEPARTMENT FOR
 FEDERAL GOVERNMENT CONTRACTS
 N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

Public Works Contracts

Project No. _____ Title of Bid _____

This certification shall be completed, certified to, and submitted to the contracting unit **prior to contract award**, except for emergency contracts where submission is required prior to payment.

PART I: VENDOR INFORMATION	
Individual or Organization Name	
Address of Individual or Organization	
DUNS Code (if applicable)	
CAGE Code (if applicable)	
Check the box that represents the type of business organization:	

- Sole Proprietorship (skip Parts III and IV)
 Non-Profit Corporation (skip Parts III and IV)
 For-Profit Corporation (any type)
 Limited Liability Company (LLC)
 Partnership
 Limited Partnership
 Limited Liability Partnership (LLP)
 Other (be specific): _____

PART II – CERTIFICATION OF NON-DEBARMENT: Individual or Organization			
I hereby certify that the individual or organization listed above in Part I is not debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above- named organization; that the _____ (“ OWNER ”) is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by “ OWNER ” to notify the “ OWNER ” in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the “ OWNER ”, permitting the “ OWNER ” to declare any contract(s) resulting from this certification void and unenforceable.			
Full Name (Print):		Title:	
Signature:		Date:	

PART III – CERTIFICATION OF NON-DEBARMENT: Individual or Entity Owning Greater than 50 Percent of Organization

Section A (Check the Box that applies)

<input type="checkbox"/>	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of its voting stock, or of the partner in the partnership who owns more than 50 percent interest therein, or of the member of the limited liability company owning more than 50 percent interest therein, as the case may be.
Name of Individual or Organization	
Home Address (for Individual) or Business Address	
OR	
<input type="checkbox"/>	No one stockholder in the corporation owns more than 50 percent of its voting stock, or no partner in the partnership owns more than 50 percent interest therein, or no member in the limited liability company owns more than 50 percent interest therein, as the case may be.

Section B (Skip if no Business entity is listed in Section A above)

<input type="checkbox"/>	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of the voting stock of the organization's parent entity, or of the partner in the partnership who owns more than 50 percent interest in the organization's parent entity, or of the member of the limited liability company owning more than 50 percent interest in organization's parent entity, as the case may be.
Stockholder/Partner/Member Owning Greater Than 50 Percent of Parent Entity	
Home Address (for Individual) or Business Address	
OR	
<input type="checkbox"/>	No one stockholder in the parent entity corporation owns more than 50 percent of its voting stock, no partner in the parent entity partnership owns more than 50 percent interest therein, or no member in the parent entity limited liability company owns more than 50 percent interest therein, as the case may be.

Section C – Part III Certification

I hereby certify that no individual or organization that is debarred by the federal government from contracting with a federal agency owns greater than 50 percent of the **Organization listed above in Part I** or, if applicable, owns greater than 50 percent of a parent entity of _____ (***name of organization***). I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the (“**OWNER**”) is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award “**OWNER**” to notify the “**OWNER**” in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the “**OWNER**”, permitting the “**OWNER**” to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

Part IV – CERTIFICATION OF Non-Debarment: Contractor – Controlled Entities

Section A

Below is the name and address of the corporation(s) in which the **Organization listed in Part I** owns more than 50 percent of voting stock, or of the partnership(s) in which the **Organization listed in Part I** owns more than 50 percent interest therein, or of the limited liability company or companies in which the **Organization listed above in Part I** owns more than 50 percent interest therein, as the case may be.

Name of Business Entity

Business Address

Add additional sheets if necessary

OR

The **Organization listed above in Part I** does not own greater than 50 percent of the voting stock in any corporation and does not own greater than 50 percent interest in any partnership or any limited liability company.

Section B (skip if no business entities are listed in Section A of Part IV)	
<input type="checkbox"/>	Below are the names and addresses of any entities in which an entity listed in Part III A owns greater than 50 percent of the voting stock (corporation) or owns greater than 50 percent interest (partnership or limited liability company).
Name of Business Entity Controlled by Entity Listed in Section A of Part IV	Business Address
Add additional Sheets if necessary	
OR	
<input type="checkbox"/>	No entity listed in Part III A owns greater than 50 percent of the voting stock in any corporation or owns greater than 50 percent interest in any partnership or limited liability company.

Section C – Part IV Certification of Non-Debarment			
<p>I hereby certify that the Organization listed above in Part I does not own greater than 50 percent of any entity that that is debarred by the federal government from contracting with a federal agency and, if applicable, does not own greater than 50 percent of any entity that in turns owns greater than 50 percent of any entity debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the (“OWNER”) is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by “OWNER” to notify “OWNER” in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the “OWNER”, permitting the “OWNER” to declare any contract(s) resulting from this certification void and unenforceable.</p>			
Full Name (Print):		Title:	
Signature:		Date:	

STATE OF NEW JERSEY -- DIVISION OF PURCHASE AND PROPERTY
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

Quote Number: _____

Bidder/Offeror: _____

PART 1: CERTIFICATION

BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

FAILURE TO CHECK ONE OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>. Bidders **must** review this list prior to completing the below certification. **Failure to complete the certification will render a bidder's proposal non-responsive.** If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party

PLEASE CHECK THE APPROPRIATE BOX:

I certify, pursuant to Public Law 2012, c. 25, that neither the bidder listed above nor any of the bidder's parents, subsidiaries, or affiliates is listed on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. **I will skip Part 2 and sign and complete the Certification below.**

OR

I am unable to certify as above because the bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.

EACH BOX WILL PROMPT YOU TO PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, CLICK THE "ADD AN ADDITIONAL ACTIVITIES ENTRY" BUTTON.

Name _____	Relationship to Bidder/Offeror _____	<input type="button" value="Delete"/>
Description of Activities _____ _____		
Duration of Engagement _____	Anticipated Cessation Date _____	
Bidder/Offeror Contact Name _____	Contact Phone Number _____	
<input type="button" value="ADD AN ADDITIONAL ACTIVITIES ENTRY"/>		

Certification: I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder; that the State of New Jersey is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): _____

Signature: _____

Do Not Enter PIN as a Signature

Title: _____

Date: _____

Compliance with New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.)

Every contractor and subcontractor performing services in connection with this project, shall pay all workers a wage rate not less than the published prevailing wage rates, for the locality the work is being performed, as designated by the New Jersey Department of Labor and Workforce Development (NJ DLWD).

Wage rates for the county of the location of the Public Agency (Owner), as published by the State Department of Labor and Workforce Development (DLWD), can be viewed at https://www.nj.gov/labor/wagehour/wagerate/prevailing_wage_determinations.html

The contractor must complete and sign the "Prevailing Wage Certification" form included in the bid package and submit with his bid. This form confirms the contractor's intention to comply with the act. The Owner may terminate the contract if contractor fails to pay workers prevailing wage.

The prevailing wage rates in affect at the time of award, will be included as a part of the construction contract.

PREVAILING WAGES COMPLIANCE CERTIFICATION

It is the determination that this is a public works project that in total will exceed \$2,000.00 (two thousand dollars), therefore prevailing wages rules and regulations apply as promulgated by the New Jersey Prevailing Wage Act and in conformance with N.J.S.A. 34:11-56:25 et seq.

Certification

1. I certify that our company understands that this project requires prevailing wages to be paid in full accordance with the law.

2. I further certify that all subcontractors named in this bid understand that this project requires the subcontractor to pay prevailing wages in full accordance with the law.

Non-compliance Statement

If it is found that any worker, employed by the contractor or any subcontractor covered by said contract, has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the Owner, may begin proceedings to terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable for any excess costs occasioned thereby to the public body.

NOTIFICATION OF VIOLATIONS – New Jersey Department of Labor and Workforce Development

Has the bidder or any person having an “interest” with the bidder, been notified by the New Jersey Department of Labor and Workforce Development by notice issued pursuant to N.J.S.A. 34:11-56a et seq that he/she has been in violation for failure to pay prevailing wages as required by the New Jersey Prevailing Wage Act within the last five (5) years?

*Yes _____

No _____

*If yes, please attach a signed document explaining any/or all administrative proceedings with the Department within the last five (5) years. Please include any pending administrative proceedings with the Department if any.

Submission of Certified Payroll Records

All certified payroll records are to be submitted to the Owner, Business Administrator, who is coordinating the activities for the project:

Name of Company _____

Authorized Agent _____

Authorized Signature _____

**Lowest Responsible Bidder by 10% or More
Certification of Prevailing Wage Rates and
Acknowledgement of Penalties Form
P.L.2021, c.301**

I, _____ of the bidding organization/firm of _____, located in the Municipality of _____, County of _____, State of _____; and being of full age, do hereby certify and affirm that:

I am a Bidder and/or authorized representative of same submitting a bid for labor/materials/services on the _____ [Project]. I hereby certify that, should _____ [organization/firm] be deemed the lowest responsible bidder for the Project, and should _____ [organization/firm's] bid amount be ten percent (10%) or more lower than the next lowest bid for the contract, that the prevailing wage rates required by the New Jersey Prevailing Wage Act, P.L.1963, c.150 (C.34:11-56.25 et seq.) shall be paid.

Furthermore, I hereby certify and acknowledge, that I understand that if _____ [organization/firm] does not provide this Certification prior to the award of contract, the Project Owner shall award the contract to the next lowest responsible and responsive bid, pursuant to P.L.2021, c.301.

Name of Authorized Agent _____
Signature _____
Title _____
Date _____

CERTIFICATION OF INSURANCE STATEMENT

The Bidder fully understands the Owner's insurance requirements as stated in the Bid Documents (i.e., Supplementary General Conditions, AIA 201 Article 11 Insurance and Bonds, A101 Exhibit A Insurance and Bonds) and agrees to provide all insurance required by these documents at award of contract.

COMPANY NAME

BIDDER (Signature)

BIDDER (Print Name)

Note: Failure to sign this document may result in the rejection of your Proposal.

CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES

Bidder's Name: _____

Address: _____

1. A statement as to the financial ability, adequacy of plant equipment, organization and prior experience of the Bidder, as required by N.J.S.A. 18A:18A-28 has been submitted to the Department of Treasury within the last twelve (12) months preceding the date of opening of bids for this contract.

2. I certify, as required by N.J.S.A. 18A:18A-32, that there has been no material adverse change in the qualification except:

(Name and Title of Signer - Please print or type)

(Signature)

(Date)

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Contractor Instructions

Business entities (contractors) receiving contracts from a public agency that are NOT awarded pursuant to a “fair and open” process (defined at N.J.S.A. 19:44A-20.7) are subject to the provisions of P.L. 2005, c. 271, s.2 (N.J.S.A. 19:44A-20.26). This law provides that 10 days prior to the award of such a contract, the contractor shall disclose contributions to:

- any State, county, or municipal committee of a political party
- any legislative leadership committee*
- any continuing political committee (a.k.a., political action committee)
- any candidate committee of a candidate for, or holder of, an elective office:
 - of the public entity awarding the contract
 - of that county in which that public entity is located
 - of another public entity within that county
 - or of a legislative district in which that public entity is located or, when the public entity is a county, of any legislative district which includes all or part of the county

The disclosure must list reportable contributions to any of the committees that exceed \$300 per election cycle that were made during the 12 months prior to award of the contract. See N.J.S.A. 19:44A-8 and 19:44A-16 for more details on reportable contributions.

N.J.S.A. 19:44A-20.26 itemizes the parties from whom contributions must be disclosed when a business entity is not a natural person. This includes the following:

- individuals with an “interest” ownership or control of more than 10% of the profits or assets of a business entity or 10% of the stock in the case of a business entity that is a corporation for profit
- all principals, partners, officers, or directors of the business entity or their spouses
- any subsidiaries directly or indirectly controlled by the business entity
- IRS Code Section 527 New Jersey based organizations, directly or indirectly controlled by the business entity and filing as continuing political committees, (PACs).

When the business entity is a natural person, “a contribution by that person’s spouse or child, residing therewith, shall be deemed to be a contribution by the business entity.” [N.J.S.A. 19:44A-20.26(b)] The contributor must be listed on the disclosure.

Any business entity that fails to comply with the disclosure provisions shall be subject to a fine imposed by ELEC in an amount to be determined by the Commission which may be based upon the amount that the business entity failed to report.

The enclosed list of agencies is provided to assist the contractor in identifying those public agencies whose elected official and/or candidate campaign committees are affected by the disclosure requirement. It is the contractor’s responsibility to identify the specific committees to which contributions may have been made and need to be disclosed. The disclosed information may exceed the minimum requirement.

The enclosed form, a content-consistent facsimile, or an electronic data file containing the required details (along with a signed cover sheet) may be used as the contractor’s submission and is disclosable to the public under the Open Public Records Act.

The contractor must also complete the attached Stockholder Disclosure Certification. This will assist the agency in meeting its obligations under the law. **NOTE: This section does not apply to Board of Education contracts.**

* N.J.S.A. 19:44A-3(s): “The term “legislative leadership committee” means a committee established, authorized to be established, or designated by the President of the Senate, the Minority Leader of the Senate, the Speaker of the General Assembly or the Minority Leader of the General Assembly pursuant to section 16 of P.L.1993, c.65 (C.19:44A-10.1) for the purpose of receiving contributions and making expenditures.”

List of Agencies with Elected Officials Required for Political Contribution Disclosure
N.J.S.A. 19:44A-20.26

County Name:

State: Governor, and Legislative Leadership Committees

Legislative District #s:

State Senator and two members of the General Assembly per district.

County:

Freeholders

County Clerk

Sheriff

{County Executive}

Surrogate

Municipalities (Mayor and members of governing body, regardless of title):

**USERS SHOULD CREATE THEIR OWN FORM, OR DOWNLOAD
FROM [the Pay to Play section](#) OF THE DLGS WEBSITE A
COUNTY-BASED, CUSTOMIZABLE FORM.**

STOCKHOLDER DISCLOSURE CERTIFICATION

Name of Business:

I certify that the list below contains the names and home addresses of all stockholders holding 10% or more of the issued and outstanding stock of the undersigned.

OR

I certify that no one stockholder owns 10% or more of the issued and outstanding stock of the undersigned.

Check the box that represents the type of business organization:

Partnership

Corporation

Sole Proprietorship

Limited Partnership

Limited Liability Corporation

Limited Liability Partnership

Subchapter S Corporation

Sign and notarize the form below, and, if necessary, complete the stockholder list below.

Stockholders:

Name:	Name:
Home Address:	Home Address:
Name:	Name:
Home Address:	Home Address:
Name:	Name:
Home Address:	Home Address:

Subscribed and sworn before me this ___ day of _____, 2 __.	_____
(Notary Public)	(Affiant)
My Commission expires:	_____
	(Print name & title of affiant)
	(Corporate Seal)

STATUS OF PRESENT CONTRACTS

PURSUANT TO N.J.A.C. 17:19-2.13, BIDDER DECLARES THE FOLLOWING WITH RESPECT TO ITS UNCOMPLETED CONTRACTS, ON ALL WORK, FROM WHATEVER SOURCE (PUBLIC AND PRIVATE), BOTH IN NEW JERSEY AND FROM OTHER GOVERNMENTAL JURISDICTIONS.

- Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.
- Calculations shall be based on Bidder's base bid amount only at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.

Entity	Project Title	Original Contract Amount	Uncompleted Amount As of Bid Opening Date	Name and Telephone Number of Party To Be Contacted From Entity For Verification

Sworn and Subscribed to before me
 this _____ day of _____, 20__

BIDDER

 Notary Public

 (Print and Signature)

PERFORMANCE RECORD

How many years has your organization been in business as a Contractor under your present business name? _____

How many years experience in construction work has your organization had:

(a) As a Prime contractor? _____ (b) As a subcontractor? _____

What is the construction experience of the principal individuals of your organization?

Individual's Name	Present Position or Office	Years of Constr. Experience	Magnitude and Type of Work	In What Capacity

Have you ever failed to complete any work contracted to you? _____

If so, where and why? _____

Has any officer or partner of your organization ever failed to complete a construction contract handled in its own name?

If so, state name of individual, name of owner, location and type of project and reason for the failure to complete.

Surety Disclosure Statement and Certification
N.J.S. A. 2A:44-143

SAMPLE

SURETY DISCLOSURE STATEMENT AND CERTIFICATION

....., surety(ies) on the attached bond, hereby certifies(y) the following:

(1) The surety meets the applicable capital and surplus requirements of N.J.S.A.17:17-6 or N.J.S.A. 17:17-7 as of the surety's most current annual filing with the New Jersey Department of Insurance.

(2) The capital (where applicable) and surplus, as determined in accordance with the applicable laws of this State, of the surety(ies) participating in the issuance of the attached bond is (are) in the following amount(s) as of the calendar year ended December 31, (most recent calendar year for which capital and surplus amounts are available), which amounts have been certified as indicated by certified public accountants (indicating separately for each surety that surety's capital and surplus amounts, together with the name and address of the firm of certified public accounts that shall have certified those amounts):

.....
.....
.....

(3) (a) With respect to each surety participating in the issuance of the attached bond that has received from the United States Secretary of the Treasury a certificate of authority pursuant to 31 U.S.C. 9305, the underwriting limitation established therein and the date as of which that limitation was effective is as follows (indicating for each such surety that surety's underwriting limitation and the effective date thereof):

.....
.....
.....

(b) With respect to each surety participating in the issuance of the attached bond that has not received such a certificate of authority from the United States Secretary of the Treasury, the underwriting limitation of that surety as established pursuant to N.J.S.A. 17:18-9 as of (date on which such limitation was so established) is as follows (indicating for each such surety that surety's underwriting limitation and the date on which that limitation was established):

.....
.....
.....

(4) The amount of the bond to which this statement and certification is attached is \$.....

(5) If, by virtue of one or more contracts of reinsurance, the amount of the bond indicated under item (4) above exceeds the total underwriting limitation of all sureties on the bond as set forth in items (3)(a) or (3)(b) above, or both, then for each such contract of reinsurance:

(a) The name and address of each such reinsurer under that contract and the amount of that reinsurer's participation in the contract is as follows:.....

.....

.....

.....; and

(b) Each surety that is party to any such contract of reinsurance certifies that each reinsurer listed under item (5)(a) satisfies the credit for reinsurance requirement established under NJSA 17:51B-1 et seq. and any applicable regulations in effect as of the date on which the bond to which this statement and certification is attached shall have been filed with the appropriate public agency.

CERTIFICATE

(to be completed by an authorized certifying agent

for each surety on the bond)

I (name of agent), as (title of agent) for (name of surety), a corporation/mutual insurance company/other (indicating type of business organization) (circle one) domiciled in (state of domicile), DO HEREBY CERTIFY that, to the best of my knowledge, the foregoing statements made by me are true, and ACKNOWLEDGE that, if any of those statements are false, this bond is VOIDABLE.

.....

(Signature of certifying agent)

.....

(Printed name of certifying agent)

.....

(Title of certifying agent)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ as PRINCIPAL and sureties with underwriting office at _____ to which all communication in regard to this bond should be addressed, a Corporation organized and existing under the laws of the State of _____ and duly authorized to do business in the state of New Jersey, as SURETY, are hereby held and firmly bound unto the _____ (Owner) in the penal sum of _____ Dollars, (\$ _____) for payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

SIGNED and SEALED this _____ day of _____ two thousand and ____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT, WHEREAS, the above named Principal did on the _____ day of _____, 20____, entered into a contract with _____ identified as _____ which said contract, upon execution by the Owner, and the Principal, will be a part of this bond the same as though set forth herein.

Now, if the said Principal shall well and faithfully do and perform each and every, all and singular, the things agreed by it (or them) to be done and performed according to the terms of said contract, and shall pay all lawful claims of beneficiaries as defined by N.J.S.2A:44-143 for labor performed or materials, provisions, provender or other supplies or teams, fuels, oils, implements or machinery furnished, used or consumed in the carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any beneficiary as defined in N.J.S.2A:44-143 having a just claim, as well as for the oblige herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said Surety hereby stipulated and agrees that no modifications, omissions or additions in or to the terms of the said contract, or in or to the plans or specifications therefore, shall in anyway affect the obligations of said Surety on its bond.

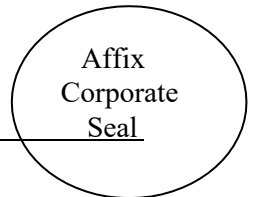
Recovery of any claimant under the bond shall be subject to the conditions and provisions of this article to the same extent as if such conditions and provisions were fully incorporated in the form set forth above.

Principal:

Witness

Print or Type Name

By: _____
Print Name:
Print Title:

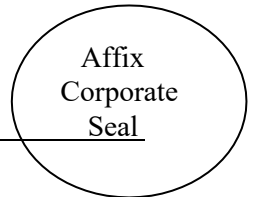


Surety:

Witness

Print or Type Name

By: _____
Print Name:
Print Title:



PAYMENT BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ as PRINCIPAL and sureties with underwriting office at _____ to which all communication in regard to this bond should be addressed, a Corporation organized and existing under the laws of the State of _____ and duly authorized to do business in the state of New Jersey, as SURETY, are hereby held and firmly bound unto the _____ in the penal sum of _____, for payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

SIGNED and SEALED this _____ day of _____ two thousand and _____.

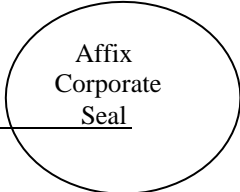
THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT, WHEREAS, the above named Principal did on the _____ day of _____, 20____, entered into a contract with _____ identified as _____ which said contract, upon execution by the Owner, and the Principal, will be a part of this bond the same as though set forth herein.

Now, if the said Principal shall pay all lawful claims of beneficiaries as defined by N.J.S.2A:44-143 for labor performed or materials, provisions, provender or other supplies or teams, fuels, oils, implement or machinery furnished, used or consumed in carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any beneficiary as defined in N.J.S.2A;44-143 having a just claim, as well as for the party of the first part mentioned in the contract aforesaid; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said Surety hereby stipulated and agrees that no modifications, omissions or additions in or to the terms of the said contract, or in or to the plans or specifications therefore, shall in anyway affect the obligations of said Surety on its bond.

Principal:

By: _____
Print Name:
Print Title:

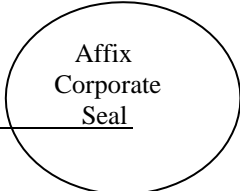


Witness

Print or Type Name

Surety:

By: _____
Print Name:
Print Title:



Witness

Print or Type Name

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned,

as principal, and _____ a Corporation organized and existing under the laws of the state of _____, and duly authorized to do business in the State of New Jersey, as Surety, are held and firmly bound unto the _____ as Owner, in the penal sum of _____

(10% of the Final Contract Amount)

for payment of which, well and truly to be made, we hereby, jointly, and severally, bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That whereas the above named principal did on the _____ day of _____, 20____, enter into a Contract with the Owner for _____

(Project Name)

which said Contract is made a part of this bond the same as though set forth herein.

NOW, if the said principal shall remedy without cost to the Owner any defects which may develop during the one (1) year Maintenance Period of the work performed under the said Contract, provided such defects, in the judgment of the Owner are caused by defective or inferior materials or workmanship, then this obligation shall be void, otherwise it shall be and remain in full force and effect. The one (1) year period shall commence on the date established in the Certificate of Substantial Completion.

The said Surety hereby stipulates and agrees that no modifications, deletions or additions in or to the terms of the said Contract or the plans or specifications therefor shall in any way affect its obligations on this bond.

Signed and Sealed this _____ day of _____, 20__.

(Principal) (Seal)

(Witness)

(Title)

(Surety) (Seal)

(Witness)

(Title)

**INSTRUCTIONS FOR COMPLETING THE INITIAL PROJECT
WORKFORCE REPORT – CONSTRUCTION (AA201)**

DO NOT COMPLETE THIS FORM FOR GOODS AND/OR SERVICE CONTRACTS

- 1. Enter the Federal Identification Number assigned to the contractor by the Internal Revenue Service, or if a Federal Employer Identification Number has been applied for but not yet issued, or if your business is such that you have not or will not receive a Federal Identification Number, enter the social security number assigned to the single owner or one partner, in the case of a partnership.**
- 2. Note: The Department of Labor & Workforce Development, Construction EEO Monitoring Program will assign a contractor ID number to your company. This number will be your permanently assigned contractor ID number that must be on all correspondence and reports submitted to this office.**
- 3. Enter the prime contractor’s name, address and zip code number.**
- 4. Check box if Company is Minority Owned or Woman Owned**
- 5. Enter the complete name and address of the Public Agency awarding the contract. Include the contract number, date of award and dollar amount of the contract.**
- 6. Enter the name and address of the project, including the county in which the project is located.**
- 7. Note: A project contract ID number will be assigned to your firm upon receipt of the completed Initial Project Workforce Report (AA201) for this contract. This number must be indicated on all correspondence and reports submitted to this office relating to this contract.**
- 8. Check “Yes” or “No” to indicate whether a Project Labor Agreement (PLA) was established with the labor organization(s) for this project.**
- 9. Under the Projected Total Number of Employees in each trade or craft and at each level of classification, enter the total composite workforce of the prime contractor and all subcontractors projected to work on the project. Under Projected Employees enter total minority and female employees of the prime contractor and all subcontractors projected to work on the project. Minority employees include Black, Hispanic, American Indian and Asian, (J=Journeyworker, AP=Apprentice). Include projected phase-in and completion dates.**
- 10. Print or type the name of the company official or authorized Equal Employment Opportunity (EEO) official include signature and title, phone number and date the report is submitted.**

This report must be submitted to the Public Agency that awards the contract and the Department of Labor & Workforce Development, Construction EEO Compliance Monitoring Program after notification of award, but prior signing the contract.

**THE CONTRACTOR IS TO RETAIN A COPY AND SUBMIT COPY TO THE PUBLIC AGENCY AWARDING
THE CONTRACT AND FORWARD A COPY TO:**

**NEW JERSEY DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
CONSTRUCTION EEO COMPLIANCE MONITORING UNIT**

**P.O. BOX 209
TRENTON, NJ 08625-0209**

(609) 292-9550

STATE OF NEW JERSEY

DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
CONSTRUCTION EEO COMPLIANCE MONITORING PROGRAM

Official Use Only

Assignment

Code

FORM AA-201

Revised 11/11

INITIAL PROJECT WORKFORCE REPORT CONSTRUCTION

For instructions on completing the form, go to: http://www.state.nj.us/treasury/contract_compliance/pdf/aa201ins.pdf

1. FID NUMBER		2. CONTRACTOR ID NUMBER		5. NAME AND ADDRESS OF PUBLIC AGENCY AWARDDING CONTRACT						
3. NAME AND ADDRESS OF PRIME CONTRACTOR				Name:						
				Address:						
(Name)				CONTRACT NUMBER		DATE OF AWARD		DOLLAR AMOUNT OF AWARD		
(Street Address)				6. NAME AND ADDRESS OF PROJECT				7. PROJECT NUMBER		
(City) (State) (Zip Code)										Name:
4. IS THIS COMPANY MINORITY OWNED [] OR WOMAN OWNED []				Address:						
				COUNTY						8. IS THIS PROJECT COVERED BY A PROJECT LABOR AGREEMENT (PLA)? YES <input type="checkbox"/>
9. TRADE OR CRAFT	PROJECTED TOTAL EMPLOYEES				PROJECTED MINORITY EMPLOYEES				PROJECTED PHASE - IN DATE	PROJECTED COMPLETION DATE
	MALE		FEMALE		MALE		FEMALE			
	J	AP	J	AP	J	AP	J	AP		
1. ASBESTOS WORKER										
2. BRICKLAYER OR MASON										
3. CARPENTER										
4. ELECTRICIAN										
5. GLAZIER										
6. HVAC MECHANIC										
7. IRONWORKER										
8. OPERATING ENGINEER										
9. PAINTER										
10. PLUMBER										
11. ROOFER										
12. SHEET METAL WORKER										
13. SPRINKLER FITTER										
14. STEAMFITTER										
15. SURVEYOR										
16. TILER										
17. TRUCK DRIVER										
18. LABORER										
19. OTHER										
20. OTHER										

I hereby certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements are willfully false, I am subject to punishment.

(Signature)

10. (Please Print Your Name)

(Title)

(Area Code)

(Telephone Number)

(Ext.)

(Date)

State Of New Jersey

Department of Labor & Workforce Development
Construction EEO Compliance Monitoring Program

MONTHLY PROJECT WORKFORCE REPORT - CONSTRUCTION

For instructions on completing the form, go to: http://www.state.nj.us/treasury/contract_compliance/pdf/aa202ins.pdf		3. F ID or SS Number			
1. Name and address of Prime Contractor (NAME)		2. Contractor ID Number		4. Reporting Period	
(ADDRESS)		5. Public Agency Awarding Contract		Date of Award	
(CITY) (STATE) (ZIP CODE)		6. Name and Location of Project		County	
				7. Project ID Number	

8. CONTRACTOR NAME (LIST PRIME CONTRACTOR WITH SUBS FOLLOWING)	9. PERCENT OF WORK COMPLETED	10. TRADE OR CRAFT	CLASSIFICATION (SEE REVERSE)	11. NUMBER OF EMPLOYEES						12. TOTAL	13. WORK HOURS		14. % OF WORK HRS		15. CUM. WORK HRS		16. CUM. % OF W/H			
				A.	B.	C.	D.	E.	F.	NO. OF	TOTAL	A.	B.	A.	B.	TOTAL	A.	B.	A.	B.
				TOTAL	BLACK	HISPANIC	AMERICAN INDIAN	ASIAN	FEMALES	MIN. EMP.	WORK HOURS	MIN. W/H	FEMALE W/H	% OF MIN. W/H	% OF FEMALE W/H	WORK HOURS	MIN. HOURS	FEMALE HOURS	% OF MIN. W/H	% OF FEM. W/H
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			AP																	
			J																	
			AP																	

17. COMPLETED BY (PRINT OR TYPE)

(NAME) (SIGNATURE) (TITLE)

(AREA CODE) (TELEPHONE NUMBER) (EXT.) (DATE)



AIA® Document A101® – 2017

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

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

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

Greater Egg Harbor Regional High School District
Board of Education
1824 Dr. Dennis Foreman Drive
Mays Landing, NJ 08330-2640

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

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

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

Fraytak Veisz Hopkins Duthie, P.C.
1515 Lower Ferry Road
Trenton, NJ 08618

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

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

Init.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner/Architect.
- Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

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

(Paragraph deleted)

§

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

Init.

/

Not later than () calendar days from the date of commencement of the Work.

By the following date: as shown in specification section 01800

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

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

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item

Price

§ 4.4 Unit prices, if any:

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

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

Liquidated damages to be assessed in accordance with Specification Section 01800 - Time of Completion and liquidated Damages.

§ 4.6 Other:

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the fifteenth day of a month, the Owner shall make payment of the amount certified to the Contractor within sixty days of request, to provide sufficient time for review and approval by the Greater Egg Harbor Regional School Board of Education.

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

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

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

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

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

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

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Two percent (2%) of the amount due on each partial payment shall be withheld when the outstanding balance of the contract exceeds \$500,000, and five percent (5%) of the amount due on each partial payment shall be withheld when the outstanding balance of the contract is \$500,000 or less.

§ 5.1.7.1.1 The following items are not subject to retainage:

(Paragraphs deleted)

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

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

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

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 60 days after the issuance of the Architect's final Certificate for Payment, or as follows:

(Paragraphs deleted)

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- Litigation in a NJ Court of Law or court of competent jurisdiction
- Other *(Specify)*

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

(Paragraphs deleted)

Init.

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User Notes:

(1668110442)

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

(Name, address, email address, and other information)

:

(Name, address, email address, and other information)

(Paragraphs deleted)

§ 8.5 Insurance and Bonds

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

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017.

§ 8.7 Other provisions:

8.7.1 A condition of this Agreement is that the Contractor will comply with all applicable governmental laws and regulations including, but without limitation, those set forth in Section 00860 of the Specifications, which are hereby incorporated by reference as if set forth herein at length.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction

(Paragraph deleted)

- .4 Drawings

Init.

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Number Title Date

.5 Specifications

Section Title Date Pages

.6 Addenda, if any:

Number Date Pages

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

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

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

The Sustainability Plan:

Title Date Pages

Supplementary and other Conditions of the Contract:

Document Title Date Pages

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

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

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)



AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the ___ day of ___ in the year _____.
(In words, indicate day, month and year.)

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

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

- A.1 GENERAL**
- A.2 OWNER’S INSURANCE**
- A.3 CONTRACTOR’S INSURANCE AND BONDS**
- A.4 SPECIAL TERMS AND CONDITIONS**

ARTICLE A.1 GENERAL

The Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction and the Project Manual.

(Paragraphs deleted)

(Table deleted)

(Paragraphs deleted)

(Table deleted)

(Paragraphs deleted)

ARTICLE A.3 CONTRACTOR’S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner’s written request. An additional certificate evidencing continuation of commercial liability

ADDITIONS AND DELETIONS:

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

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

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies. The coverage maintained by the Contractor shall be written by companies licensed to do business in the State where the project is located and maintaining an AM BEST rating of A- or better with a financial size rating of Class IX or larger.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor (and all Subcontractors) shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04. The Products and Completed Operations insurance shall be maintained for five (5) years after final payment or the then current applicable statute of repose. A "per project endorsement" shall be included, so that the general aggregate limit applies solely to the project that is the subject of this contract.

§ A.3.1.5 Contractor shall, without in any way altering Contractor's liability under the Contract or applicable law, obtain, pay for and maintain insurance for the coverages and amounts of coverage not less than those set forth below in the Schedule of Insurance Coverages and shall provide to Owner certificates issued by insurance companies satisfactory to Owner to evidence such coverage no later than 7 days of the date of the execution of this Contract and prior to any personnel or equipment being brought onto and/or before any work commences at the job site. The coverage afforded under any insurance obtained pursuant to this paragraph shall be primary to any valid and collectible insurance carried separately by any of the indemnities. Such certificates shall provide that there shall be no cancellation, non-renewal or material change of such coverage without thirty (30) days prior written notice to Owner. In the event of any failure by Contractor to comply with the provisions of this Article 11, Owner may, at its option, on notice to Contractor, suspend the Contract for cause until there is full compliance with this Article 11 and/ or terminate the Contract for cause. Alternatively, Owner may purchase such insurance at Contractor's expense, provided that Owner shall have no obligation to do so, and if Owner shall do so, Contractor shall not be relieved of or excused from the obligation to obtain and maintain such insurance amounts and coverages. Contractor shall provide to Owner a copy of any and all applicable insurance policies. The Owner shall be named as an additional insured on a primary and non-contributory basis on all Insurance Policies to be provided by the Contractor.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General

(Paragraphs deleted)

Conditions. The Contractor shall either require each of his subcontractors to procure and to maintain during the life of their subcontracts, subcontractor's public liability and property damage, of the type and in the same amounts as specified below; or insure the activities of their subcontractors under their respective policies.

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than one million dollars (\$ 1,000,000.00) each occurrence, two million dollars (\$ 2,000,000.00) general aggregate, and two million dollars (\$ 2,000,000.00) aggregate for products-completed operations hazard (and independent contractor liability), providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.
- .6 the policy shall name the Owner, Architect, Construction Manager (if applicable) and their Consultants, Agents and Employees as additional insured.

§ A.3.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than one million dollars (\$ 1,000,000.00) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits applicable to the laws of the State and other State or Federal jurisdiction required to protect the employees of the Contractor and any Subcontractor who will be engaged in the performance of this Contract. The certificate must also indicate that no proprietor, partner, executive officer or member is excluded. This insurance shall include Employers' Liability Protection.

§ A.3.2.6 Employers' Liability with policy limits not less than one million dollars (\$1,000,000) bodily injury, each occurrence, one million dollars (\$1,000,000) disease, each employer, and one million dollars (\$1,000,000) disease, aggregate limit. Including the employer's liability insurance under the umbrella insurance can satisfy the limit requirements.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.13 Excess Liability, umbrella insurance form, applying excess of primary to the commercial general liability, commercial automobile liability and employer's liability insurance shall be provided with minimum limits in an amount such that the commercial general liability insurance and excess/umbrella is equal to \$1,000,000 per occurrence, general aggregate, and products/completed operations.

§ A.3.2.14 The General Liability insurance, General Aggregate and Umbrella Excess Liability limits shall apply and be written exclusively, in total, to this Project only. A per project endorsement for all coverages and limits must be included in each policy.

A.3.2.14.1 Bodily injury and property damage insurance policies shall be so written as to provide coverage for special hazards where such hazards will be incidental to subcontractors' work.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as

the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

- [] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.
- [] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- [] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- [] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- [] **§ A.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits
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§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	Amount equal to the Contract Sum
Performance Bond	Amount equal to the Contract Sum

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

§ A.3.4.1 Contractor shall furnish each of the performance bond and payment bond meeting all statutory requirements of the State of New Jersey in form and substance satisfactory to the Owner and, without limitation, complying with the following specific requirements:

- .1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner’s sole judgment;
- .2 The bonds shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance with N.J.S.A. 2A:44-143 and 2A:44-144, and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A, (go to www.nj.gov/dobi/surety.htm), and shall remain in effect for a period of not less than one year following the date of substantial completion or the time required to resolve any items of incomplete or inadequate work and the payment of any disputed amounts, whichever time period is longer;
- .3 The performance bond and the labor and material payment bond shall each be in an amount equal to the Contract Sum;
- .4 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his/her power of attorney indicating the monetary limit of such power;
- .5 Any bond under this Paragraph 11.6.1 must display the surety’s bond number. A rider including the following provisions shall be attached to each bond:
 - .1 Surety hereby agrees that it consents to and waives notice of any addition, alteration,

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omission, change or other modification of the Contract Documents. Any other alterations, change, extension of time or other modification of the Contract Documents or a forbearance on the part of either the Owner or the Contractor to the other shall not release the surety of its obligations hereunder and notice to surety of such matter is hereby waived. Surety further agrees that in the event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or surety shall cause written notice of such default (specifying said default in writing) to be given to the Owner, and the Owner shall have thirty (30) calendar days after receipt of such notice within which to cure such default or such additional reasonable time as may be required if the nature of such default is such that it cannot be cured within thirty (30) calendar days. Such notice of default shall be sent by certified or registered U.S. mail, return receipt requested, first class postage, prepaid to the Owner.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

PART 1

CONTRACT CONDITIONS AND GENERAL REQUIREMENTS

**SECTION 00700 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
AIA DOCUMENT A201 - 2017**



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

THE OWNER:
(Name, and address)

Greater Egg Harbor Regional High School District Board of Education
1824 Dr. Dennis Foreman Drive, Mays Landing, NJ 08330

THE ARCHITECT:
(Name, and address)

Fraytak Veisz Hopkins Duthie, P.C. Architects - Planners
1515 Lower Ferry Road, Trenton, NJ 08618

TABLE OF ARTICLES

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- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS:

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

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

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

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User Notes:

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The Contract Documents shall include the Bidding Requirements, including, but not limited to Advertisement or Invitation to Bid, Instructions to Bidders, the Contractor's Bid Proposal Form and other bidding forms, or portions of the Addenda relating to any Bidding Documents. The Contract Documents shall apply to all Prime Contractors for the Project and each Prime Contractor is responsible for the content of all.

§ 1.1.2 The Contract

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

§ 1.1.2.1 The Contractor acknowledges and warrants that it has closely examined all of the Contract Documents, that they are suitable and sufficient to enable the Contractor to complete the Work in a timely manner for the Contract Sum, and that they include all Work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in full compliance with all applicable codes, laws, ordinances and regulations.

§ 1.1.3 The Work

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

§ 1.1.3.1 The Contractor is strongly encouraged to visit the site of the Project before submitting a bid. Such site visit shall be for the purpose of familiarizing the Contractor with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, including all existing site conditions, access to the site, physical characteristics of the site and surrounding areas.

§ 1.1.3.2 Nothing in these General Conditions shall be interpreted as imposing on either the Owner or Architect, or their respective agents, employees, officers, directors or consultants, any duty, obligation or authority with respect to any items that are not intended to be incorporated into the completed project, including but not limited to shoring, scaffolding, hoists, temporary weatherproofing, or any temporary facility or temporary activity, since these are the sole responsibility of the Contractor.

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.5.1 The Drawings are diagrammatical and show the general arrangement and extent of the Work; exact locations and arrangements of parts shall be determined as the Work progresses and shall be subject to the Architect's approval.

- .1 No extra compensation will be allowed due to discrepancies between actual dimensions and those indicated.
- .2 The right is reserved by the Architect to make any reasonable change in location of equipment, ductwork, and piping prior to roughing in without involving additional expense to the Owner.
- .3 Contractor shall coordinate his/her Work within the Work of others, so that interference between mechanical, electrical and other work and the architectural and structural work does not occur.
- .4 Contractor shall furnish and install supports, hangers, offsets, bends, turns, and the like in connection with this Work to avoid interference with work of other Contractors, to conceal Work where required, and to secure necessary clearance and access for operation and maintenance without involving additional expense to the Owner.

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

§ 1.2.1.1 The general character of the detail work is shown on the drawings, but minor modifications may be made in large scale details. Where the word "similar" occurs on the drawings, it shall be used in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection to other parts of the work.

- .1 Where on any drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to other like portions of the work.
- .2 Where detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the work unless otherwise indicated.
- .3 In case of differences between small and large-scale drawings, the larger scale drawings shall take precedence. Dimensions given shall take precedence over scale measurements.

§ 1.2.1.2 During the course of the work, should any ambiguities or discrepancies be found in the Specifications or on the Drawings; or should there be found any discrepancies between the Drawings and Specifications to which the Contractor has failed to call attention before submitting his/her bid, then the Architect will interpret the intent of the Drawings and Specifications; and the Contractor hereby agrees to abide by the Architect's interpretation and to carry out the work in accordance with the decision of the Architect.

§ 1.2.1.3 It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Architect may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work. In the event of such

ambiguity or discrepancy, the Contractor shall comply with the more stringent requirement, and supply the better quality or greater quantity of work.

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

§ 1.2.2.1 The various materials and products specified in the Specifications by name or description are given to establish a standard of quality and of cost for bid purposes. It is not the intent to limit the acceptance to any one material or product specified, but rather to name or describe it as the absolute minimum standard that is desired and acceptable.

- .1 A material or product of lesser quality will not be acceptable.
- .2 Where “Basis of Design” products or manufacturer’s names are used, whether or not followed by the words “Or Approved Equal”, they shall be subject to approved equals and authorized only by the Architect and/or the Owner.

§ 1.2.2.2 Substitutions lowering performance, quality, method of assembly or installation, or in general not in keeping with details and specifications, will not be permitted. Refer to substitution procedure indicated elsewhere in the Contract Documents.

§ 1.2.2.3 It is understood when a bid for any product or material is submitted, the bidder is aware of specified requirements and all materials or products within his/her bid are equal or better than such specified items.

§ 1.2.2.4 In addition to the Specifications, it shall be understood that details on Drawings shall become part of the Specification in determining the required “Standard of Quality”.

§ 1.2.2.5 If a conflict occurs between the Drawing details and Specifications, the bidder during the bidding process and/or Contractor shall bring such conflicts to the attention of the Architect in accordance with applicable requirements indicated elsewhere in other sections of the Contract Documents.

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

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

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

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

Refer to Section 00800 – Supplementary General Conditions

(Paragraphs Deleted)

§ 2.3 Information and Services Required of the Owner

(Paragraph Deleted)

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

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

(Paragraphs Deleted)

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

1. If the Contractor requires clarification of the intent of the Contract Documents after award, the Contractor shall be responsible to issue a type written Request for Information (RFI) to the Architect utilizing the Architect's sample form via acceptable methods set forth in Section 4.2.4.
2. All RFI's shall clearly identify the Architect's project number, the Construction Company name, author's name, date issued, address, phone number(s), facsimile number and the addressee of the communication.
3. RFI's shall be sequentially identified and numbered when issued to the Architect with the following prefix for each trade and shall be logged accordingly:
 - S – Structural Work (ex. S1, S2, etc.)
 - P/FP – Plumbing / Fire Protection Work
 - H – Heating, Ventilating, Air Conditioning, Refrigeration Work (HVACR)
 - E – Electrical / Information Technology Work
 - G – General Construction Work
4. RFI's involving Structural, Plumbing / Fire Protection, HVACR or Electrical Work shall be addressed and issued to the Architect and simultaneously issued directly to the respective Consulting Engineer.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing

conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.2.1 Conditions Precedent – Notice

- .1 Notice of any alleged Conflict that have been reasonably identified prior to submitting a Bid shall be provided to the Architect immediately in order that the Architect in its discretion, may issue an Addendum.
- .2 A Bidder's failure to do so constitutes an absolute waiver of any Conflict that may thereafter be asserted with respect thereto and shall bar any recovery regard such Conflict.
- .3 If any errors, inconsistencies or omissions appear in the drawings, specifications or other Contract Documents, which should reasonably have been discovered and concerning which interpretation had not been obtained from the Architect during the Bidding Period, the Contractor shall within ten (10) days after written "Notice of Award", notify the Architect in writing of such error, inconsistency or omission. In the event the Contractor fails to give such notice, the Contractor and its Surety will indemnify the Owner for the costs of any such errors, inconsistencies or omissions and the cost of rectifying same including attorney's fees. Interpretation of this procedure after the ten-day period will be made by the Architect and his/her decision will be final. By Submission of a Bid, the Contractor acknowledges that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and that the Drawings, the Specifications and all Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws, statutes, ordinances, building codes and regulations, and otherwise to fulfill all of its obligations under the Contract Documents.
- .4 Contractor acknowledges, except as to any reported error, inconsistencies or omissions, and to concealed or unknown conditions defined in elsewhere, by executing the Agreement, the Contractor represents the following:
 - .1 The Contract Documents are sufficiently complete and detailed for the Contractor to perform the Work and comply with all requirements of the Contract Documents.
 - .2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedures, and techniques necessary to perform the Work, use of materials, selection of equipment, and requirements of products by manufacturers are consistent with:
 - .1 good and sound practices within the construction industry;
 - .2 generally prevailing and accepted industry standards applicable to Work;
 - .3 requirements of any warranties applicable to the Work; and
 - .4 all laws, ordinances, regulations, rules, and orders which bear upon the Contractor's performance of the Work.
 - .3 The Contractor has read, understands and accepts the Contract Documents and its Bid was made in accordance with them.
 - .4 The Contract Sum is based upon the products, materials, systems and equipment required by the Contract Documents without exception. Where the Contract Documents list one or more manufacturer or brand name products, materials, systems and equipment as acceptable, the Contract Sum is, in each instance, based upon one of the listed manufacturers or brand name products, materials, systems and equipment, or, if the Contract Sum is based upon the substitution of an "or equal" manufacturer or product, material, system or equipment, the Contractor has in each such instance sought and received the Architect's approval for the substitution either:
 - .1 prior to the Bid in accordance with the Architect's Addenda;
 - .2 after commencement of the Work, under in conformance with substitution procedures elsewhere in the Contract Documents.
 - .5 The Contract Sum is firm and is all inclusive and no escalation is contemplated for any reason whatsoever.
 - .1 The Contract Sum includes any and all costs associated with completion by those dates and times, including any and all costs associated with out-of-sequence work, come-back work, stand-by work, stacking of Trades, coordination with the schedules and work of separate Contractors, allowing sufficient time, work and storage areas, and site access for

- separate Contractors to timely progress and complete their work, overtime, expediting and acceleration that may be required to complete the work by those dates and times.
- .2 The Contractor has reviewed the completion dates and times, and Milestone dates set forth in the Contract Documents, agrees that such dates and times are reasonable and commits to achieve them.
 - .6 The Contractor shall satisfy itself as to the accuracy of all dimensions and locations. In all cases of interconnection of its work with existing or other work, it shall verify at the site, all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to verify all such locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor and/or his/her Surety shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

- .1 At any time within the construction period, the Owner or Architect shall have the right to require the replacement of the Prime Contractor's Project Manager, Superintendent, or Foreman.
- .2 The Owner or Architect shall have the authority to direct the Contractor to assign additional supervisory personnel to ensure compliance with the Contract schedule and qualify requirements at no addition to the Contract price.
- .3 When more than one major phase is being constructed at different locations on the project site, supervision must be assigned to each phase when work of that contract is being performed. When performing construction work to maintain the progress schedule requires extended hours, multiple shifts, and additional work days, adequate supervision shall be required for each Contractor during these times. The competence level and ability of supervisory personnel must be adequate to perform the construction activities involved and shall be in accordance with requirements indicated elsewhere in the Contract Documents.

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

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

§ 3.3.4 Contractor shall lay out his/her own work and be responsible for all lines, elevations and measurements of the building and other work executed by him under the Contract. He/She must exercise proper precaution to verify the figures shown on the Drawings before laying out the work and will be held responsible for any errors resulting from his/her failure to exercise such precaution.

- .1 Contractors whose failure to perform his/her Work or whose negligence in performing his/her Work, negatively impacts other Contractors' work shall be responsible for damages incurred by the other Contractors that are necessary to maintain the project schedules, all as is more fully set forth in the further provisions of the Contract Documents including, without limitation, Section 6.2.5 of the General Conditions.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 Standard of Quality: The various materials and products specified in the Specifications by name or description are given to establish a standard of quality and of cost for bid purposes.

- .1 It is not the intent to limit the Contractor to any one material or product specified, but rather to describe as the minimum standard.
- .2 When proprietary names are used as the "Basis of Design", for specified products or equipment, they shall be followed by the words, "or approved equal in quality necessary to meet the specifications", unless otherwise indicated elsewhere in the Contract Documents.

§ 3.4.2.2 The Architect will evaluate alternatives and substitutions and shall be the sole judge of whether the alternatives (substitutions), are acceptable or not.

- .1 The burden of proving the alternatives (substitutions), are equal or better to the specified product is that of the Contractor.
- .2 Contractor shall submit request for substitution in accordance with substitution procedures indicated elsewhere in the Contract Documents.
- .3 Any alternative names or products which do not meet the Specifications will not be accepted.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

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

§ 3.5.3 The Contractor shall forward guarantee and warranty registration cards to the manufacturers in the name of the Owner showing date of acceptable Substantial Completion of the Work as the beginning date for guarantee and warranty periods.

- .1 All warranties and guarantees shall be in accordance with requirements indicated in applicable Sections of the Contract Documents.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

- .1 It shall be the obligation of the Contractor to review the Contract Documents and to determine and to notify the Owner and Architect of any discrepancy between building codes and regulations of which the Contractor has knowledge or should be reasonably able to determine.
- .2 The Contractor shall not violate any zoning, setback or other requirements of applicable laws, codes and ordinances, building codes, rules or regulations. The Contractor shall promptly notify the Architect in writing, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a full-time competent superintendent and necessary assistants, acceptable to the Owner and the Architect, who shall be in attendance at the Project site during performance of the Work and until Final Completion of all Work including all corrective and punch list items. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

- .1 Within fifteen (15) days after the date of the Notice to Proceed, the Contractor shall submit to the Architect, on forms supplied by the Architect, a Critical Path Method (CPM) with arrow network diagram Progress Schedule upon which shall be indicated the dates for starting and the dates for completion of all contracts and all divisions of the work in a manner which will coincide with the Time for Completion. Contractor's Construction Schedule shall be in accordance with requirements indicated elsewhere in the Contract Documents.
- .2 The Contractor shall cooperate and consult with other Prime Contractors during the construction of this project. The Contractor shall schedule and execute his/her Work so as to avoid delay to other Prime Contractors. The Contractor is financially responsible to the other Prime Contractors for delay caused by him/her to other Prime Contractors on the Project who are intended to and shall be third party beneficiaries of the Contractor's promise herein above stated in accordance with the further provisions of the Contract Documents, including, without limitation, Section 6.2.5 of the General Conditions. If contrary to the foregoing, another Prime Contractor shall assert a claim or file an action directly against the Owner on account of delay for which the Contractor is allegedly responsible, the Contractor and its Surety shall indemnify and Hold Harmless the Owner and Architect for such claims, losses or delays of any kind made by another Prime Contractor; provided however, that this indemnity obligation is for the sole and exclusive benefit of the Owner and Architect and shall not be applied to the benefit of any Prime Contractor.

- .3 The Contractor shall immediately, after being awarded the contract, prepare and submit to the Architect, a submittal schedule which will be reviewed by the Architect for the orderliness of the submittals by the Contractor. This schedule shall be provided to the Architect for approval by the Architect within fourteen (14) days of receipt of Contract by the Contractor. The schedule shall be coordinated with the Project's Construction Schedule and shall allow the Architect reasonable time to review submittals.

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

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.10.4 The General Construction Work Contractor (and/or the assigned lead Contractor) shall be the scheduling Coordinator and shall perform all duties and assume all of the responsibilities of the Scheduling Coordinator as set forth in the Contract Documents and shall in addition to the requirements of other sections of the Contract Documents.

- .1 If the General Construction Work Contractor fails to perform its duties as the Scheduling Coordinator adequately or to the Owner's satisfaction, the Owner may, in addition to its other rights and remedies, appoint a substitute Scheduling Coordinator who shall act in the place and with the authority of the original Scheduling Coordinator. In that event, the Owner may, in its sole discretion, choose one of the Separate Prime Contractors or an Independent Consultant as the substitute Scheduling Coordinator. The cost and expense incurred by the Owner to engage such substitute scheduling Coordinator shall be charged to and borne by the General Construction Work Contractor and its Surety.
- .2 The Contractor's failure to cooperate and participate with the Owner and separate Prime Contractors in the development and review of construction schedules as provided in this Section 3.10 shall be a material breach of its obligations, entitling the Owner to exercise all rights and remedies under the Contract Documents and applicable law.
 - .1 In no event shall any revision to any construction schedule constitute the basis for an adjustment in the Contract time or the Contract Sum unless such adjustment is agreed to by the Owner, the Architect and achieved by a Change Order.
 - .2 Float shall belong to the Project and all "float time" belongs exclusively to the Owner and may be used as the Owner, if in its sole discretion determines.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

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

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

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

- .1 Contractor, for itself, its successors and assigns, agrees to indemnify and save Owner, the individual members (past, present and future), its successors, assigns, employees, agent, Architect, Engineers, harmless from and against any and all claims, demands, damages, actions or causes of action by any party,

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together with any and all losses, costs or expenses in connection therewith or related thereto, including, but not limited to, attorney fees and costs of suit for bodily injuries, death or property damage arising in or in any manner growing out of the work performed, or to be performed under this Contract. Contractor and its successors and assigns agree to indemnify the Owner, its individual members (past, present and future), its successors, assigns, employees, agents, Architect, and Engineers against all fines, penalties or losses incurred for, including, but not limited to, attorney fees and costs of suit, or by reason of the violation by Contractor in performance of this Contract, or any ordinance, regulation, rule of law of any political subdivision or duly constituted public authority. Without limiting the foregoing, the Contractor, at the request of Owner, its individual members (past, present, future), its successors, assigns, employees, agents, Architect, or Engineers, agree to defend at the Contractor's expense, any suit or proceeding brought against Owner, its individual members (past, present, future), its successors, assigns, employees, agents, Architect, Engineers due to, or arising out of the work performed by the Contractor.

- .2 The Contractor assumes the entire risk, responsibility, and liability for any damage or injury of every kind and nature whatsoever (including death, resulting therefrom) to all persons, whether employees of the Contractor or otherwise, and to all property (including the Work itself) caused by, resulting from, arising out of or occurring in connection with the execution of the Work, or in preparation for the Work, or any extension, modification, or amendment to the Work by the Change Order or otherwise. To the fullest extent permitted by law, the Contractor and its Surety shall indemnify and save harmless the Owner, the Architect, the Architect's Consultants, agents and employees of any of them (herein collectively called the "Indemnitees") from and against any and all liability, loss, damages, interest, judgements and liens growing out of, and any and all costs and expenses (including, but not limited to, counsel fees and disbursements) arising out of, relating to or incurred in connection with the Work including, any and all claims, demands, suits, actions or proceedings which may be made or brought against any of the Indemnitees for or in relation to any breach of the Contract for Construction or any violation of the laws, statutes, ordinances, rules, regulations, or executive orders relating to or in any way affecting the performance or breach of the Contract for Construction, whether or not such injuries to persons or damages to property are due or claimed to be due, in whole or in part, to any negligence of the Contractor or its employees, agents, subcontractors, or materialmen, excepting only such injuries and/or damages are the result of the sole gross negligence of the Owner or Architect.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.19 Re-Design

§ 3.19.1 If the Contractor makes, or causes to be made, due to approval of substitute equipment or otherwise, any substantial change in the form, type, system and details of construction from those shown on the Drawings, he/she shall pay for all costs arising from such changes. The Contractor shall pay all Architectural and Engineering fees required to check the adequacy of such changes. Any changes or departures from the construction or details shown shall be made only after written approval from the Architect.

§ 3.19.2 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute the Owner-Contractor Agreement, which representations and warranties shall survive the execution and delivery of the Owner-Contractor Agreement and the final completion of the Work.

- .1 that he/she is authorized to do business in the State, County, and/or City where construction will take place at the Project and is properly licensed by all necessary governmental and public authorities having jurisdiction over him/her and over the Work at the site of the Project;
- .2 that he/she is familiar with all Federal, State, Municipal and department laws, ordinances and regulations, which may in any way affect the Work of those employed herein, including but not limited to any special acts relating to the Work or to the Project of which it is a part;
- .3 that such temporary and permanent Work required by the Contract Documents as is to be done by him/her, can be satisfactorily constructed and used for the purposes for which it is intended;
- .4 that he/she is familiar with local trade jurisdictional practices at the site of the Project;

- .5 that he/she has carefully examined the plans; specifications and the site of the Work, and that from his/her own investigations, he/she has satisfied himself/herself as to the nature and location of the Work, the character, quality and quantity of the surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, and the general local conditions, and all other materials which may in any way affect the Work or his/her performance;
- .6 that he/she has determined what local ordinances, if any, will affect his/her Work. He/She has checked for any County, City, Borough, or Township rules or regulations applicable to the area in which the Project is being constructed and in addition, for any rules or regulations of other organizations having jurisdiction, such as chambers-of-commerce, planning commission, industries, or utility companies who have jurisdiction over property on which the Work will be performed. Any costs of compliance with local controls are included in the prices/bid, even if documents of such controlling agencies are not listed specifically in the Contract Documents.

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

- .1 All project communications shall be in typewritten 8-1/2" x 11" form and shall be transmitted via one of the following methods:
 - .1 First Class mail delivered through the U.S. Postal Service,
 - .2 Electronic facsimile,
 - .3 Overnight or Common Carrier Service (UPS, FedEx, DHL, etc.)

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- .2 Electronic mail (E-mail) **shall not be used**. Any information sent via E-mail, to the Architect and Owner **will not** be recognized as valid communication and will be discarded from the project record.
- .3 Notice of proposed changes. The Architect shall notify the Contractor of all proposed changes to the Contract Documents, after award of the Contract via type written Bulletin, or in the case of minor changes in the work, via other written instrument (letter or facsimile). The Contractor shall submit a proposal to increase or decrease the Contract Sum for approval prior to commencing with the Work change unless there is no change in the Contract Sum or time.

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

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

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

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.15 Reference in the technical provisions of the Specifications to standard specifications and test methods including those of the American Society for Testing and Materials (ASTM), the American Iron and Steel Institute (AISI), the American National Standards Institute (ANSI), the American Society of Mechanical Engineers (ASME), the American Society of Heating, Refrigeration and Air Conditioning Engineers (SSGREA), the Factory Mutual System (FM), the National Fire Protection Association (NFPA), Federal Specifications, and other similar nationally recognized technical societies and agencies shall refer to the editions and revisions current with the date of the Contract Documents.

§ 4.2.16 The Architect's decision with respect to proposed substitutions of material or equipment specified by trade name shall be final. The Architect reserves the right to waive Specifications and to accept a proposed substitution which in his/her opinion is superior to the material or product specified, or to limit the Specification to the product or equipment specified.

§ 4.2.17 Approval of substitutions shall not relieve the Contractor of responsibility for adequate fulfillment of all the various parts of the Work, nor from specified guarantees and maintenance. Modification of adjacent or connecting Work required due to any substitution approval shall be provided as part of the substitution.

§ 4.2.18 Insofar as practicable, except as otherwise specified or shown, the material or product of one manufacturer shall be used throughout the Work for each specified purpose.

§ 4.2.19 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in strict accordance with the manufacturer's directions. Should such directions conflict with the Specifications, the Contractor shall request clarification from the Architect before proceeding.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, within thirty (30) days, after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

§ 5.2.3 The names of all Subcontractors and material suppliers shall be submitted for approval to the Architect and Owner not later than fifteen (15) days after the date of the Award of Contract unless otherwise authorized by the Architect.

.1 The list of proposed Subcontractors shall include a description of the materials and equipment each

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proposes to furnish and install in the Work..2 The description shall be in sufficient detail to allow the Architect to determine general conformance to Contract requirements.

- .3 Approval of the submittals required under this Article shall not relieve the Contractor from conformance to Contract requirements.
- .4 If the Architect and/or the Owner make reasonable objection to a Subcontractor, the Contractor shall substitute a Subcontractor reasonably acceptable to the Architect and the Owner at no additional cost.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 Written confirmation of award of each major subcontract shall be submitted to the Architect, in form subject to his/her approval, within seven (7) days after receipt of Architect's approval of proposed Subcontractor list as provided under Section 5.2.3 (above).

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

§ 6.1.3 The General Construction Work Contractor, (and/or the assigned lead Contractor), shall act as the scheduling coordinator for all work of the Separate Prime Contractors and any other activities of the Owner’s own forces and shall have direct responsibility for scheduling and coordination of all Work, as more specifically set forth in Article 3. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor’s Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner’s or Separate Contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor’s delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor’s delays, improperly timed activities, damage to the Work or defective construction.

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

- .1** Should the Contractor cause damage to the work or property of any Separate Contractor on the Project, the Contractor shall, upon due notice, promptly settle with such other Contractor by agreement or otherwise account of any damage alleged to have been so sustained, the Contractor shall defend such proceeding at his/her own expense, and if any judgement against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for any attorney’s fees and court costs which the Owner has incurred.

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

§ 6.3 Owner’s Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

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

§ 7.2 Change Orders

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

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

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

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

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6.1 For any extra work or portion thereof performed by the Prime Contractor, the cost to the Owner shall include the cost of the extra work plus a maximum allowance of fifteen (15%) percent for overhead and profit.

- .1** For any extra work or portion thereof performed by Subcontractor(s), the cost to the Owner shall include the cost of the extra work to the Subcontractor plus a maximum allowance of ten (10%) percent for overhead and profit, plus the Prime Contractor's overhead and profit not to exceed five (5%) percent of the Subcontractor's cost.
- .2** The cost of bonds and insurance shall be included as part of the overhead and profit.

§ 7.3.6.2 Change Orders shall include all costs, including the cost of preparation of the Change Order, all impact and ripple costs associated with modifications or delays to the work, and all costs associated with modifications to other work.

- .1** The Prime Contractor shall furnish all necessary documentation to support the additional costs, including, but not limited to the following:
 - .1** Copy of the Subcontractor's proposal.
 - .2** Complete breakdown of all costs for labor and materials.
 - .3** Complete breakdown of related costs.
 - .4** Other information as may be requested by the Architect.

§ 7.3.6.3 The overall cost of the Change Order shall be all inclusive and once accepted by the Owner, it shall be considered full and final.

§ 7.3.6.4 No additional time will be granted to the Contractor for minor Change Orders unless each individual Change Order totals more than \$100,000.

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

§ 7.3.11 if the Contractor claims that certain Work constitutes an addition, deletion, or change to the Work, the Contractor shall notify the Owner and Architect at least fourteen (14) days before proceeding with such Work, or else any claim by the Contractor for any adjustment to the Contract Sum or the Contract Time on account thereon shall be deemed waived.

Init.

- .1 If the Contractor gives timely notice and the Owner directs the Contractor to proceed with such disputed Work as part of its Work or as a minor change in the Work, the Contractor shall promptly proceed with such disputed Work, subject to later resolution in accord with the requirements of the Contract Documents.
- .2 In that event, the Contractor shall present, at the end of each day that the Contractor performed the disputed Work, a summary of the day's costs attributable to the disputed work, including labor hours and material costs, for verification by the Owner and the Architect.
- .3 Only the costs as verified by the Owner and Architect shall be used in computing any increase in costs for the purposes of the adjustment to the Contract Sum, should it later be determined that the Contractor is entitled to such adjustment.
- .4 Upon request, the Contractor shall provide to the Owner and Architect full supporting documentation for all costs claimed.
- .5 If and to the extent that the Contractor fails to submit such summary each day, its claim for an adjustment to the Contract Sum shall be deemed waived.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

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

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

§ 8.2 Progress and Completion

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

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

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. Contractor agrees to increase manpower, increase work hours, and to increase equipment necessary to maintain the Project Construction Schedule, and when also requested by the Architect and the Owner, and shall be without additional cost or charge to the Owner.

§ 8.2.4 Work shall commence within ten (10) days of the issuance by Owner of a Notice to Proceed and shall proceed uninterrupted to Final Completion. The Contractor acknowledges and recognizes that the Owner is entitled to full and beneficial occupancy and use of all or part of the completed Work in accordance with the Milestone Dates set forth in other sections of the Contract Documents, as per approved Schedule, and that the Owner has made arrangements to discharge its public obligations based upon the Contractor's achieving Substantial Completion of all of the Work within the Contract Time. The Contractor further acknowledges and agrees that if the Contractor fails to complete substantially or cause the Substantial Completion of any portion of the Work, as required by the Project Construction Schedule and/or within the Contract Time, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, the Owner and the Contractor agree as set forth (below):

Init.

- .1 If the Contractor fails to achieve partial completion within the requirements of the Milestone Dates or the approved Schedule or to achieve Substantial Completion of all or part of the Work when and as required by the Project Construction Schedule, and/or within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor and its Surety, as liquidated damages and not as a penalty, the amounts indicated in other sections of the Contract Documents and commencing upon the first day following expiration of the Project Construction Schedule and/or the Contract Time, as the case may be, and continuing until the actual Date of Substantial Completion.

§ 8.2.5 Adherence to Schedule

- .1 The Owner reserves the right to withhold monthly progress payments if the Contractor is behind schedule, unless the Contractor documents, in writing, any delays that are not the fault of the Contractor and to which the Owner and Architect agree.
- .2 Monthly progress payments will only be released after the Contractor reaches the status of completion for that month contemplated by the Construction Schedule.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and litigation; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

- .1 Any direct claim against the Owner for delay costs caused by another Prime Contractor shall be subject to the provisions of Section 8.3.3

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 No payment shall be made by the Owner to the Contractor as compensation for damages for any delays or hindrances from any cause whatsoever in the progress of the Work, notwithstanding whether such delays are avoidable or unavoidable. The Contractor's sole remedy for delays shall be an extension of time only, pursuant to and only in accordance with Section 8.3. Such extension shall be a period equivalent to the time lost by reason of and all of the aforesaid causes. In no event shall the Owner or Architect be held responsible for any loss or damage or increased costs sustained by the Contractor through any delays caused by the Owner or Architect or any other Prime Contractor. If, contrary to the foregoing provision, the Contractor commences a direct action against the Owner or Architect seeking to recover delay costs and fails to substantially prevail in its claim that the Owner was the cause of the alleged delay, the Contractor shall reimburse the Owner and the Architect as the case may be for any attorneys' fees, professional fees and all other costs and expenses incurred by them associated with analyzing, defending or otherwise opposing any such action; provided, however, that where the delay alleged by the Contractor arises from acts, omissions, or default of another Prime Contractor or another Prime's Subcontractors and Suppliers, then the provisions of Section 8.3.1 shall apply.

- .1 Where the cause of the delay is due to weather conditions, extension of time shall be granted only for unusually severe weather, as determined by reference to historical data. The term "historical data" as used in the preceding sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five years for the month in question, plus 10 percent. Weather shall not be deemed to be unusually severe unless it is more than 10 percent more severe for that month over the last five years.

§ 8.3.4 The Contractor is required to submit at any construction conference considering any claim and at any proceeding considering an extension of time, and in all subsequent administrative proceedings, all files, records, and the documents of whatever kind pertaining to the Contractor's performance of the project work, the job budget, the summary of all supporting data worksheets and other documents prepared in connection with the submittal of the Contractor's successful bid.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

Init.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.2.1 Contractor must provide draft copies of the Schedule of Values, within fifteen (15) days from the Notice to Proceed. Submit two (2) copies to the Architect.

- .1 Schedule of Values shall include cost of work at the/each Building and for the/each Project and shall include the Architect's Special Project Number. Schedule of Values shall include materials and installation and in accordance with each Specification Section as listed in the Specification Index, as shown on the Drawings and/or as directed by the Architect. Contractor shall include separate line items for the following:
 - .1 Bonds,
 - .2 Insurance,
 - .3 Mobilization,
 - .4 General Conditions,
 - .5 Contractor's Construction Schedule,
 - .6 Submittals (Product Data, Samples, and Shop Drawings),
 - .7 As-Built Drawings and similar requirements as per Section for Closeout Documents,
 - .8 Punch List items and Closeout Documents per Section for Closeout Documents,
 - .9 Final Cleaning,
 - .10 Other items, as directed by the Architect.
- .2 Contractor shall enclose with the Schedule of Values, copies of invoices and/or cancelled checks from Bonding and Insurance Agents for the required cost of the coverage for the project being billed.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers and shall reflect retainage if provided for in the Contract Documents. The application for payment shall be on approved AIA G702 Forms and shall be accompanied by a partial waiver of liens in a form acceptable to the Owner and Architect.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such

materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.2.1 To encourage early purchase, Owner may pay for stored materials and equipment. The following procedures must be followed in order to obtain payment.

- .1 A certificate of insurance naming the Owner as loss beneficiary for the full dollar amount representing the materials stored.
- .2 A Consent of Surety in the amount being requisitioned, said Surety being the Bonding Company of the Prime Contractor.
- .3 Materials to be stored in warehouse must be inspected by the Architect/Engineer and the Contractor will not receive extra compensation for storage costs.
- .4 Any time and travelling expenses for the Construction Inspector to visit and inspect equipment stored will be borne by the Contractor making the off-site storage request.
- .5 Payment invoices for materials stored off site shall be so noted.
- .6 After the receipt of the above, the Construction Inspector will endorse same and forward to the Owner for their approval.
- .7 Payment invoices not following the above format will be rejected in total.
- .8 There will be no storage space available in the existing building(s). Space in new building(s) may be used for storage only if approved, in writing, by the Architect/Engineer and all Contractors having work in the area.
- .9 The Contractor will be paid for storage materials no more than the actual or replacement value of the materials. The Contractor will furnish vendors price lists, priced inventories or other documentation to support claims for payment of materials stored on or off site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

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

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the

Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.
- .8 **deliberate delay in the submission for approval of names of Subcontractors, Materialmen, sources of supply, product data, shop drawings and samples; or**
- .9 **otherwise failing to comply with the requirements of the Contract Documents.**

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

- .1 If the Contractor disputes any determination by the Architect with regard to any Certificate of Payment, the Contractor nevertheless expeditiously shall continue to prosecute the Work.
- .2 The failure of the Owner to retain any percentage payable to the Contractor or any change in or variation of the time, method or condition of payments to the Contractor shall not release or discharge to any extent whatsoever, the Surety upon any bond given by the Contractor hereunder. The Owner shall have the right, but not the duty, to disregard any schedule of items and costs that the Contractor may have furnished and defer or withhold in whole or in part any payment if it appears to the Owner, in its sole discretion, that the balance available in the Contract Sum as adjusted and less retained percentages, may be insufficient to complete the Work.
- .3 Notwithstanding any provision of any law to the contrary, the Contractor agrees that the time and conditions for payment under the Contract for Construction shall be as stated in the Contract for Construction and in the Contract Documents. The Contractor specifically agrees that the Owner's failure to give, or timely give notice of:
 - .1 any error in an invoice or application for payment submitted by the Contractor for payment; or
 - .2 any deficiency or non-compliance with the Contract Documents with respect to any Work for which payment is requested, shall not waive or limit any of the Owner's rights or defenses under the Contract for Construction and the Contract Documents, or require the Owner to make a payment in advance of the time, or in an amount greater than, as provided by the Contract for Construction.
- .4 The Contractor shall make payments to its Subcontractors in accordance with the provisions of any applicable law governing the time, conditions, or requirements for payment to its Subcontractors, and shall comply with the provisions of any such law.
 - .1 The Contractor will pay its Subcontractors no later than fifteen (15) days after receipt of a payment from the Owner which includes payment for the Work of any such Subcontractors.
 - .2 The Contractor shall require its Subcontractors, by appropriate agreement, to pay their Subcontractors and Suppliers (of any tier) within the same time.

- 3 The Contractor and its Surety shall indemnify and defend the Owner any loss, cost, expenses, or damages, including Attorney's fees arising from or relating to the Contractor's failure to comply with such law.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

- .1 Owner's beneficial occupancy must be approved by all governing authorities having jurisdiction and by issuance of a temporary or permanent "Certificate of Occupancy" and in accordance with all applicable Codes and Regulations.
- .2 Substantial Completion occurs when each of the following conditions precedent has occurred:
 - .1 the Work has been sufficiently completed in accordance with Contract Documents so that the Owner obtains beneficial use and occupancy of the Work;
 - .2 Certificates of Occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project have been received by the Owner; and
 - .3 the Architect has issued a certificate of Substantial Completion. The date of Substantial Completion is the date certified by the Architect in accord with the Contract Documents and shall follow the Contractor's Notification for Substantial Completion inspection and the Architect's inspection of the Project.

§ 9.8.2 Unless otherwise indicated in the Contract Documents, no later than thirty (30) calendar days, prior to the date scheduled for Substantial Completion, the Contractor shall prepare and submit to the Architect and Owner, a comprehensive punch list of items remaining to be completed or corrected.

- .1 No later than ten (10) calendar days prior to the date for Substantial Completion, the Architect and/or Owner may add additional items requiring completion or correction.
- .2 The Contractor shall immediately proceed with the Work required by the punch list and shall complete and correct items on or added thereto by the date scheduled for Substantial Completion.
- .3 When the Contractor determines that the Work has reached Substantial Completion, or when the Owner, Architect so determine and direct the Contractor to do so, the Contractor shall request the Architect's final inspection to determine Substantial Completion. In addition, the Contractor shall prepare and submit to the Architect and Owner its final Application for Payment submitted in compliance with the requirements of the Contract Documents and shall thoroughly reinspect the Work; prepare and submit to the Architect and Owner a comprehensive final punch list of any and all items remaining to be completed or corrected (whether or not included on any previous punch list).
 - .1 Within fourteen (14) calendar days after receipt of the Contractor's request and final punch list, the Architect will inspect the Work to determine whether Substantial Completion has occurred.
 - .2 If the Architect determines that Substantial Completion has not occurred, it shall advise the Contractor and the Owner of the reasons for their determination and the Contractor shall continue with the Work and request another inspection for Substantial Completion and submit another final punch list after the concerns of the Architect have been addressed.
 - .1 The fees and expenses incurred by the Owner for services of the Architect as a result of any additional re-inspections of the Work, shall be paid by the Contractor or its Surety.
 - .3 When the Architect determines after an inspection under this Section that Substantial Completion has occurred the Architect shall:
 - .1 add to the Contractor's final punch list any additional items which they discover which also need to be completed or corrected;
 - .2 determine and certify the amount required to complete each item on the punch list, basing such determination upon the amount the Owner would have to expend or incur to complete each item if the Contractor failed to do so; and
 - .3 prepare and issue a certificate of Substantial Completion, which shall establish the date of Substantial Completion.
 - .4 The Contractor shall proceed promptly to complete and correct items on the final punch list within thirty (30) calendar days of the date of Substantial Completion or prior date established for Final Completion in other sections of the Contract Documents.
 - .5 The failure of items to appear on any punch list shall not constitute an acceptance of any Work not in accord with the Contract Documents nor relieve the Contractor or its Surety of responsibility with respect thereto.

- .6 Warranties required by the Contract Documents shall commence on the approved date of Substantial Completion of the Work for the entire project unless otherwise provided in the Certificate of Substantial Completion.
- .7 The Architect shall submit the Certificate of Substantial Completion to the Owner and Contractor. If not completed within this time, the Owner may proceed to finish the Work as otherwise provided in this Agreement.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.9.4 As portions of the Project are completed and occupied, the Contractor shall ensure the continuing construction activity will not unreasonably interfere with the use, occupancy and quiet enjoyment of the completed portions thereof.

- .1 The Contractor agrees to coordinate the Work with the Architect and the Owner in order to minimize disturbance to occupied portions of the structure.
- .2 In the event performances or scheduled events by the Owner are conducted in close proximity to the Work in progress, the Contractor agrees to cease all Work which may disturb the Owner's occupants at the site.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

- .1 If more than one inspection for Final Completion is required, the Contractor will be billed and responsible for the professional fees and services of the Architect.
- .2 Following Substantial Completion, in the event the Contractor or their Subcontractor fails to complete the list of items of the Work instructed by the Architect to be corrected or completed within fourteen (14) days after the date of receipt of Certificate of Substantial Completion, the Owner may:
 - .1 exercise any available remedies to correct or complete deficient work or retain a third party to correct or complete such work at the cost of the defaulting Contractor; and
 - .2 retain and deduct from any payments or retention otherwise due to the defaulting Contractor any fees and expenses for services required to be provided by the Architect more than twenty-one (21) days after the Date of Substantial Completion.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

- .1 The General Contractor (and/or assigned Lead Contractor) shall provide all necessary temporary enclosures, guardrails, barricades, etc., to adequately protect all workers and public from possible injury subject to Section 10.1.1.2 (below).
- .2 The General Contractor (and/or assigned Lead Contractor) shall be responsible for the general safeguarding of the Project, for gaining compliance with the safety requirements from all other Contractors and parties engaged in operations at the site and shall act as the Project Site Representative with regard to all safety inspections required and shall perform all necessary functions for this purpose.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 Lost or Stolen Materials

§ 10.2.9.1 The Contractor shall protect all materials and equipment and equipment for which he/she is responsible, which is stored at the Project Site for incorporation in the Work, or which has been incorporated into the Work. He/She shall replace at his/her expense all such materials and equipment which may be lost, stolen or damaged, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

- .1 Certificate of insurance shall be submitted within ten (10) business days upon notification of award of Contract.
- .2 The Contractor may carry whatever additional insurance he/she deems necessary to protect himself/herself against hazards not covered by the Owner's Property Insurance, including coverage for theft, collapse, water damage, materials and equipment stored on the site, and for materials and equipment stored off site, and against loss of owned or rented capital equipment and tools owned by mechanics or any tools, equipment, scaffolding, staging, towers and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work. The Owner's "All Risk" Insurance does not cover theft of materials unless installed and made an integral part of the building. This loss must be assumed by the Contractor.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within five (5) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

- .1 The Property Insurance obtained by the Owner shall include collapse and water damage, to the extent covered by the Owner's "All Risk" insurance.
- .2 The Owner agrees to be responsible for losses not covered by Property Insurance due to statutory deductible provisions.
- .3 The fact that the Owner is furnishing Property Insurance shall not be interpreted to relieve the Contractor of his/her obligation to complete the work without additional cost to the Owner beyond the Contract amount, except as provided in Section 11.2.1.2 (above).

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the

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insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

(Paragraphs Deleted)

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5. The Contractor shall bear all costs of correcting any and all Work not complying with this warranty, and the Contractor and its Surety shall indemnify the Owner for all costs, expenses, losses, and/or damages incurred by the Owner, including Attorney's fees, additional testing and inspections and compensation for the services and expenses of the Architect made necessary thereby. This warranty is in addition to any other warranty or remedy provided elsewhere in the Contract Documents and shall survive the expiration of any such other warranty, acceptance of a final payment for the Work, and the termination of the Contract for Construction.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

§ 12.3.1 The Contractor and its Surety guarantee to make good, repair and/or correct, at no cost or expense to the Owner, any and all latent defects hereafter discovered, provided only that notice in writing, shall be given by the Owner to the Contractor within one (1) year of the discovery of such defects.

- .1** This obligation shall survive the termination of any or all other obligation or obligations under the Contract Documents and it is agreed by the Contractor and its Surety that in the event the Owner is required to bring

suit under this provision against the Contractor or its Surety to enforce this obligation, the Contractor and its Surety hereby waive any defense of the status of limitations.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules.

- .1** Contractor must comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, utility companies, National Board of Fire Underwriters, and others which bear on performance of Work. Deliver to the Owner, certificates and other required legal evidence and proof of compliance with the above.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

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§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, their agents or employees, or any other persons performing portions of the Work
(Paragraph Deleted)

under contract with the Contractor
(Paragraphs Deleted)

because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work or under any order of any Court or other public authority having jurisdiction, the Contractor may, upon seven (7) additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the costs of finishing the Work, including compensation for the services of any Consultants and the Architect's services and expenses made necessary thereby, and the other costs and expenses identified hereinafter, exceed the unpaid balance of the Contract Sum, the Contractor and its Surety shall pay the difference to the Owner upon demand. The costs of finishing the Work include, without limitation, all reasonable Attorney's fees, additional title costs, insurance, additional interest because of any delay in completing the Work, and all other direct and indirect consequential costs, including, without limitation, Liquidated Damages for untimely completion as specified

in the Contract Documents, incurred by the Owner by reason of, or arising from, or relating to the termination of the Contractor as stated herein.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work performed as of the date of termination in accordance with the Contract Documents. The Contractor shall, as a condition of receiving the payment(s) referred to herein, execute and deliver all such papers, turn over all plans, documents and files of whatsoever nature required by the Owner and take all such steps, including the legal assignment of its contractual rights, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor. The Contractor warrants that it will enter into no subcontracts or other agreements that would adversely impact the Owner's rights or increase the Owner's obligations under this Section. In no event shall the Owner be liable to the Contractor for lost or anticipated profits or consequential damages, or for any amount in excess of the compensation due to the Contractor in accord with the Contract Documents for the Work performed as of the date of termination. The warranty and indemnity obligations of the Contractor and Surety shall survive and continue, notwithstanding and termination pursuant to this Section, with respect to the Work performed as of the date of termination.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law.

- .1 No act or omission by the Owner or Architect, or by anyone acting on behalf of either shall be deemed or construed as a waiver or limitation of any right or remedy under the Contract Documents, or as an admission, acceptance, or approval with respect to any breach of the Contract for Construction or failure to comply with the Contract Documents by the Contractor, unless the Owner expressly agrees, in writing.

- .2 The Owner's exercise, or failure to exercise any rights, claims or remedies it may have arising out of or relating to the C9.8.ontract Documents shall not release, prejudice, or discharge the Owner's other rights and remedies, nor shall it give rise to any right, claim, remedy or defense by any other person, including the Contractor, its Surety, any Subcontractor, or any other person or entity.
- .3 Whenever possible, each provision of the Contract Documents shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of the Contract Documents, or portion thereof, is prohibited or found invalid by law, only such invalid provision or portion thereof shall be ineffective and shall not invalidate or affect the remaining provision of the Contract Documents or valid portions of such provision, which shall be deemed severable.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

- .1 The Owner has the responsibility to make a claim as promptly after recognizing or receiving notice of a condition which give reason for a claim.
- .2 The Contractor must provide notice of a claim prior to the submission of a payment requisition, not later than the submission of the second payment requisition following the date the Contractor knew or should have known of the condition giving rise to the claim.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker,

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unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.4 Arbitration

§ 15.4.1 All questions in dispute between the Owner and the Contractor shall be determined by the Courts having jurisdiction of the subject matter, and neither party shall submit to arbitration by the American Arbitration Association or any other arbitration agency.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

1.1 GENERAL

- A. The following Supplementary General Conditions supplement, modify, change, delete from or add to the "General Conditions of the Contract for Construction", AIA Document A201, 2017 ("**General Conditions**"). Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect. These Supplementary General Conditions take precedence over any conflicting provisions in the General Conditions.
- B. Refer to other Sections in Division 1 "General Requirements" for additional modifications, deletions and additions to the "General Conditions of the Contract for Construction."

1.2 ARTICLE 2 OWNER

- A. PARAGRAPH 2.2 - INFORMATION AND SERVICES REQUIRED OF THE OWNER:

Insert the following Paragraph:

2.2.1 The Architect will furnish the successful contractor, the following number of sets of drawings and specifications, signed and sealed for purposes of obtaining NJ Uniform Construction Plan Review by the Municipal Construction Official having jurisdiction over the project to obtain Construction Permits.

Single Overall Contract 3 Sets

- B. Additional copies can be provided upon request in writing to the Architect at the Architect's reproduction costs.

1.3 SUBMITTALS

- A. Supplement Paragraph 3.12 "Shop Drawings, Product Data and Samples", as follows:

3.12.10 Contractor shall provide separate submittals for each Product with reference to Architect's Project Number. Contractor shall, within ten (10) working days from the issue date of the Notice of Award, forward to the Architect a written submittal log including all of the following information:

- .1 A list of all required submission items grouped by technical section division number as set forth in the specifications,

- .2 If in variance with the Milestone Dates Specified in Section 1:01800, the dates upon which each submission will be made by the contractor and the date by which the contractor expects same to be returned to him/her by the Architect, allowing a reasonable time for review,
- .3 Critical items and long lead items shall be so noted on the log,
- .4 A sequence of submissions reasonably based upon the expected progress of the Project.
- .5 Submittals will be mandatory and shall meet time requirements established in other sections of the Contract Documents.
- .6 The Contractor shall complete the entire submission process as soon as possible but in no event later than the time set forth in Section 1:01800 after the Notice of Award. Exceptions may be made if so noted on the submission log, with good reason, and subject to the Architect's approval.
- .7 Omission of any required submittal item from the log does not relieve the Contractor of his/her obligation to make timely submissions of same. The Contractor shall keep their his/her submission log up to date at all times. He/She will provide an updated copy to the Architect, at any time, upon request.

3.12.11 All project submittals are to be complete and provide all information required by the Contract Documents including, but not limited to, model numbers, applicable technical requirements, selected features, color, finish, and other options. Improperly prepared submittals sent to the Architect will be returned without action. The Contractor is responsible to field verify all dimension and conditions effecting the preparation of submittals and the Work.

3.12.12 Submittals provided by the Contractor on behalf of subcontractors and suppliers must be reviewed for completeness and approved by the Contractor prior to submitting same to the Architect. The Contractor will be solely responsible for improperly prepared submittals.

3.12.13 Submittals are to be provided to the Architect consistent with the sequence of the proposed Work.

3.12.14 All fabricated work shall require shop drawings.

3.12.15 Submittal Procedures: The Contractor's failure to follow proper procedures for submittals constitutes grounds for withholding of payments until such time as the Contractor is in compliance. Proper submittal procedures include all of those set forth elsewhere in this specification including the following:

- .1 Failure to adhere to deadlines for completion of submittals and record/resubmittals.
- .2 Failure to provide submittals in good order as required by the Contract Documents.
- .3 Failure to provide submittals in relationship to the progress of the work.
- .4 Performance of work or part of the work, without complete approved submittals.

3.12.16 Architect / Engineer's actions for submittals shall be as follows:

- .1 Submittals returned to the Contractor marked "Approved" allow the Contractor to proceed with the work.
- .2 Submittals returned to the Contractor "Approved As Noted; "Resubmit For Record:"
 - .1 The Contractor may proceed with work, however noted items by the Architect / Engineer (or any affected portion of the submittal), must be corrected and resubmitted to the Architect's office within ten (10) working days of Contractor's receipt of the original submittal. Final acceptance of all work is subject to the Contractor's compliance with requirements of the Contract Documents.
- .3 Submittals returned marked "Returned for Corrections" require the Contractor to resubmit corrected or alternate data in accordance with the corrections indicated.
 - .1 The originals of the reproducible transparencies marked "Returned for Corrections" shall be corrected until approval is obtained. The Contractor shall provide such number of prints of transparencies marked "Approved" as required for the expeditious execution of the work.
- .4 Submittals returned marked "No Action Taken:"
 - .1 The Contractor may not proceed with the work. The Architect / Engineer will not review submittals so marked until the Contractor has properly completed the submittal or corrected the reasons stated thereon.
 - .2 Reasons for "No Action Taken" on a submittal include, but are not limited to the Contractor's failure to:
 - .1 Submit an approved sub-contractor or supplier.
 - .2 Indicate job specific product data such as catalog number, size, type or material on each submittal.
 - .3 Submit complete data, test reports or similar information, as required by the Contract Documents.
 - .4 Obtain prior approval for substitution.
 - .5 Submit documents in a legible or orderly fashion.

- .6 Adhere to any submittal requirements set forth in the Contract Documents.
 - .7 Submit only submittals which are called for in the Contract Documents, other submittals will not be reviewed by the Architect / Engineer.
- .5 Shop drawing submittals and color selection approvals by the Architect:
- .1 The Contractor shall submit all shop drawing submittals within the specified time stipulated in contract documents.
 - .2 The Architect / Engineer shall release / return to the Contractor the approved color selections to coincide with the approved Milestone Schedule / Project Phasing if more than one construction phase is identified in Section 01800.
- .6 Long Lead Items:
- .1 In addition to and concurrent with the submission of the "Schedule of Values", Contractor shall submit a list of all materials, equipment or components which are anticipated to require more than four weeks delivery, together with scheduled ordering and delivery time table.
 - .2 This will be discussed and reviewed regularly at the job meetings.
 - .3 Upon request by the Architect / Engineer, the Contractor shall be prepared to produce evidence of having placed orders for specific materials, equipment and components.
- .7 The Contractor will not be entitled to receive payment or Work performed by the Contractor for which submittals were required to be submitted for review and approval by the Architect. All Work installed in variance with the Contract Documents will be rejected.

3.12.17 Request for Substitutions:

- .1 Pursuant to N.J.S.A. 18A:18A-15(d), requests for substitutions, for a requested approved equal product, will be reviewed for compliance with the specifications based upon the data provided by the Contractor after the award of the project. Approval or rejection will be based on samples, technical data and other items submitted and will be reviewed once and only once for each such request
- .2 Submission of request for substitution shall constitute a representation by the Contractor that he/she:
 - .1 Has investigated the proposed product and determined that it is equal to or better than the specified product.
 - .2 Will provide the same variety for the proposed product as for the specified product.
 - .3 Will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including:
 - .1 Re-design.
 - .2 Additional components and capacity required by other work affected by the change.

- .3 Waives all claims for additional costs and time extensions which subsequently may become apparent and which are caused by the change.
- .3 Substitutions will not be considered when acceptance would require substantial revision of the contract documents.
- .4 Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request.
- .5 Substitution requests will not be considered when submitted directly by subcontractor or supplier.
- .6 When the proposed substitution is not accepted, Contractor(s) must provide the product (or one of the products, as the case may be) specified.
- .7 The Contractor will be notified in writing within a reasonable time, verbal acceptance will not be valid.
- .8 Acceptable substitutions will be added to the contract documents by appropriate modifications.
- .9 Requests for substitution will be reviewed by the Architect upon receipt of all the information requested in the following paragraph. Failure to provide the required information shall be cause for rejection of substitution request.
- .10 Submittal for Substitutions:
 - .1 The Contractor shall begin the submission process as soon as possible after the Notice to Proceed, but in no event later than fifteen (15) working days after Notice to Proceed.
 - .2 The Contractor shall sequence and time his/her submissions in a reasonable and orderly fashion. He/She will allow for sufficient time for the Architect's review as well as the transmission of same amongst all project participants.
 - .3 In the case of color selections, the Contractor is responsible for the completion of all required and related submissions, including samples, prior to the Owner's selection of colors. Exceptions can be made for certain long lead items so identified on the submittal log.
 - .4 The Contractor shall complete the entire submission process as soon as possible but in no event later than thirty (30) calendar days after Notice to Proceed.
 - .1 Exceptions may be made if so noted on the submission log, with good reason, and subject to the Architect's / Engineer's approval.
 - .2 Upon receipt by the Architect, he/she will review same and advise the Contractor if the log is acceptable.
 - .3 At no time will the Contractor unduly burden the Architect / Engineer with excessive or unreasonable submittals made at one time.

- .4 An advertent omission of any required submittal item from the log does not relieve the Contractor of his/her obligation to make timely submissions of same. The Contractor shall keep his/her submission log up to date at all times. He/She will provide an updated copy to the Architect, at any time, upon request.
- .5 Submit three (3) copies of requests for substitutions, fully identified for product, material or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Submit the following:
 - .1 Complete product data, drawings, and descriptions of materials and methods where applicable. Provide manufacturer's name and address, trade name, and model number of product (if applicable), and name of fabricator or supplier (if applicable).
 - .2 Samples where applicable or requested.
 - .3 Detailed comparison of significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect where applicable) for proposed substitution in comparison with original requirements.
 - .4 List, with addresses, of three (3) projects where proposed substitution has been used previously and successfully in a similar application.
 - .5 Coordination information indicating every required change in every other element of the work which is affected by substitution, extended to include work by Owner and separate contractors.
 - .6 A complete statement of effect substitution will have upon schedule of the work, including its effect (if any) on Contract Time (in comparison with compliance with requirements without approval of proposed substitution).
 - .7 Cost information, including a proposal of net change in Contract Sum (if any).
 - .8 Certification by Contractor to the effect that, in his/her opinion and after his/her thorough evaluation, proposed substitution will result in total work which is equal to or better than the work originally required by contract documents, in every respect of significance except as specifically stated in certification; and that it will perform adequately in application indicated, regardless of equality and exceptions thereto.
 - .9 Include in certification, Contractor's waiver of rights to additional payment and time which may subsequently be necessitated, by failure of substitution to perform adequately and for required work to make corrections thereof.

3.12.18 Approval of Substitutions:

- .1 Requests for substitutions, for a requested approved equal product, will be reviewed for compliance with the specifications based upon the data provided by the Contractor after the award of the project. Approval or rejection will be based on samples, technical data and other items submitted and will be reviewed once and only once for each such request.

- .2 Change Order Form: Submit requests for substitution(s) which propose a change in either the Contract Sum or Contract Time by procedures required for change order proposals.

1.4 ARTICLE 9 PAYMENTS AND COMPLETION

- A. Supplement Paragraph 9.2 "SCHEDULE OF VALUES" as follows:

9.2.2 Immediately after Award of Contract, the Contractor shall prepare and submit a Schedule of Values, breaking down all Work by type and Trade. Each scheduled value line item shall be for material and labor for each entity of Work.

9.2.3 Project soft costs including, but not limited to, bond, insurance, mobilization, supervision, submittals, punch-list, training, as-built drawings and close-out documents, shall be indicated in separate line items.

9.2.4. Project Allowances: Include all project allowance(s) at the end of the schedule of values to allow subsequent draw-down when authorized in writing by the Architect.

9.2.5 When an advertisement for bid has included multiple buildings in a single project, the Contractor shall submit separate Schedule of Values for each building.

9.2.6 Unless printed invoices are provided by the Contractor from Insurance and Bonding Companies for which payment is being requested, a maximum of one and one half (1-1/2%) of the total cost of the awarded Contract Amount will be allowed.

- B. Supplement Paragraph 9.6 "PROGRESS PAYMENTS", as follows:

9.6.9 Unless indicated otherwise in the contract documents, pursuant to N.J.S.A.18A:18-40.3, If the contractor does have a performance bond, 2% of the amount due on each partial payment shall be withheld by the board of education when the outstanding balance of the contract exceeds \$500,000, and 5% of the amount due on each partial payment shall be withheld by the board of education when the outstanding balance of the contract is \$500,000 or less, until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items.

9.6.10 Final payment will be made provided the work has been completed, the contract fully performed and a final certificate for payment has been issued by the Architect.

9.6.11 As required by N.J.S.A. 2A:30A-1 et seq., this is to inform you that as a governmental entity, the School District may require longer to make payment than 30 calendar days after receipt of your billing. Payment will be made within 30 days of receipt of the application for payment unless a vote of authorization by the Board is required. As provided by law, payments that require a vote of authorization may be

certified at the next scheduled public meeting and paid during the next subsequent payment cycle.

9.6.12 The Architect shall review applications and certifications for payment submitted by the Contractor which have been signed and certified as required by the Contract Documents. By submitting an application and certification for payment, the Contractor is representing that it has verified that all Work for which payment is being requested, has been completed in accordance with all the requirements of the Contract Documents.

9.6.13 The Architect's approval of the Contractor's certification for payment shall constitute a representation to the Owner, based on the Architect's evaluation of the Contractor's Work and on the data comprising the Contractor's Application for Payment, that, to the best of the Architect's knowledge, information and belief, and, based on periodic on-site observations, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The Architect is not responsible to provide continuous observation of the Work.

1.5 ARTICLE 11 INSURANCE AND BONDS

A. Supplement Paragraph 11.1 "Contractor's Insurance and Bonds", as follows:

11.1.5 Contractor's liability insurance must be maintained until the final Certificate of Payment is issued pursuant to Paragraph 9.10.1 and Completed Operations Insurance is in effect.

11.1.6 Insurance specified to be provided by the Contractor under Paragraph 11.1 shall be on an occurrence basis, as follows and as noted in AIA A101 - 2017, Exhibit A:

- .1 The Contractor shall take out and maintain during the life of this Contract commercial general liability insurance, covering any and all bodily injury, including accidental death, as well as claims for property damage arising out of or in connection with the Work performed hereunder, whether such Work be performed by the Contractor or by any subcontractor or by anyone directly or indirectly employed by either of them.
 - .1 The policy shall name the Owner, the Architect, and their consultants and agents and employees as additional insureds.
- .2 The Contractor shall take out and maintain comprehensive automobile liability insurance, including coverage for all owned, non-owned and hired vehicles, covering bodily injury and property damage.
 - .1 The policy shall name the Owner, the Architect, and their consultants and agents and employees as additional insureds.
- .3 Contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18 of the AIA General Conditions.

- .4 Completed Operations Insurance written to the limits specified for liability insurance specified AIA A101 - 2017, Exhibit A, Article A.3 - Contractor's Insurance and Bonds. Coverage shall be maintained for five (5) years from the date of the start of Beneficial Occupancy until after final payment or the then current applicable statute of repose.
- .5 Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance.
- .6 The Contractor shall either:
 - .1 require each of his/her subcontractors to procure and to maintain during the life of their subcontracts, Subcontractor's Public Liability and Property Damage, of the type and in the same amounts as specified in the preceding paragraph; **or**
 - .2 insure the activities of their subcontractors under their respective policies.

B. Paragraph 11.3 WAIVERS OF SUBROGATION

Delete Paragraph 11.3.2 in its entirety.

END OF SECTION 00800

SECTION 00850 - CONTRACT DRAWINGS

- 1.1 All Drawings listed on drawing No. G001, "Title Sheet and Drawing Index," dated January 23, 2024, unless otherwise revised or amended (via Addenda, Bulletin, etc.), shall form a part of the Contract Documents.

END OF SECTION 00850

SECTION 00860 - LAWS GOVERNING PUBLIC WORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The paragraphs below supplement the General Conditions. Attention is called, but not limited, to the following Laws Governing Public Work.

1.2 STATE SALES AND USE TAX EXEMPTION

- A. Supplement paragraph 3.6 "Taxes" as follows:

3.6.1 As a New Jersey governmental entity, the Board of Education is exempt from the requirements under New Jersey state sales and use tax (N.J.S.A. 54:32B-1 et seq.), and does not pay any sales or use taxes. Bidders should note that they are expected to comply with the provisions of said statute and the rules and regulations promulgated thereto to qualify them for examinations and reference to any and all labor, services, materials and supplies furnished to the Board of Education. Contractors may not use the Board's tax identification number to purchase supplies, materials, service or equipment, for this project.

.1 A contractor may qualify for a New Jersey Sales Tax Exemption on the purchase of materials, supplies and services when these purchases are used exclusively to fulfill the terms and conditions of the contract with the Board of Education. All contractors are referred to New Jersey Division of Taxation-Tax Bulletin S&U-3 and in particular, Contractor's Exempt Purchase Certificate (Form ST-13). Again, contractors are not permitted to use the Board's tax identification number to purchase supplies, materials, services of equipment.

1.3 MUNICIPAL REQUIREMENTS

- A. Supplement paragraph 3.7 "Permits, Fees, Notices and Compliance with Laws" as follows:

3.7.1.1 N.J.S.A. 52:27D-130, provides that local Municipal Construction Enforcing Agency issue required construction permit, perform required inspections during construction, and issue required certificate of occupancy upon completion of Project.

3.7.1.2 N.J.S.A. 52:27D-126C, "No county, municipality, or any agency or instrumentality thereof shall be required to pay any municipal fee or charge in order to secure a construction permit for the erection or alteration of any public building or part thereof from the municipality wherein the building may be located. No erection or alteration of any public building or part thereof by a county, municipality, school board, or any agency or instrumentality thereof shall be subject to any fee, including any surcharge or training fee, imposed by any department or agency of State government pursuant to any law, or rule or regulation, except that nothing contained

in this section shall be interpreted as preventing the imposition of a fee upon a board of education by either the Department of Education for plan review or by a municipality for the review of plans submitted to it pursuant to the provisions of section 12 of P.L.1975, c.217 (C.52:27D-130).

3.7.1.3 N.J.S.A. 40:55D-8(d), A municipality shall exempt a board of education from the payment of any fee related to land use, and site development.

3.7.1.4 N.J.S.A. § 52:27d-126e (amended effective July 21, 2017) - Waiving of Construction Permit, Enforcing Agency Fees for Certain Construction Projects To Benefit Disabled Persons.

1. a. Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-1 19 et seq.), or any rules, regulations or standards adopted pursuant thereto, to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the provisions of section 8 of P.L.1975, c.217 (C.52:27D-126) may, by ordinance, provide that no person shall be charged a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration or improvement designed and undertaken solely to promote accessibility by disabled persons to an existing public or private structure or any of the facilities contained therein.

The ordinance may further provide that a disabled person, or a parent or sibling of a disabled person, shall not be required to pay any municipal fee or charge in order to secure a construction permit for any construction, reconstruction, alteration or improvement which promotes accessibility to his own living unit.

For the purposes of this subsection, "disabled person" means a person who has the total and permanent inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment, including blindness, and shall include, but not be limited to, any resident of this State who is disabled pursuant to the federal Social Security Act (42 U.S.C.416), or the federal Railroad Retirement Act of 1974 (45 U.S.C.231 et seq.), or is rated as having a 60% disability or higher pursuant to any federal law administered by the United States Veterans' Act. For purposes of this paragraph "blindness" means central visual acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees shall be considered as having a central visual acuity of 20/200 or less.

b. (1) Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-119 et seq.) or any rules, regulations or standards adopted pursuant thereto to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the provisions of section 8 of P.L. 1975, c.217 (C.52:27D-126) shall not charge a person who has a service-connected disability declared by the United States Department of

Veterans Affairs, or its successor, to be a total or 100% permanent disability that would entitle them to a property tax exemption under section 1 of P.L.1948, c.259 (C.54:4-3.30) or a spouse, parent sibling, or guardian of the disabled veteran, a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration, or improvement designed and undertaken solely to promote accessibility by the disabled veteran to his own living unit.

(2) A municipality that has granted an exemption from a construction permit surcharge fee or enforcing agency fee pursuant to paragraph (1) of this subsection may apply to the Department of Community Affairs, in accordance with rules and regulations promulgated by the Commissioner of Community Affairs for this purpose, for reimbursement of those exempt fees.

- B. Utility Connection Fees: Contractors shall pay utility connection fees and shall be reimbursed by Owner upon presentation of receipt for same.
- C. Certificates of Occupancy: Contractors shall be responsible for obtaining all Certificates of Occupancy.

1.4 TIME INCLUDING COMPLETION

- A. Supplement Article 8 "Time" as follows:

8.1.7 The term "completed" in N.J.S.A. 18A:18A-19 shall mean substantial completion as defined in this Article 8.

8.1.8 The term "Working Days" as used to compute the time of completion shall mean Mondays through Fridays, exclusive of the twelve major yearly holidays, as listed on the official State of New Jersey website, <https://www.state.nj.us/nj/about/facts/holidays/>

- B. Supplement Article 8.3 "Delays and Extension of Time" as follows:

8.3.4 The Contractor agrees that the Owner can deduct from the Contract Price, any wages paid by the Owner to any Inspector or Inspectors necessarily employed by the Owner for any number of days in excess of the number of days allowed in the specifications for completion of the work.

1.5 NONDISCRIMINATION AND MISCELLANEOUS LABOR PROVISIONS

- A. Attention is called to the following which supplement paragraph 13.1 "Antidiscrimination Provisions" as follows:

13.1.3 N.J.S.A. 10:2-1, Antidiscrimination provisions. Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction,

alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

- a. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;
- b. No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;
- c. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and
- d. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to N.J.S.A. 18A:18A-51 et seq.

During the performance of this contract, the contractor agrees to Mandatory Equal Employment Opportunity Language, as shown Exhibit B.

13.1.3 N.J.S.A. 34:11-56.25 et seq., in accordance with which the Contractor(s) and subcontractor(s) are required to do the following:

- .1 Pay to all workers engaged in the performance of services directly upon the work not less than the prevailing rate of wages. In the event that it is found that any worker employed by the Contractor(s) or any subcontractor(s) has been paid a rate of wage less than the prevailing wage required to be paid by such contract, the Owner may terminate the contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and

to prosecute the work to completion or otherwise.

- .1 Prime Contractor(s) shall post the New Jersey Department of Labor and Workforce Development - Prevailing Wage Rate Determination in accordance with N.J.S.A. 34:11-56.25 et seq., which establish and enforce a prevailing wage level for workers engaged in the project, based on the effective date where the contract(s) is/are to be awarded. This document is to be posted in a prominent and easily accessible place at the site of the work and at such a place or places as are used to pay workers their wages. The prevailing wage rates shall be incorporated into the bid specification manual as a reference and part of the contract. A copy of the project's prevailing wage rates, as applicable to this Project, are on file at the Architect's office.
- .2 Before final payment, furnish Owner with an Affidavit stating that all workers have been paid in accordance with the New Jersey Prevailing Wage Act.
- .3 Keep an accurate record showing the name, craft or trade and actual hourly rate of wages paid to each workman employed by him/her in connection with his/her work. Preserve records for 2 years from date of payment.
- .4 Upon request, the Contractor(s) and each Subcontractor shall file written statements certifying to the amounts then due and owing to any and all workers for wages due on account of the work. The statement shall set forth the names of the persons whose wages are unpaid and the amount due to each. These statements shall be verified by the oaths of the Contractor(s) or subcontractor(s), as the case may be.

1.6 AMERICANS WITH DISABILITIES ACT; FACILITIES FOR PERSONS WITH DISABILITIES

- A. The contractor must comply with all provisions of Title II of the Americans with Disabilities Act (ADA), P.L. 101-336, in accordance with 42 U.S.C. S121.01 et seq. The Board of Education further recognizes that all specifications for the construction, remodeling or renovation of any public building shall provide facilities for persons with disabilities. Reference: N.J.S.A. 18A:18A-17.
- B. It is further recommended that bidders are required to read the Americans with Disabilities language form that is included in these specifications. The form shall be signed to show agreement with the provisions of Title II of the Act and the provisions are to be made a part of the contract. The signed form shall be submitted with the bid proposal. The contractor is obligated to comply with the Act and to hold the owner harmless.

1.7 AMERICAN GOODS AND PRODUCTS

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.5 N.J.S.A. 18A:18A-20 et seq., American goods and products to be used where possible. Each board of education shall provide as a condition of the Contract that only manufactured and farm products of the United States, where ever available, be used in the work.

1.8 PAYMENTS TO LISTED SUBCONTRACTORS UNDER SINGLE OVERALL CONTRACT

A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.6 N.J.S.A. 18A:18A-18, providing that under a single overall contract, all payment required to be made for work and materials supplied by the various subcontractors shall, upon certification by the Prime Contractor of the amount due to the subcontractor(s), be paid directly to the subcontractor(s).

1.9 POLITICAL CONTRIBUTION DISCLOSURE FORM

A. In accordance with N.J.S.A. 19:44A-20.26 "pay to play," Contracts exceeding \$17,500.00 are not to be entered into with business entities unless certain disclosures are made about political contributions.

1. In accordance with N.J.S.A. 19:44A-20.26 Contractor shall be required to disclose political contributions made, if any, ten (10) days before entering into Contract in accordance with C.271 form. All bidders must complete this form and submit with Bid Proposal Forms.

B. In accordance with N.J.A.C. 6A:23A-6.3, No district board of education shall vote upon or award any contract in the amount of \$17,500 or greater to any business entity that has made a contribution reportable by the recipient under N.J.S.A. 19:44A-1 et seq., to a member of the district board of education during the preceding one-year period.

1. Contributions reportable by the recipient under N.J.S.A. 19:44A-1 et seq., to any member of the district board of education from any business entity doing business with the school district shall be prohibited during the term of a contract.

2. The disclosure requirement set forth in N.J.S.A. 19:44A-20.26 also shall apply when the contract is required by law to be publicly advertised for bids.

1.10 DISCLOSURE OF CONTRIBUTIONS TO NEW JERSEY ELECTION LAW ENFORCEMENT COMMISSION (ELEC)

A. N.J.S.A. 19:44A-20.27 establishes a new disclosure requirement for business entities. It requires that, when a business entity has received in any calendar year \$50,000 or more in public contracts with public entities, it must file an annual report with the Election Law Enforcement Commission (ELEC). The report shall disclose any contribution of money or any other thing of value, including an in-kind contribution, or pledge to make a contribution of any kind:

1. To a candidate for or the holder of any public office having ultimate responsibility for the awarding of public contracts, or,
 2. To a political party committee, legislative leadership committee, political committee or continuing political committee.
- B. The report will include all reportable contributions made by the business entity during the 12 months prior to the reporting deadline. ELEC will be promulgating a form and procedures for filing commencing in January 2007. ELEC can also impose fines for failure to comply with this requirement.
- C. While the local unit has no role in this process, it is recommended that all bid or proposal specifications and contracts should include language notifying business entities of their potential obligation under the law. Such language could read as follows:
1. Starting in January 2007, all business entities are advised of their responsibility to file an annual disclosure statement of political contributions with the New Jersey Election Law Enforcement Commission (ELEC) pursuant to N.J.S.A. 19:44A-20.27 if they receive contracts in excess of \$50,000 from public entities in a calendar year. Business entities are responsible for determining if filing is necessary. Additional information on this requirement is available from ELEC at 888-313-3532 or at www.elec.state.nj.us."

1.11 PROMPT PAYMENT ACT

- A. The Owner will issue timely payments to Contractors in accordance with the requirements of the Prompt Payment Act, N.J.S.A. 2A:30A-1, et seq. The bidders are hereby notified that the Owner as a public entity requires all payments to be approved at scheduled public board meetings. The vote on authorization for payments will be made at the first public meeting of the Board following the Board's receipt of the architect's authorization for payment and paid during the subsequent payment cycle.

1.12 NEW JERSEY DEPARTMENT OF TREASURY

- A. Disclosure of Investment Activities in Iran
1. Pursuant to Public Law 2012, c.25 (N.J.S.A.52:32-55, et. seq.), any person or entity ("bidder") that submits a bid or proposal or otherwise enters into or renews a contract with a board of education is required to disclose if it is engaged in investment activities in Iran. In order to comply with the provisions of P.L. 2012, c. 25, all bidders are required to complete a certification that attests that neither the bidder, nor any of its parents, subsidiaries and/or affiliates is listed on the list developed by the New Jersey Department of Treasury's List of Persons or Entities Engaging in Prohibited Investment Activities in Iran, pursuant to section 3 of P.L.2012, c. 25 (N.J.S.A. 52:32-57). The Department of Treasury List is available at <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>.

A copy of the list is attached for informational purposes. All bidders are advised to refer to the most current version of the list to ensure compliance with P.L. 2012, c. 25.

2. If the bidder is unable to certify compliance with the law, the bidder shall provide a detailed and precise description of such investment activities as described in N.J.S.A. 52:32-56(f).
 3. If the board determines that a person or entity submits a false certification concerning its engagement in investment activities in Iran under N.J.S.A. 52:32-58, the board shall report to the New Jersey Attorney General the name of that person or entity. The Attorney General shall determine whether to bring a civil action against the person or entity to collect the penalty prescribed in N.J.S.A. 52:32-59.
- B. N.J.S. 18A:18A-49.4 Civil action brought on behalf of Board of Education.
1. 8.a. A Board of Education as defined in and subject to the provisions of the "Public School Contracts Law, N.J.S.A. 18A:18A-1 et seq., shall implement and comply with the provisions of P.L.2012, c.25 (C.52:32-55 et al.), except that the Board shall rely on the list developed by the State Department of the Treasury pursuant to N.J.S.A. 52:32-57.
 2. 8.b. If the Board determines that a person or entity has submitted a false certification concerning its engagement in investment activities in Iran under N.J.S.A. 52:32-58, the Board shall report to the New Jersey Attorney General the name of that person or entity, and the Attorney General shall determine whether to bring a civil action against the person to collect the penalty prescribed in N.J.S.A. 52:32-59. The Board may also report to the Board's attorney the name of that person, together with its information as to false certification, and the Board's attorney may determine to bring such civil action against the person to collect such penalty.
- C. N.J.S. 18A:18A-49.5 Board of Education, Compliance; Report of False Certification.
1. 3.a. A board of education as defined in and subject to the provisions of the "Public School Contracts Law," P.L.1977, c.114 (N.J.S. 18A:18A-1 et seq.), shall implement and comply with the provisions of P.L.2022, c.3 (C. 52:32-60.1 et al.), except that the board shall rely on the list developed by the Department of the Treasury pursuant to subsection b. of section 1 of P.L.2022, c.3 (C. 52:32-60.1).
 - b. The board may also report to the board's attorney the name of that person, together with its information as to the false certification, and the board's attorney may determine to bring such civil action against the person to collect such penalty.

1.13 EQUAL EMPLOYMENT OPPORTUNITIES AND AFFIRMATIVE ACTION

- A. Bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq.
 - 1. Each contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:
 - a. "A photocopy of a valid letter that the contractor is operating under an existing Federally approved or sanctioned affirmative action program; or
 - b. "A photocopy of a Certificate of Employee Information Report approval, issued in accordance with N.J.A.C. 17:27-4"; or
 - c. "A photocopy of an Employee Information Report (Form AA302) provided by the Division and distributed to the public agency to be completed by the contractor.
- B. Initial Project Workforce Report - Construction (AA201)
 - 1. In accordance with the requirements of the New Jersey Department of Labor & Workforce Development Construction EEO Compliance Monitoring Unit, the Initial Project Workforce Report-Construction (AA201) document, must be submitted to the Public Agency that awards the contract and the Department of Labor & Workforce Development Construction EEO Compliance Monitoring Program after notification of award, but prior to signing the contract.

https://www.nj.gov/treasury/contract_compliance/documents/pdf/guidelines/pa.pdf

1.14 OFFICE OF THE STATE COMPTROLLER

- A. N.J.A.C. 17:44-2.2: Authority to Audit or Review Contract Records
 - 1. Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by the Office of the State Comptroller (OSC) pursuant to N.J.S.A. 52:15C-14(d).
 - a. (The contract partner) shall maintain all documentation related to products, transactions or services under this contract for a period of **five (5) years** from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.
- B. Contractor/Vendor Requirements-Office of the New Jersey State Comptroller
 - 1. Contractors/vendors doing business with the board of education are reminded of the following legal requirements pertaining to the Office of the New Jersey State Comptroller:
 - a. Access to Relevant Documents and Information - N.J.S.A. 52:15C-14 (d)
 - 1) Private vendors or other persons contracting with or receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State

authority, public institution of higher education, or unit of local government or board of education shall upon request by the State Comptroller provide the State Comptroller with prompt access to all relevant documents and information as a condition of the contract and receipt of public monies. The State Comptroller shall not disclose any document or information to which access is provided that is confidential or proprietary. If the State Comptroller finds that any person receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education refuses to provide information upon the request of the State Comptroller, or otherwise impedes or fails to cooperate with any audit or performance review, the State Comptroller may recommend to the contracting unit that the person be subject to termination of their contract, or temporarily or permanently debarred from contracting with the contracting unit.

- b. Maintenance of Contract Records - N.J.A.C. 17:44-2.2
 - 1) Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by OSC pursuant to N.J.S.A. 52:15C-14(d).
 - 2) The contractor/vendor to whom a contract has been awarded, shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

1.15 ANTI-BULLYING BILL OF RIGHTS ACT (P.L. 2010.C.122)

A. N.J.S.A. 18A:37-16 provides:

1. A member of a board of education, school employee, student or volunteer shall not engage in reprisal, retaliation or false accusation against a victim, witness or one with reliable information about an act of harassment, intimidation or bullying.
2. A member of a board of education, school employee, contracted service provider, student or volunteer who has witnessed, or has reliable information that a student has been subject to, harassment, intimidation or bullying shall report the incident to the appropriate school official designated by the school district's policy, or to any school administrator or safe schools resource officer, who shall immediately initiate the school district's procedures concerning school bullying.
3. A member of a board of education or a school employee who promptly reports an incident of harassment, intimidation or bullying, to the appropriate school official designated by the school district's policy, or to any school administrator or safe schools resource officer, and who makes this report in compliance with the procedures in the district's policy, is immune from a cause of action for damages arising from any failure to remedy the reported incident.

4. A school administrator who receives a report of harassment, intimidation, or bullying from a district employee, and fails to initiate or conduct an investigation, or who should have known of an incident of harassment, intimidation, or bullying and fails to take sufficient action to minimize or eliminate the harassment, intimidation, or bullying, may be subject to disciplinary action.

1.16 CONTROLLING SILICA EXPOSURES IN CONSTRUCTION

- A. Occupational Safety and Health Administration (OSHA) - U.S. Department of Labor: OSHA 29 CFR 1926.1153, 2017.

1. The above referenced guidance advisory document is not a standard or regulation, and it creates no new legal obligations. The document is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards promulgated by OSHA or by a state with an OSHA approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any specific recommendations contained within this document is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.
 - a. This guidance document addresses the control of employee exposures to respirable dust containing crystalline silica, which is known to cause silicosis, a serious lung disease, as well as increase the risk of lung cancer and other systemic diseases.
 - b. This document provides information on the effectiveness of various engineering control approaches for several kinds of construction operations and equipment, and contains recommendations for work practices and respiratory protection, as appropriate.
 - c. OSHA encourages employers to conduct periodic exposure monitoring to confirm that engineering and work practice controls are effective and that appropriate respiratory protection is being used where necessary.

2. The above referenced advisory document can be found at:
https://www.osha.gov/dsg/topics/silicacrystalline/construction_info_silica.html

1.17 CERTIFICATION OF NON-DEBARMENT FOR FEDERAL GOVERNMENT CONTRACTS

1. Pursuant to N.J.S.A. 52:32-44.1, any natural person, company, firm, association, corporation, or other entity prohibited, or "debarred," from contracting with the federal government agencies, shall also be prohibited from contracting for public work in the state of New Jersey. This prohibition also extends to any affiliate

organization(s) held by or subject to the control of an entity of that prohibited person or entity.

2. Prior to awarding a contract for public work, a local units must obtain written certification from the contracting person or entity through the form (Certification of Non-Debarment for Federal Government Contracts, N.J.S.A. 52:32-44.1 (P.L. 2019, c406), attesting to their non-debarment from contracting with federal government agencies.

1.18 CONTRACTOR EMPLOYEES PROCEDURE FOR CRIMINAL HISTORY RECORD CHECKS

1. The Office of Student Protection (OSP) suggests the following recommendation when educational facilities submit contractor employees (i.e., masons, building and roofing companies) for short-term and long-term projects. The school official, acting as a liaison to the construction contractor, must share with other school district administrators the names of the company's employees who will be submitting to a criminal record check. This process will assure that employees of the contractor who have not obtained their approval for employment and are disqualified or ineligible for school employment will be identified as a contractor service provider employee and not continue to be employed at school facilities and have direct contact with the student population.
2. To ensure compliance with the requirements of N.J.S.A. 18A:6-7.2, the Chief School Administrator shall direct the school official acting as a liaison to the construction company to obtain a list of individuals who will be employed by the contractor for the school facility project that will be undergoing a criminal history record check. The liaison shall then provide a copy of this list to the Superintendent's Office and Human Resource Director, as these offices will receive any adverse action correspondence from the OSP related to the criminal history record check process.
3. Upon receipt of disqualification or ineligibility correspondence, the Superintendent's Office or Human Resource personnel shall review the contracted company list in order to determine if the subject of that letter is either a school employee or an employee of any contract service provider and take the appropriate action.
4. As with any school employee, **no employee of a contract service provider** shall commence work at a school facility without having first obtained an approval for employment from the Office of Student Protection.
5. Approvals for employment for these type contracted employees shall be maintained with the liaison and copies forwarded to the Superintendent's Office.

1.19 LABOR-REGISTERED APPRENTICESHIP PROGRAM

1. As of May 1, 2019, P.L. 2019, c.21 requires contractors that directly employ

craftworkers to participate in a United States Department of Labor-registered apprenticeship program as a condition of initial or renewed PWCR registration. Contracting units are not responsible for verifying contractor participation in a registered apprenticeship program.

2. A contractor working on a Public Works Project who directly employs craft workers, must certify to the NJDOL that they participate in a registered Apprenticeship Program for each craft they employ as defined in N.J.S.A. 34:11-56 and CFR , et al.
3. Registered apprenticeship program” means an apprenticeship program which is registered with and approved by the USDOL, which provides each trainee with combined classroom and on-the-job training in an occupation recognized as an apprenticeable occupation, and which meets the program standards of enrollment and graduation under 29 C.F.R. §29.6.

1.20 NEW JERSEY PREVAILING WAGE ACT - BILL A4869

1. An Act concerning certain contracts for public work and amending and supplementing P.L.1963, c.150.

Be It Enacted by the Senate and General Assembly of the State of New Jersey:

- a. C.34:11-56.27a Lowest bidder of public work contract, proof of prevailing wage rates payment; rules, regulations.

- 1) a. If a person makes the lowest bid for a contract with a public body for public work subject to the provisions of the “New Jersey Prevailing Wage Act,” P.L.1963, c.150 (C.34:11-56.25 et seq.) and that bid is ten percent or more lower than the next lowest bid for the contract, the person making the lowest bid shall certify to the public body that the prevailing wage rates required by that act shall be paid. If the bidder does not provide the certification prior to award of the contract, the public body shall award the contract to the next lowest responsible and responsive bidder. This certification shall be required only when a public body is engaging in competitive bidding for public work.

- b. The Commissioner of Labor and Workforce Development, in consultation with the Division of Local Government Services in the Department of Community Affairs, shall promulgate rules and regulations concerning the standardization of the certification necessary to effectuate the provisions of this section.

- 2) Section 3 of P.L.1963, c.150 (C.34:11-56.27) is amended to read as follows:

C.34:11-56.27 Prevailing wage rate required in contract.

3) a. Every contract in excess of the prevailing wage contract threshold amount for any public work to which any public body is a party or for public work to be done on property or premises owned by a public body or leased or to be leased by a public body shall contain a provision stating the prevailing wage rate which can be paid (as shall be designated by the commissioner) to the workers employed in the performance of the contract and the contract shall contain a stipulation that such workers shall be paid not less than such prevailing wage rate. Such contract shall also contain a provision that in the event it is found that any worker, employed by the contractor or any subcontractor covered by said contract, has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the public body, the lessee to whom the public body is leasing a property or premises or the lessor from whom the public body is leasing or will be leasing a property or premises may terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable for any excess costs occasioned thereby to the public body, any lessee to whom the public body is leasing a property or premises or any lessor from whom the public body is leasing or will be leasing a property or premises.

b. The Commissioner of Labor and Workforce Development, in consultation with the Division of Local Government Services, shall promulgate rules and regulations concerning the standardization of the contractual language necessary to effectuate the provisions of this section.

4) This act shall take effect 180 days from the date of enactment, except that the Commissioner of Labor and Workforce Development make take any anticipatory action in advance thereof as may be necessary for the implementation of this act.

Approved November 8, 2021.

END OF SECTION 00860

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127)
N.J.A.C. 17:27-1.1 et seq.
CONSTRUCTION CONTRACTS

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

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affection or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable 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 age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Dept. of LWD, construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

- (A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as supplemented and amended from time to time and the American with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

EXHIBIT B (Continued)

- (B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:
- 1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;
 - 2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;
 - 3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
 - 4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
 - 5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and nondiscrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
 - 6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
 - i. The contractor or subcontractor shall interview the referred minority or women worker.
 - ii. If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.
 - iii. The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.
 - iv. If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.
 - 7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program upon request.
- (C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which

EXHIBIT B (Continued)

result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ration established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

- (D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.

(Revised: January, 2016)

Reviewed By: _____

Title: _____

Company: _____

Date: _____

Signature: _____

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:
 - 1. Project description.
 - 2. Contract scope description.
 - 3. Contractor's use of the premises.
 - 4. Preconstruction meeting.
 - 5. Security procedures.

1.3 PROJECT DESCRIPTION

- A. The project consists of the Alterations at Absegami High School for the Greater Egg Harbor Regional High School District, Board of Education, Atlantic County, New Jersey.
- B. Contract Documents prepared by Fraytak Veisz Hopkins Duthie, P.C. Architects / Planners, (Project Number: FVHD-5369-5) and their Consulting Engineers:
 - 1. Consulting Civil Engineer: French & Parrello Associates, P.A., Wall, NJ.
 - 2. Consulting Mechanical/Electrical Engineer: Gillan & Hartmann, Inc., Mont Clare, PA.

1.4 CONTRACT SCOPE DESCRIPTION

- A. The Base Bid Work consists of but is not limited to the following:
 - 1. Renovations to the school facade and connection point where a TCU was previously adjacent (and removed) to the school with EIFS insulated assembly, as indicated on the drawings.
 - 2. Convert the former corridor access point in the school to Storage Room #A102.
 - 3. Provide new masonry opening / double egress FRP door in an aluminum frame to the new plaza.

4. Provide and install wood door, hollow metal frame, door hardware, as indicated on the drawings.
5. Remove and replace the curtain wall in the Library with FRP doors and insulated panels, insulated glass and insulated glass with translucent film, as indicated on the drawings.
6. Remove existing pavement. Construct new bus parking area and concrete plaza, as indicated on the drawings.
7. Provide and install masonry repointing, where indicated on the drawings.
8. All plumbing, and electrical system work as indicated on the drawings.
9. All other indicated work.

B. Alternate Bid(s):

1. Alternate Bid No. 1: Replacement of Two (2) Ceiling Mounted Cabinet Unit Heaters.

C. Single Overall Contract: This contract includes:

1. All work in accordance with drawings, Parts 2 and 6 Specification Sections and in accordance with Contract Documents.
2. General Construction Work includes:
 - a. Work that is primarily architectural in nature plus work traditionally recognized as general construction in accordance with drawings and as listed as a part of Part 2 specification sections, unless otherwise indicated below:
 - 1) Also includes both administrative and coordination responsibilities.
 - a) General Construction Contractor is responsible for all coordination between his/her work and work of all Prime Subcontractors.
 - 2) All concrete work in accordance with Part 2 specification sections.
 - 3) Provide and install the miscellaneous Structural Steel.
 - 4) Perform selective roof demolition, cutting, alterations, repair, and flashing work associated with General Construction Work, where indicated or required.
 - a) Roofing work shall be performed in accordance with requirements of existing roofing system warranty and in accordance with the Contract Documents.
 - 5) All other indicated work.
3. Electrical Work includes:
 - a. Work shall include demolition and removal of the electrical system work at the previous corridor from the school to the TCU, as indicated or required, to allow for new construction.

- b. Provide and install new Storage Room electrical power distribution, lighting, and the connections to equipment tied into such systems, including all work in accordance with drawings and Part-6 specification sections.
- c. Work shall include demolition and removals, as indicated or required, to allow for new construction.
- d. All other indicated work.

1.5 CONTRACTOR'S USE OF THE PREMISES

- A. The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
 - 1. Other areas are off limits to all construction personnel.
- B. The following building facilities may not be used by construction personnel:
 - 1. Toilet facilities.
 - 2. Food service facilities, including dining areas.
- C. The Owner will partially occupy the adjacent school building during the construction period.
 - 1. The Owner will endeavor to cooperate with the Contractor's operations when the Contractor has notified the Owner in advance of need for changes in operations in order to accommodate construction operations.
 - 2. Conduct the work so as to cause the least interference with the Owner's operations.
- D. Coordinate with Local Authorities as to which routes are capable of handling heavy truck traffic.
- E. Signs: Provide signs adequate to direct visitors.
 - 1. Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.
- F. All deliveries by the Contractor shall be coordinated with the Owner's Representative, prior to the delivery date.

1.6 PRECONSTRUCTION MEETING

- A. A preconstruction meeting will be held at a time and place designated by the Architect for the purpose of identifying responsibilities of the Owner's / Architect's personnel and explanation of administrative procedures.

B. The Contractor shall also use this meeting for the following minimum agenda:

1. Construction schedule.
2. Use of areas of the site.
3. Delivery and storage.
4. Safety.
5. Security.
6. Cleaning up.
7. Subcontractor procedures relating to:
 - a. Submittals.
 - b. Change orders.
 - c. Applications for payment.
 - d. Record documents.

C. Attendees shall include:

1. The Owner / Owner's Representative.
2. The Architect, and any Consultants.
3. The Prime Contractor and his/her superintendent.
4. Major Subcontractors, suppliers, and fabricators.
5. Others interested in the work.

1.7 SECURITY PROCEDURES

A. Limit access to the site and building to persons involved in the work.

B. Provide secure storage for materials for which the Owner has made payment and which are stored on-site.

C. Secure completed work as required to prevent loss.

D. The Contractor, and their employees, will be required to be registered with the Owner's Representative / School's Main Office.

1. The Contractor's personnel and Subcontractors will be required to wear identification badges at all times on the site.

END OF SECTION 01010

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Definitions and Explanations: Certain requirements of the work related to each allowance are shown and specified in the contract documents. The allowance has been established in lieu of additional requirements for that work, and further requirements thereof (if any) will be issued by change order.
- B. The type of allowance scheduled herein for the work includes the following:
1. Lump sum allowances.
- C. Selection and Purchase: At the earliest feasible date after the award of the Contract, advise the Architect of the scheduled date when the final selection and purchase of each product or system described by each Allowance must be accomplished in order to avoid delays in the performance of the work. Obtain and submit proposals for the work of each Allowance, as required by the Architect for use in making the final selections; include whatever recommendations for selection may be relevant to the proper performance of the work. Purchase products and systems as specifically selected (in writing) by the Architect.
1. Submit proposals and recommendations, for the purchase of the products or systems of Allowances, in the form specified for change orders.
- D. Change Order Data: Where applicable, include in each change order proposal both the quantity of the products being purchased and the unit cost, along with the total amount of the purchase to be made. Where requested, furnish survey-of-requirements data to substantiate the quantity. Indicate applicable taxes, delivery charges, and amounts of applicable trade discounts.
- E. Lump-Sum Allowances: The amounts herein specified are the net amounts available for purchase of the materials specified, including taxes (if any), and each change order amount shall be based thereon. **All other costs associated with the performance of the work under the Allowance, including but not limited to insurance, storage, handling, overhead, profit, etc., are not a part of the allowance, and shall be included in the lump sum bid / or base bid Contract amount.**
1. In the event the actual purchase amount of materials, plus taxes (if any) exceeds the specified allowance, the Owner will pay the excess; should the actual purchase amount, plus taxes (if any) be less than the specified Allowance, the Contractor shall credit the Owner with the difference.
 2. The actual purchase amount, plus taxes (if any) shall be substantiated by certified bills of sale to be submitted with the change order.

- F. Change Order Mark-Up: Except as otherwise indicated, comply with the provisions of the General Conditions and the Supplementary General Conditions.
- G. Excess Materials: Submit invoices or delivery slips to indicate the actual quantities of materials delivered to the site for use in fulfillment of each allowance. Where economically feasible, and so requested by the Architect, return unused materials to the manufacturer/supplier for credit to the Owner, after the installation has been completed and accepted. Where not economically feasible to return for credit, and so requested by the Architect, prepare unused materials for the Owner's storage, and delivery to the Owner's storage space as directed. Otherwise, disposal of excess materials is the Contractor's responsibility.

1.2 SCHEDULE OF ALLOWANCES

- A. General: The following allowance amount is included in the Contract Sum, for the corresponding unit of work, as described.
 - 1. Construction Work
 - a. A sum of **\$5,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.

END OF SECTION 01020

SECTION 01030 - ALTERNATE BIDS

PART 1 - GENERAL

1.1 PROCEDURE FOR ALTERNATE BIDS

- A. Each Bidder shall submit on the Proposal Form, all Alternate Bids applicable to the work under his/her bid. Alternate Bids shall state the difference in price as "additions to" or "deductions from" the Base Bid, unless otherwise noted, for the substitution, omission, or addition of the following materials, items or construction from that shown and specified.
- B. The Alternate Bids, when accepted, become part of the Contract.
- C. Each Bidder shall carefully check the Drawings and Specifications to determine the extent of each Alternate Bid required.
- D. Alternate Bids shall include all overhead and profit applicable thereto.
- E. Alternate Bids shall reflect the increase or decrease in cost of all work of every name and nature which may be affected thereby and no subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.
- F. The description herein for each Alternate Bid is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable specification sections and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each Alternate Bid. Coordinate related work and modify surrounding work as required to properly integrate with the work of each Alternate Bid. It is recognized that descriptions of Alternate Bids are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.
- G. Except as otherwise described or approved, materials and workmanship of the Alternate Bids shall conform to the requirements specified under the various sections of the Specifications for similar items of work.
- H. Where methods of construction, materials, finishes or details of installation required by the various Alternate Bids differ from the requirements shown on the drawings or specified for corresponding items, the alternate construction, materials, etc. will be subject to approval by the Architect.
- I. The Contractor shall submit shop drawings and samples for the work under each accepted Alternate Bid for approval in conformance with requirements specified for submittals in both Part 1, AIA Document A201 and Section 00800 - Supplementary General Conditions.

- J. The following Alternate Bids shall apply to single overall bids, and must be included in the Bidder's Proposal(s).

1.2 ALTERNATE BIDS - CONSTRUCTION WORK

- A. **Alternate Bid No. 1: Replacement of Two (2) Ceiling Mounted Cabinet Unit Heaters**

State the amount to be added to the base bid to remove and replace two (2) ceiling mounted cabinet unit heaters and all associated work, as shown on various drawings and as indicated in various specification sections.

END OF SECTION 01030

SECTION 01040 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 REQUIREMENTS INCLUDED

- A. Coordination of submittals.
- B. Coordination meetings.
- C. Coordination drawings.
- D. Coordination of project closeout.
- E. Administrative/supervisory personnel.
- F. Coordination of trades.
- G. Coordination of space.
- H. Coordination of field measurements and field conditions.

1.3 GENERAL REQUIREMENTS

- A. Contractor shall coordinate his/her activities with the activities of other subcontractors and work performed by others.
- B. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
 - 1. Inform the Architect when coordination of his/her work is required.

1.4 COORDINATION OF SUBMITTALS

- A. Coordinate and correlate the submittals on each work item and on interrelated work items to ensure their timeliness, completeness, consistency, compatibility and compliance with the Contract Documents.
- B. Prepare and submit special coordination drawings where close and careful coordination of information is required for proper fabrication or installation of

materials, products or equipment by separate entities. Coordination drawings may also be required where limited space availability necessitates close and careful coordination for efficient and proper installation of different components.

1. Show interrelationships of components shown on separate shop drawings.
 2. Indicate required installation sequences.
- C. Coordinate any request for substitution to ensure compatibility of its space requirements, its operating characteristics and elements and its effects on other work. Prior to proposing a substitution for any item, verify that its size, configuration, supports and connections will coordinate with all other work and that it will fit within the allotted space while allowing for proper operating, maintenance and circulation space.
1. Comply with requirements for requests for submittal of substitution indicated in AIA A201 and Section 00800.

1.5 COORDINATION MEETINGS

- A. The General Construction Work Contractor shall hold additional coordination meetings and conferences with other prime work contractors, subcontractors and others involved in the Work as needed to ensure coordination of work.
1. Notify the Architect of such coordination meetings.
- B. Regular project site meetings shall be in accordance with Sections 00870 and 01200.

1.6 COORDINATION OF TRADES

- A. Coordinate construction activities included under various sections of these Specifications to ensure efficient and orderly installation of each part of the Work and to prevent interferences among parts of the Work. Coordinate work items and construction operations included under different sections of the Specifications that are dependent upon one another for proper installation, connection and operation.
1. Where installation of one part of the Work is interrelated with installation of other components, schedule construction activities in the sequence required to obtain the best results.
 2. Where availability of space is limited, coordinate installation of different components to prevent interferences and to ensure proper accessibility for required maintenance, service and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Where necessary, prepare memoranda outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings. Distribute these coordination memoranda to all parties involved in the work being coordinated.
 - 1. Prepare similar memoranda for the Owner and other Contractor(s) where coordination with construction or operations by them is required.
 - 2. Provide copies of such coordination memoranda to the Architect.
- C. Coordinate the scheduling and timing of required administrative activities with other construction activities to avoid conflicts and ensure orderly progress of the Work. Administrative activities include:
 - 1. Preparation and updating of schedules.
 - 2. Preparation and processing of submittals.
 - 3. Preparation and processing of requests for information.
 - 4. Project meetings.
 - 5. Testing and inspection activities.
 - 6. Project close-out activities.

1.7 COORDINATION OF SPACE

- A. Coordinate use of available space and sequence of installation for work (e.g., mechanical and electrical work) which is indicated diagrammatically or schematically on the drawings. Prevent physical interference of components. Follow routing shown for pipes, ducts and conduits, taking into account the limitations of available space; make runs parallel with lines of building. Utilize space efficiently to ensure proper installations (including installation of other work) and accessibility for maintenance, service and repairs.
 - 1. Detailed drawings of proposed departures from spatial arrangements or locations indicated in the Contract Documents, due to field conditions or other causes, shall be submitted to the Architect for review. No such departures shall be made without prior review by the Architect.
 - 2. Where required for coordination, the Architect will have the authority to order, as changes in the Work, changes in locations and sizes. Such changes shall be made without adjustment to the Contract Sum or Contract Time.
- B. Field verify measurements of existing items and work which precedes each sequence. Ensure proper fit and location.
- C. In finished areas, conceal pipes, ducts and wiring in the construction.
- D. Coordinate locations of fixtures and outlets with finish elements.

1.8 COORDINATION OF FIELD MEASUREMENTS AND FIELD CONDITIONS

- A. Prior to ordering materials or equipment or performing work, the Contractor and/or Subcontractors shall verify Contract Document and submittal dimensions and weights affecting their work and other prime contractor's work associated with field measurements and field conditions at the project site, (for site and building work), and shall be responsible for their accuracy and correctness.
- B. Differences discovered from dimensions or weights indicated in the Contract Documents or submittals shall be submitted in writing to the Architect for review, before proceeding with the work.
- C. Commencing work implies acceptance of surfaces, areas, preceding work and other field conditions, and verification of dimensions, by the Contractor.
- D. No Change Order will be issued in cases where discrepancies in dimensions are discovered after work has been commenced or where the Contractor has failed to properly investigate and take into account field measurements and existing field conditions.

1.9 COORDINATION DRAWINGS

- A. General Requirements: Prepare coordination drawings where limited space available may cause conflicts in the locations of installed products, and where required to coordinate installation of products.
 - 1. All work on the coordination drawings shall be performed by a competent draftsmen and shall be clear and fully legible. The Architect shall be the judge of the legibility of the composite drawings.

1.10 COORDINATION OF PROJECT CLOSEOUT

- A. Coordinate completion and clean-up work and administrative activities in preparation for Substantial Completion and occupancy of the Work or of designated portions of the Work.
- B. After Owner occupancy, coordinate access for completion or correction of the work not in conformance with the Contract Documents to minimize disruption of Owner's activities.
- C. Assemble and coordinate closeout submittals specified in Section 01700.

1.11 REQUIRED ADMINISTRATIVE/SUPERVISORY PERSONNEL

- A. General: In addition to the other administrative and supervisory personnel required for the performance of the Work, the Prime Contractor shall provide specific coordinating personnel as specified herein.

- B. Project Manager / Superintendent: A full time on site Project Manager, with a recommended minimum of eight (8) years experience, including project management experience on a similar type of projects.
 - 1. The Contractor for General Construction Work shall provide a full-time staff member or members, (Project Manager/Superintendent), experienced in coordination of mechanical and electrical work on projects of this type and scale, including administration and supervision.

1.12 COORDINATION OF TRADES

- A. Coordinate work with other trades to eliminate any possible interference before any piping, conduit, equipment, devices, controls, supports, ductwork and fixtures are installed.
- B. Where multiple items of mechanical and electrical equipment, devices, piping, conduits, supporting metal work, hangers, pull boxes, outlets, ductwork or controls are shown on any of the Contract Documents of the various trades in the same location, coordinate and adjust items to fit within designated location(s).

1.13 COORDINATION OF SPACE, FIELD MEASUREMENTS AND FIELD CONDITIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both substrate and conditions under which his/her work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Recheck measurements and dimensions, before starting each installation.
 - 1. Submit to the Architect for review any change in dimensions shown on the Contract Documents or submittals affecting physical size, shape or location of any part of the work, whether due to field conditions or other causes.
- C. Passage of equipment:
 - 1. Establish passage clearances required to deliver, install and erect mechanical and electrical equipment. Wherever necessary, provide equipment in sections or knocked down in order to allow passage of equipment through available openings.
 - 2. Where there is not sufficient clearance for passage of mechanical or electric equipment, deliver, install and protect such equipment before confining walls, floors, slabs and steel work are erected. Schedule and coordinate this work with the work of other trades.
 - 3. If any structure, equipment or system must be altered to allow passage of equipment, the person or entity responsible for providing that structure,

equipment, or system shall restore it to its original condition, without additional cost to the Owner.

4. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- D. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
 - E. Provide all appropriate structural supports, hangers, wires for roof, floor and wall and associated assemblies which include but are not limited to materials, finishes, equipment, fixtures, piping, raceways, mechanical and electrical components. This work shall be in conformance with requirements of the Contract Documents whether or not indicated by a reference in specification or as may be in detail shown on drawings and schedules.
 - F. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
 - G. Install each component during weather conditions and construction status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
 - J. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.
 - K. Where mounting heights are not indicated:
 1. Install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.
 2. Install mechanical and electrical systems, materials and equipment to provide maximum possible headroom. Maintain maximum headroom and space conditions. Where headroom or space conditions (less than 8'-0") appear inadequate, the Architect shall be notified before proceeding with the work.

END OF SECTION 01040

SECTION 01050 - ALTERATIONS, CUTTING, PATCHING AND REFINISHING WORK

PART 1 - PRODUCTS

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 DESCRIPTION

- A. Work included: Alterations, removals and demolition required for this work include, but are not necessarily limited to:
 - 1. Alterations, cutting, patching, removal and preparation work to be done as noted on drawings, as required, to complete construction.
 - 2. Patching and refinishing of existing surfaces damaged or left unfinished as a result of this work, including site work, existing ground surfaces, concrete surfaces, bituminous paving surfaces, etc.
 - 3. Asbestos.
 - a. The Contractor shall review and familiarize themselves with the Owners Asbestos Hazard Emergency Response Act (AHERA) report prior to the commencement of any demolition activity. Also, the Contractor will be provided with an inventory of all ACM (Asbestos Containing Materials) in the buildings where they are working, and will be required to sign a form (provided by the Owner) that they are in receipt of the inventory.
 - b. Contractor is herein cautioned that asbestos may be within concealed spaces where work will be taking place. The Contractor shall immediately notify the Owner if any concerns or conditions arise in regards to potential asbestos containing building materials (ACBM's) in order that the owner may verify same and take appropriate action. The Contractor shall not proceed with the work until the material has been abated and air sampling clearance levels have been achieved as set forth by the Owner's Environmental Consultant.
 - c. The Contractor shall employ personnel who are trained in accordance with OSHA workplace standards as they pertain to asbestos.
 - d. **The Architect / Engineer has no authority or professional involvement relative to the hazardous material/asbestos removal or disposal phase for this project and are not available for questions and/or direction in this regard. The hazardous material/ asbestos reference is included as a convenience for the Owner, and the Architect accepts no responsibility nor liability for the accuracy of information, bidders conclusions, methods to be used, nor for any aspect of approvals required by the Contractor in undertaking and completing this project insofar as**

hazardous material/asbestos is concerned. The Contractor shall direct any/all questions and concerns to the Owners Hazardous Material Abatement Consultant.

- e Worker and Community Right to Know Act Requirements
 - 1) It is required that the Contractor and/or Subcontractors comply with all of the requirements of HAZCOM 2012 and New Jersey Right To Know (RTK) program. General Contractor is responsible for ensuring that containers of substances belonging to the Contractor and/or Subcontractors that are stored at the Owner's facility are properly RTK labeled. Refer to N.J.A.C. 8:59-5.10.
 - 2) Surveys of hazardous substances stored at the Owner's facility by the Contractor and/or Subcontractor are to be provided to the Owner of the facility. Refer to N.J.A.C. 8:59-2.2(h).
 - 3) Material Safety Data Sheets (MSDS) and/or Safety Data Sheets (SDS) from manufacturers must be provided to the Owner for all products present at, purchased for, and brought on site by Contractors and/or Subcontractors to the Owner's facility. Refer to N.J.A.C. 8:59-2.2(1).
 - 4) Contractor and/or all Subcontractors must submit, prior to starting any work, a copy of their approved Hazard Communication Plan - 29 CFR 1910.1200.

- 4. This project shall be subject to the requirements of the EPA "Renovation, Repair and Painting" rule including the following:
 - a. The Contractor must be lead safe trained and certified. The Contractor will be required to submit a copy of their EPA certificate prior to the start of the work.
 - b. The Contractor shall provide the Owner with a copy of the EPA's Lead Hazard Management information pamphlet "Renovate Right-Important Lead hazard Information for Families, Child Care Providers and Schools" prior to the start of any renovation work. The Contractor shall have the Owner sign a pre-renovation disclosure form confirming receipt of the pamphlet.
 - c. The Contractor shall at all times employ lead safe practices as identified in the rules.

- 5. This project shall be subject to the requirements of the EPA rules on diesel exhaust and off-site particulate dust, including the following:
 - a. Diesel exhaust contributes the highest cancer risk of all air toxics in New Jersey and is a major source of NOx within the state. Therefore, per NJ DEP recommendations, construction projects involving non-road diesel construction equipment operating in a small geographic area over an extended period of time shall implement the following measures to minimize the impact of diesel exhaust:
 - 1) All on-road vehicles and non-road construction equipment operating at, or visiting, the construction site shall comply with the three minute idling limit, pursuant to N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15. Contractor shall purchase "No Idling" signs to post at the site to

remind subcontractors to comply with the idling limits. Signs are available for purchase from the Bureau of Mobile Sources at 609/292-7953 or <http://www.stopthesoot.org/sts-no-idle-sign.htm>.

- 2) All non-road diesel construction equipment greater than 100 horsepower used on the project for more than ten days shall have engines that meet the USEPA Tier 4 non-road emission standards, or the best available emission control technology that is technologically feasible for that application and is verified by the USEPA or the CARB as a diesel emission control strategy for reducing particulate matter and/or NOx emissions.
 - 3) All on-road diesel vehicles used to haul materials or traveling to and from the construction site shall use designated truck routes that are designed to minimize impacts on residential areas and sensitive receptors such as hospitals, schools, daycare facilities, senior citizen housing, and convalescent facilities.
- b. Contractor will be liable for the effects of off-site particulate dust and/or odors during construction and shall take steps to minimize the impact of air pollution from these activities.
6. **Hot Work Permit:**
- a. A Hot Work Permit is required for any operation involving “open flame” or “producing heat and/or sparks”.
 - 1) This work includes, but is not limited to, welding, brazing, cutting, grinding, soldering, thawing pipe, torch-applied roofing, or chemical welding.
 - b. Before initiating hot work, ensure precautions are in place as required by NFPA 51B and ANSI Z49.1.
 - c. Make sure an appropriate fire extinguisher is readily available.

B. Related Sections:

1. Section 00870 - Miscellaneous Requirements.
2. Section 01010 - Summary of the Work.
3. Section 01020 - Allowances.
4. Section 01040 - Coordination.
5. Section 02070 - Selective Demolition.
6. **Division 2 through 26 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.**
 - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 22, 23 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
1. Location and Extent of Work: Submit key plan indicating room location where work to take place. Describe cutting and patching, indicate methods and show how they will be performed.
 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 3. Products: List products to be used and firms or entities that will perform the Work. Provide samples and field mock-up as indicated or requested by the Architect.
 - a. Samples and field mock-up shall match existing surfaces and colors.
 - b. Obtain Architect's approval prior to proceeding with work.
 4. Schedule and Dates: Provide work schedule, indicate when cutting and patching will be performed.
 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Coordinate cutting of operating elements with other plumbing, HVAC, electrical or other trades.
- C. Miscellaneous Building Elements: Do not cut and patch any building elements or related components in a manner that could change their operation, load-carrying

capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. Engage experienced installers or fabricators for all work.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- F. Mock-Ups: Provide mock-ups for Architect approval for each proposed patching method. Do not proceed with patching work until obtaining of approvals from the Architect.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties. Confirm existing warranties with Owner prior to starting of work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

B. Inspection:

1. Prior to start of any work the General Construction Work Contractor shall verify all existing work area conditions; lines, lengths, corners and all other dimensions.
 - a. General Construction Work Contractor shall engage a Licensed Professional Land Surveyor (PLS) to perform layout of the site elements. Copies of all surveys performed by the General Contractor shall be submitted to the Architect in two copies and shall include layout drawings and data sheets.
2. The General Construction Work Contractor shall submit information and survey to Subcontractor(s), the Architect for all required coordination of new construction and all related site work.
3. Prior to work of this section, verify information and survey submitted by the General Construction Work Contractor, carefully inspect the existing conditions and verify that materials and surfaces to be altered or removed are the same as noted on the drawings.

C. Discrepancies:

1. In the event of discrepancy of existing conditions, surfaces, etc., immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. The Contractor shall provide cutting, patching, relocations, and or re-installations of existing construction to provide for installation of other components or performance of other construction associated with his/her work, and subsequently patch and finish as required to restore surfaces to their original condition. Work shall be performed whether or not shown on drawings.
 - 2. The General Construction Work Contractor shall provide all required and necessary pockets in concrete and masonry walls and in existing roof assemblies including all required cutting, and preparation work to allow for installation of new work. The General Construction Work Contractor shall subsequently patch as required to restore and prepare surfaces to receive new finishes.
 - 3. All repairing, patching, piecing out, filling in, restoring and refinishing shall be neatly done by craftsmen skilled in their respective trades and completed in proper manner to leave same in condition satisfactory to the Architect.
 - 4. All new work shall be installed plumb, level, true, and shall be shimmed as required to cover any irregularities in substrates.
- B. Cutting:
 - 1. Before cutting is started in any location the Contractor shall carefully investigate conditions as to human and structural safety, existing piping, wiring and items concealed, and wherever same interfere with the work they shall be properly relocated, rerouted or removed as the case may be, at no increase to contract price.
 - 2. Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 3. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

4. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 5. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 6. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 7. Do not disturb any structural work, plumbing, steam, gas, or electric work without approval of Architect.
 8. Electrical Services:
 - a. Cut off conduit in walls or partitions to be removed shall be performed by respective trade.
 - b. Cap, valve, or plug and seal remaining portion of conduit to prevent entrance of moisture or other foreign matter after cutting shall be performed by respective trade.
 9. Proceed with patching after construction operations requiring cutting are complete.
 - a. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work.
 10. Existing work disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled or replaced with new work, and refinished and left in as good condition as existing before commencing work.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Field Mock-up: Prepare field mock-up of proposed restoration method, as requested or required by the Architect. Obtain Architect's approval prior proceeding with actual work.
 3. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate or minimize evidence of patching and refinishing.
 4. Floors and Walls: Where walls, partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the existing and

new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
5. Ceilings: Cut, remove, patch, repair, install new including hanging assemblies and finish ceilings as necessary to provide an even-plane surface of uniform appearance.
 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4 CLEAN-UP

- A. Areas where demolition is in progress within or adjacent to Owner occupied areas shall be broom cleaned at the end of each working day.
- B. Do not burn materials or debris on premises.
- C. Do not allow demolished materials to accumulate inside or outside of existing building.
- D. Remove from the site all rubbish and debris resulting from work of this section.
- E. If the Contractor fails to clean-up their debris within 24 hours, the Owner has the right to clean-up the debris left by the Contractor. All associated clean-up costs, incurred by the Owner, will be back-charged to the Contractor.

3.5 PROTECTION

- A. Contractor shall provide all other necessary temporary enclosures, guardrails, barricades, etc. to adequately protect all workers and public from possible injury. Provide all necessary temporary partitions, enclosures, coverings of approved materials and construction for the exclusion of weather and for confining dust and debris.
- B. Contractor shall be responsible for the protection of the existing building, facilities and improvements within the areas where work is being done. Any disturbance or damage to the work, the existing building, and improvements, equipment or any impairments of facilities resulting from his/her work, shall be promptly restored, repaired, or replaced by the responsible Contractor at no extra cost to the Owner.
- C. Adequate protection of persons and property shall be provided at all times, including Saturdays, Sundays and holidays, and during time work is being performed and after

working hours. Protection shall include barricade fencing, traffic control, dust partitions, weather protection and other means as required.

- D. Preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site and along access to the site. Be responsible for all unauthorized cutting or damaging of trees and shrubs, including damage due to careless operation of equipment, stock-piling of materials or tracking of grass areas by equipment.

3.6 SALVAGE

- A. Partial Removal: Items of salvable value to Contractor may be removed from structure as work progresses. Salvage items must be transported from site as they are removed.
 - 1. Storage or sale of removed items on site will not be permitted.
- B. Items designated on drawings or in specifications to remain the property of the Owner, or to be reused, shall be removed, and securely stored with care to prevent damage. Repair or replace such items damaged in removal.
- C. Before transporting non-designated, removed items from the site, contact Architect for decision as to what items if any are to remain the property of the Owner. Items retained by the Owner will be transported by him/her to his/her storage area.

3.7 STANDARDS

- A. All demolition work shall be performed in accordance with the applicable rules and regulations and the Codes and Ordinances of local, State and Federal authorities, and in accordance with the requirements of public utility corporations.
- B. Work shall satisfy requirements of the Occupational Safety and Health Act of 1970 with amendments.
- C. Work not affected by more stringent requirements of regulatory agencies shall satisfy the provisions of ANSI-A10.6-2006 (R2016) - American National Standard Safety Requirements for Demolition.
- D. Confine the movement and storage of vehicles, equipment and materials to such routes and locations as may be designated by the Owner and Architect.
- E. The building and grounds will be maintained in a clean and orderly manner so as to conform with all local fire safety regulations and in accordance with the latest editions of the Safety Code of the National and State Board of Fire Underwriters.

3.8 INGRESS, EGRESS AND CIRCULATION

- A. The Prime Contractor shall be responsible for performing his/her construction

activities in such manner to maintain ingress and egress for visitors and occupants of Owner-occupied areas and to continuously maintain all required emergency exits from and circulation between existing facilities. Passageways for emergency exits shall be kept continuously free from debris, construction equipment, tools, stockpiles or materials, and other hazards to speedy evacuation. The Contractor shall provide all necessary temporary work as prudence and good practice may dictate and in accordance with Applicable Law and Authorities having jurisdiction to obtain and maintain all such ingress, egress and circulation requirements. The Prime Contractor shall be responsible for providing coordination of this temporary work between Subcontractor(s), as directed by the Architect. All temporary work shall be removed when no longer required.

3.9 NON-INTERFERENCE WITH OWNER'S OPERATIONS

- A. Work under this Contract will be performed when the existing building is occupied. Coordinate with Owner's schedule and operation, obtain Owner's approval prior to proceeding with work.
- B. Contractor shall acquaint himself/herself with the general character of the Owner's operations prior to commencing work and shall schedule his/her work to avoid interference therewith. The sequence of alteration operations shall be in accordance with a schedule of contract operations approved by the Owner and Architect.
- C. The Contractor shall not start work until the schedule has been approved in writing by the Architect and the Owner. The Contractor shall not perform work in occupied areas without giving the Owner 72 hours written notice of his/her intention to work in occupied areas.
- D. The Contractor shall expedite placing orders and submission of shop drawings for equipment required to complete work under this Contract to ensure delivery of all equipment with adequate time allowed to complete the installations to conform to the project completion date.

END OF SECTION 01050

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conference
 - 2. Pre-Installation Conferences
 - 3. Coordination Meetings
 - 4. Progress Meetings
- B. Construction Schedule requirements is specified in another Division 1, Section.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. The Architect will schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than fifteen (15) calendar days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Architect and their consultants, the Prime Contractor and his/her superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could effect progress including such topics as:
 - 1. Tentative construction schedule
 - 2. Critical work sequencing
 - 3. Designation of responsible personnel
 - 4. Procedures for processing field decisions and Change Orders
 - 5. Procedures for processing Applications for Payment
 - 6. Distribution of Contract Documents
 - 7. Submittal of Shop Drawings, Product Data, and Samples
 - 8. Preparation of record documents
 - 9. Use of the premises
 - 10. Office, Work, and storage areas

11. Equipment deliveries and priorities
12. Safety Procedures
13. First Aid
14. Security
15. Housekeeping
16. Working hours

1.4 PRE-INSTALLATION CONFERENCES

- A. The Prime Contractor to conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representative of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents
 - b. Options
 - c. Related change orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, product data and quality control samples
 - g. Possible conflicts
 - h. Compatibility problems
 - i. Time schedules
 - j. Weather limitations
 - k. Manufacturer's recommendations
 - l. Compatibility of materials
 - m. Acceptability of substrates
 - n. Temporary facilities
 - o. Space and access limitations
 - p. Governing regulations
 - q. Safety
 - r. Inspection and testing requirements
 - s. Required performance results
 - t. Recording requirements
 - u. Protection
 2. Record significant discussions and agreements and disagreements of each conference along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner, and the Architect.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.5 COORDINATION MEETINGS

- A. The Contractor for General Construction will conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 PROGRESS MEETINGS

- A. Regular Progress Meetings: The Architect will schedule and conduct regular progress meetings as follows:
 1. Bi-weekly meeting with the Owner, Architect, Contractor and Subcontractors.
 - a. Weekly meetings between the Contractor and Subcontractors will be the responsibility of the Contractor and the Architect will not attend.
- B. Special Meetings will be conducted as required by the progress of the work
- C. Location of the meetings: Meetings shall be conducted at a location in the school to be determined by the Owner's Representative.
- D. Attendance: Attendance at Construction Meetings shall be as follows:
 1. The Owner shall be in attendance at bi-weekly meetings and at any special meetings as appropriate to the agenda.
 2. The Architect and their professional consultants, as needed, at bi-weekly meetings and at any special meetings as appropriate to the agenda.
 3. The Contractor at all construction meetings.
 4. Subcontractors as appropriate to the agenda.
 5. Suppliers as appropriate to the agenda.
 6. The Owner's Representative at all construction meetings.

- E. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
- F. Contractor's Construction Schedule:
 - 1. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements
 - b. Time
 - c. Sequences
 - d. Deliveries
 - e. Off-site fabrication problems
 - f. Access
 - g. Site utilization
 - h. Temporary facilities and services
 - i. Hours of work
 - j. Hazards and risks
 - k. Housekeeping
 - l. Quality and work standards
 - m. Change orders
 - n. Documentation of information for payment requests
- G. Reporting: No later than three (3) business days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- H. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.
- I. Attendance by the Contractor is mandatory, whether the meetings are weekly, bi-weekly or at whatever interval is determined by the Architect.
 - 1. Unless given prior approval by the Architect in writing not to attend meetings, Contractor will be fined **\$250.00** for each regularly scheduled meeting for which he/she is not represented by a person in authority who can speak for and/or make decisions for the Contractor.
 - 2. Fine amounts shall be withheld and deducted from the Contract Sum.

END OF SECTION 01200

SECTION 01400 - MATERIAL TESTING / QUALITY CONTROL SERVICES

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 material testing and quality control services.

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

- B. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

- 1. Quality Control Services is the responsibility of the Contractor.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, and the Owner or authorities having jurisdiction are not limited by provisions of this Section.

- C. Related Sections include the following:

- 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections in AIA Document A201 and Section 01200.
 - 2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Division 2 through 26 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality Control Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
 - 1. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 REGULATORY REQUIREMENTS

- A. Copies of Regulations: Obtain copies of referenced regulations which also available in Local Public Libraries.

1.6 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: When requirement is indicated in specific technical section and/or when requested by the Architect, in addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed

by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

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

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

D. Reports: Prepare and submit certified written reports that include the following:

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

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

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- B. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. **Specialists:** Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. **Testing Agency Qualifications:** An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
 - 1. **Preconstruction Testing:** Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
 - 2. **Contractor responsibilities include the following:**
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.

- d. When testing is complete, remove assemblies; do not reuse materials on Project.
 3. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and the Owner with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect .
 2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

- a. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- C. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
 1. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - a. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - b. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - c. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - d. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 - e. Do not perform any duties of Contractor.
 2. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - a. Access to the Work.
 - b. Incidental labor and facilities necessary to facilitate tests and inspections.
 - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - d. Facilities for storage and field-curing of test samples.
 - e. Delivery of samples to testing agencies.
 - f. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - g. Security and protection for samples and for testing and inspecting equipment at Project site.
 3. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - a. Schedule times for tests, inspections, obtaining samples, and similar activities.

4. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
 - a. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
 3. Protect construction exposed by or for quality-control service activities.
 4. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01410 - REFERENCES AND INDUSTRY STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved:" The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities.
- C. "Directed:" Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated:" The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations:" The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish:" The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install:" The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide:" The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer:" An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

- J. The term "experienced," when used with an entity, means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction, subject to verification by and approval of the Architect.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. "Project site(s)" is the space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

- E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S." .

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01410

SECTION 01505 - TEMPORARY FACILITIES

1.1 RESPONSIBILITIES OF CONTRACTOR

- A. Contractor is responsible for the following temporary facilities and services:
1. Installation, operation, maintenance and removal of each temporary facility usually considered as its own normal construction activity.
 2. Plug in electric cords, extensions cords, supplementary plug in task lighting and special lighting necessary exclusively for his/her own activities.
 3. His/Her own storage and fabrication sheds.
 4. All hoisting requirements for his/her work.
 5. Collection and disposal of debris, hazardous, unsanitary or other harmful waste material from their operations, on a daily basis to trash receptacles, hoppers, containers, dumpsters, etc. furnished by the Contractor.
 - a. **Refer to Section 01050 - Alterations, Cutting, Patching and Refinishing Work which identifies the responsible Contractor for the collection and disposal of debris and Section 01524 - Construction Waste Management for additional information.**
 6. Six foot (6'-0") high site enclosure fence, including maintenance and any gates needed. Provide fence relocations as needed during construction.
 7. The secure lockup of his/her own tools, materials and equipment.
 8. Construction aids and miscellaneous services and facilities necessary exclusively for his/her own construction activities.
 9. Temporary storage provisions for work, including offsite provisions, if required.
 10. Containerized bottled drinking water units for his/her personnel.
 11. Fire protection provisions related to work including fire extinguishers.
 12. All personnel safety equipment and provisions for his/her personnel.
 13. Temporary insulated enclosure of a portion of the building, when required.
 14. Environmental protections.
 15. Dust and fume control
 16. Tree and plant protection.

17. Other temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
18. Temporary toilets in sufficient quantity to suit project needs and including disposable supplies.

1.2 COMPRESSED AIR

- A. Contractor shall furnish his/her own equipment and energy source to provide compressed air required for the completion of work under his/her contract.

1.3 REMOVAL AND RESTORATION OF TEMPORARY FACILITIES

- A. At the completion of the work prior to final payment, Contractor shall remove temporary facilities and work which he/she has been responsible. Refer to Section 01700 for additional requirements.

1.4 UTILITY CONSUMPTION

- A. The Owner shall be responsible and pay all utility costs for electric and water consumption during the construction period.

END OF SECTION 01505

SECTION 01524 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. All of Division 1 and attached specifications and drawings that make a part of this contract.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.4 SUBMITTALS

- A. Waste Management Plan: Submit 4 copies of plan within 30 days of date established for the Notice to Proceed.

- B. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- C. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Qualification Data: For refrigerant recovery technician.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Owner / Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 1 Section "Temporary Facilities" for operation, termination, and removal requirements.

- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Sale and Donation: Not permitted on Project site.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste off Owner's property and transport to recycling receiving or processor.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials on-site.

C. Burying: Do not bury waste materials on-site.

D. Disposal: Transport waste materials off Owner's property and legally dispose of them.

E. Washing waste materials into sewers or drains is not permitted.

END OF SECTION 01524

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:
 - 1. General product requirements, including:
 - a. General specification requirements for all products.
 - b. General requirements and procedures for maintenance materials and tools.
 - 2. General requirements for product documentation, including:
 - a. Requirements and procedures for schedule of products.
 - b. General requirements for operation and maintenance data.
 - 3. General procedures for products including:
 - a. Procedures for transportation and handling.
 - b. Procedures for delivery and receiving.
 - c. Procedures for storage.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Components required to be supplied in quantity within a specification section shall be identical, interchangeable, and made by the same manufacturer.
- B. Do not use products removed from existing construction.

2.2 MAINTENANCE MATERIALS AND TOOLS

- A. Maintenance Materials: Parts and materials for repair and maintenance; specific items required are specified in product sections.
 - 1. Provide products and tools which are identical to those used in the work; if necessary to obtain identical items, order at the same time as products to be installed or tools to be used in the work.
- B. Package appropriately and label to show type and quantity of contents.

- C. Deliver, handle, and store in the same manner as products to be installed.
- D. Do not turn over to the Owner until date of substantial completion, unless otherwise approved by the Owner.
- E. Deliver to the Owner; unload.
- F. Obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 PRODUCTS

- A. It is the Contractor's responsibility to select products which comply with the contract documents and which are compatible with one another, with existing work, and with products selected by other Contractors.
 - 1. Verify that electrical characteristics of products are compatible with electrical systems; notify architect of all discrepancies.
 - 2. Where visual matching to an established physical sample is required, the Architect's decision will be final.
- B. Do not use any substitute products which have not been approved in accordance with the requirements of the contract documents.
- C. Where the specification is silent on whether substitutions will be considered, substitutions will be considered only when submitted in accordance with AIA A201 and Section 00800.
- D. Products Specified by Reference Standard: Use any product meeting the specification. Provisions of reference standards shall not modify the responsibilities of the Owner or Architect as defined in the contract documents.
- E. Products Specified by Performance Requirements: Use any product meeting the specification.
- F. Products Specified to Match a Physical Sample: Use any product that matches; obtain the Architect's approval.
- G. Products Specified by Listing a Brand Name Product(s) made by listed Manufacturer(s) as the "Basis of Design":
 - 1. Pursuant to N.J.S.A. 18A:18A-15(d) indicated basis of design brand name product(s) or equivalent made by one of the manufacturers listed will be acceptable, as determined by the Architect.

- H. Products Specified by Listing Brand Name Product(s) Accompanied by Language Indicating that Substitutions Are Allowed: Provide a product meeting the specification; submit substitution request for any brand-name product, that is not listed, in accordance with AIA A201 and Section 00800.
- I. Products Specified by Listing Manufacturer(s): Provide a product meeting the specification and made by one of the manufacturers listed or an approved equal. Approval of substitutions will be in accordance with AIA A201 and Section 00800.
- J. Unless specified or noted otherwise in the Contract Documents and/or approved submittals, all Work is to be performed in accordance with the respective material Manufacturer's printed installation instruction. Work installed in variance with the Contract Documents, Approved Submittals and Manufacturer's printed installation instructions will be rejected, removed and replaced by the Contractor and at no additional cost to the Owner.

3.2 SCHEDULE OF PRODUCTS

- A. Prepare a complete schedule of products used, including the following for each product:
 - 1. Manufacturer's name.
 - 2. Brand or trade name.
 - 3. Model number, if applicable.
 - 4. Reference standard, if more than one is applicable.
 - 5. Arrange products in the schedule by specification sections; indicate paragraph where specified.
- B. Prepare and submit a preliminary schedule within 15 working days after award of contract; resubmit when revised; submit final schedule prior to final payment. See additional requirements and milestone dates in Section 01800.
- C. Schedule of products shall not be used to obtain approval of substitute products; make separate request for substitution.

3.3 OPERATION AND MAINTENANCE DATA

- A. Provide operation and maintenance data as specified in individual product sections.
 - 1. Provide data sufficient for operation and maintenance by Owner without further assistance from the manufacturer.
 - 2. Provide completed data in time for use during Owner instruction.

- B. Data Required For Products - General:
 - 1. Name of manufacturer and product.
 - 2. Name, address, and telephone number of subcontractor or supplier.
 - 3. Local source of replacements.
 - 4. Local source of replaceable parts and supplies.
- C. Product Data: Where product data is specified for inclusion in operation and maintenance data, provide manufacturer's data sheets marked to indicate specific product and product options actually installed; delete inapplicable data.
- D. Project Record Documents: Provide an additional copy of applicable record documents for inclusion with the operation and maintenance data.
- E. Coordination Drawings: When coordination drawings are prepared, include a copy with the operating and maintenance data.
- F. Custom Manufactured Products: Provide all information needed for reordering.
- G. Finish Materials: Manufacturer's product data, color/texture designations, and manufacturer's instructions for care, cleaning, and maintenance.
- H. Products Exposed to Weather and Products for Moisture Protection: Manufacturer's product data, recommended inspection schedule and procedures, maintenance and repair procedures, and maintenance materials required.
- I. Equipment: Provide at least the following information:
 - 1. Product data giving equipment and function description, with normal operating characteristics and limiting conditions.
 - 2. Starting, operating, and troubleshooting procedures.
 - 3. Cleaning and maintenance requirements and procedures.
 - 4. External finish maintenance requirements.
 - 5. List of maintenance materials required.
 - 6. List of special tools required.
 - 7. Parts list: List all replaceable parts, with ordering data.
 - 8. Recommended quantity of spare parts to be maintained in storage.

- J. Systems: Provide overall function description, with diagrams, prepared especially for this project.
- K. Form of Data: Prepare data in the form of an instructional manual.
 - 1. Arrange contents logically, using section numbers and sequence of sections indicated on the table of contents of this project manual.
 - 2. When multiple volumes are used, arrange by related subjects; identify contents in cover title.
 - 3. Assemble into 3-ring binders with maximum 2-inch ring size.
 - a. Hardback, cleanable plastic covers.
 - b. Identify each book with title "Operation and Maintenance Instructions" and project name.
 - c. Page size 8-1/2 by 11 inches, maximum.
 - d. Prepare special typewritten data on minimum 20-pound paper.
 - e. Provide tabbed divider for each product and system.
 - f. Drawings: Bind in with other data; provide reinforced binding edge; fold larger drawings to size of pages.
 - 1) Do not use pockets or loose drawings.
 - 4. Provide table of contents for each volume listing:
 - a. Name of the project.
 - b. Name, address, telephone number, and contact name of:
 - 1) Architect.
 - 2) Contractor.
 - c. Index of products and systems included in volume.

3.4 TRANSPORTATION AND HANDLING

- A. Require supplier to package finished products in a manner which will protect from damage during shipping, handling, and storage.
- B. Transport products by methods which avoid damage.
- C. Deliver in dry, undamaged condition in manufacturer's unopened packaging.
- D. Provide equipment and personnel adequate to handle products by methods which prevent damage.
- E. Provide additional protection during handling where necessary to prevent damage to products and packaging.
- F. Lift large and heavy components at designated lift points only.

3.5 DELIVERY AND RECEIVING

- A. Arrange deliveries of products to allow time for inspection prior to installation.
- B. Coordinate delivery to avoid conflict with the work and to take into account both the conditions at the site and the availability of personnel, handling equipment, and storage space.
- C. Clearly mark partial deliveries to identify contents, to permit easy accumulation of entire delivery, and to facilitate assembly.
- D. Promptly inspect shipments and remedy damage, incorrect quantity, incompleteness, improper or illegible labeling, and noncompliance with requirements of contract documents and approved submittals.

3.6 STORAGE

- A. No indoor storage areas are available on-site.
- B. General Storage Procedures:
 - 1. Store products immediately on delivery.
 - 2. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
 - 3. Store in a manner to prevent damage to the stored products and to the work.
 - 4. Store moisture-sensitive products in weathertight enclosures.
 - 5. Store indoors if necessary to keep temperature and humidity within ranges required by manufacturer.
 - 6. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 - 7. Arrange storage to provide access for inspection and inventory.
 - 8. Periodically inspect and remedy damage and noncompliance with required conditions.
- C. Loose Granular Materials: Store on solid surfaces in well-drained area; prevent mixing with foreign materials.

D. Exterior Storage:

1. Cover products subject to weather damage with impervious sheet covering; provide ventilation to avoid condensation.
2. Provide surface drainage to prevent runoff or ponded water from damaging stored products.
3. Prevent damage and contamination from refuse and chemically injurious materials and liquids.
4. Store fabricated products on substantial platforms, blocking, or skids above the ground, sloped to drain.

END OF SECTION 01600

SECTION 01700 - PROJECT CLOSEOUT DOCUMENTS AND PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Specifications, Division 1 - Miscellaneous Requirements Sections, and Specification Sections included in Part-2 through Part-6.

1.2 SUMMARY

- A. Section Includes:

1. Maintenance of Project Record Documents,
2. Record drawings, including As-Built drawings,
3. Record project manual (specifications),
4. Operation and Maintenance Manuals,
5. Warranties,
6. Extra Materials,
7. Submittals required prior to requesting for determining dates of substantial and final completion, and also prior to release of final payment(s),
8. Transmittal of Closeout Project Documents to the Owner,
9. Instructions of Owner's personnel,
10. Final Cleaning.

- B. GENERAL REQUIREMENTS

1. All submittals shall indicate reference to the appropriate Architect's Project Number.

- C. As-Built Drawings:

1. Full-size paper set.
2. Two (2) CD-Roms.

1.3 MAINTENANCE OF PROJECT RECORD DOCUMENTS

- A. Do not use record documents of any type for construction purposes.
- B. Maintain record documents in a secure location at the site while providing for access by the Contractor and the Architect during normal working hours; store in a fire-resistive room or container outside of normal working hours.
- C. Record information as soon as possible after it is obtained.
- D. Assign a person or persons responsible for maintaining record documents.
- E. Record the following types of information on all applicable record documents:
 - 1. Dimensional changes.
 - 2. New and revised details.
 - 3. Actual routing of piping and conduit.
 - 4. Revisions to electrical circuits.
 - 5. Actual equipment locations.
 - 6. Sizes and routing of ducts.
 - 7. Locations of utilities concealed in construction.
 - 8. Particulars on concealed products which will not be easy to identify later.
 - 9. Changes made by modifications to the contract; note identification numbers if applicable.
 - 10. New information which may be useful to the Owner, but which was not shown in either the contract documents or submittals.

1.4 RECORD AND AS-BUILT DRAWINGS

- A. During the progress of the installation, the Contractor shall keep a careful record of all changes and variations in the arrangement of his/her work from the layout shown on the Contract Drawings in order that the Owner may be provided with a complete set of all plans (As-Builts) showing the work as actually installed.
 - 1. The Contractor shall maintain complete two (2) sets of opaque prints of the contract drawings, marked to show changes which occur due to his/her work.

2. Where the actual work differs from that shown on the drawings, mark this set to show the actual work.
 3. Mark location of concealed items before they are covered by other work.
 4. Mark either record contract drawings or shop drawings, whichever are best suited to show the change.
 5. Where changes are marked on record shop drawings, mark cross-reference on the applicable contract drawing.
 6. When the Contractor is required by a provision of a modification to prepare a new drawing, rather than to revise existing drawings, obtain instructions from the Architect as to the drawing scale and information required.
 7. Keep drawings in labeled, bound sets.
 - a. Mark with red pencil.
 - b. Mark work of separate contracts with different colors of pencils.
 8. Incorporate new drawings into existing sets, as they are issued.
 9. Where record drawings are also required as part of operation and maintenance data submittals, make copies from the original record drawing set.
 10. As-Built Drawing Format to be submitted to the Architect:
 - a. One (1) complete, legible full-size paper (hard copy) As-Built drawing set with the following information on each page:
 - 1) Note: "As-Built" drawing,
 - 2) Contractor's Firm name,
 - 3) Date.
 - b. Two (2) copies, pdf format CD-Rom, scanned As-Built drawings of the hard copy furnished to the Owner (indicated above) shall be furnished to the Owner and the Architect and as directed by the Architect.
 11. Mechanical/ Electrical As-Built drawings must be submitted to the Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.
- B. Record drawings shall be provided for **all work** including but not limited to the following:
1. General Construction Work
 2. HVACR Work
 3. Electrical Work

1.5 PROJECT SPECIFICATION MANUAL

- A. The Contractor shall maintain a complete copy of the project specification manual, marked to show changes which occur due to his/her work.
- B. Where the actual work differs from that shown in the project manual, mark the record copy to show the actual work.
 - 1. Include a copy of each addendum and modification to the contract.
 - 2. In addition to the types of information required on all record documents, record the following types of information:
 - a. Product options taken, when the specification allows more than one.
 - b. Product substitutions.
 - c. Proprietary name and model number of actual products furnished, for each product, material, and item of equipment specified.
 - d. Name of the supplier and installer, for each product for which neither a product data submittal nor a maintenance data submittal was specified.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
 - 1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 - 2. Maintenance Data:
 - a. Manufacturer's 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 into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.
- C. Operation and Maintenance Manuals must be submitted to the appropriate Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.
 - 1. Contractor shall submit electronic version of the MEP O&M manuals for review by the MEP Consultant. *Paper copies should not be submitted as part of the MEP review process.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 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 paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 4. Warranty manual must be submitted to the Architect for review. Architect's approval must be obtained before issuing final payment.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.8 SUBMITTAL REQUIREMENTS - 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. 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 Owner 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 Owner 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 and digital images on CD Rom, damage or settlement surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touch-up painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection 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.

1.9 SUBMITTAL REQUIREMENTS - 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 the requirements of the Contract Documents.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and signed by the Contractor.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes. Provide statement signed by Owner's representatives stating that they have received the required training.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. The cost of additional inspections required by the Architect or his/her consultants due to Contractor's failure to complete the punch list will be paid by the Contractor and will be deducted from the Contractor's final payment.
- C. The Contractor is required to obtain all final releases from governmental and regulatory agencies having jurisdiction over the project with the assistance from the Architect / Engineer and Owner (if required).

1.10 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list to the Architect. Include name and identification of each space and area affected by construction operations for

incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, applicable.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.11 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 Architect's 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.
- 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.

1.12 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.

3. Schedule training with Owner, through Architect, with at least seven calendar days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

1.13 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
1. Refer to other Division 1 - specification sections for additional cleaning as required and where applicable.
- 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. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective

- surfaces to their original condition.
- f. Remove debris and surface dust from limited access spaces, including trenches, manholes, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including glass in doors. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. 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.
 - (1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Heating, Ventilating Air Conditioning Work and Refrigeration Subcontractor shall replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - 1) Clean ducts, blowers, and coils if units were operated without filters during construction.
 - o. Electrical Work Subcontractor shall clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - p. Leave Project clean and ready for occupancy.
 - q. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

1.14 TRANSMITTAL TO OWNER

- A. Collect, organize, label, and package ready for reference.
 - 1. Provide cardboard file boxes for submittals.
 - 2. Provide cardboard drawing tubes with end caps for transparencies.
 - 3. Bind print sets with durable paper covers.

4. Label each document (and each sheet of drawings) with "PROJECT RECORD DOCUMENTS - This document has been prepared using information furnished by _____" [insert the contractor's name], and the date of preparation.

B. Submit to the Architect for transmittal to the Owner, unless otherwise indicated.

1.15 REMOVE TEMPORARY FACILITIES

A. At the completion of the work prior to final payment, remove all temporary facilities entirely from the site, including, but not limited to, the following:

1. Trailers, temporary toilets, temporary enclosures, dust barriers and other temporary protection devices.

1.16 SUBMITTALS REQUIRED PRIOR TO FINAL PAYMENT

A. Contractor must satisfy all requirements of Sections 01700 and 01900 prior to submitting for Final Payment.

B. A closeout checklist will be provided to the Contractor when he/she is substantially complete. The Contractor is instructed to mark each submittal with the corresponding item number on the checklist. All warranties must have the Owner Name, Project Name, Architect Project Number and Warranty Periods. If all documents are not received in this format, the submittal will be rejected and the Contractor will be instructed to pick these documents up at the Architect's office for correction.

C. Submittals required prior to final payment shall be in accordance with "Checklist" include, but are not limited to, the following items:

1. Completed Operations Insurance Certificate - ACORD Form.
2. Affidavit of Payment of Debts and Claims - AIA Document G706.
3. Affidavit of Release of Liens - AIA Document G706A.
4. Consent of Surety Company to Final Payment - AIA Document G707.
5. Certification of Wages in accordance with New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25 et seq.
6. 10% one year Maintenance Bond on the form provided in this specification.
7. Manufacturers' product warranties, Special written guarantees and warranties, maintenance warranty, etc. in accordance with Section 01900, various specification sections and the table of contents of the Project Manual. This is

in addition to the one-year guarantee covered by the Maintenance Bond and in addition to the Contractor's one-year guarantee.

- a. Guarantee shall be signed and sealed by Officer of the Contracting Firm and shall be notarized.
8. Project Record Drawings, (As-Built Drawings), Record Specifications, Record Product Data, and Miscellaneous Record Submittals.
 - a. Note: As-Built Drawings shall be submitted to the appropriate Engineer(s) / Architect.
 9. Operation and Maintenance Manuals and Instructions.
 - a. Note: Operation and Maintenance Manuals shall be submitted to the appropriate Engineer(s) / Architect.
 10. Balancing Reports for Heating, Ventilating, Air Conditioning and Refrigeration systems.
 11. Certificate of Occupancy / Copies of all Building Department inspection approvals.
 12. In accordance with requirements of N.J.S.A. 52:32-44. Contractor must submit accurate list of all subcontractors and suppliers. Contractor must provide a certification that all proofs of business registration for all subcontractors and suppliers are maintained on his/her file.
 13. All approvals and final releases from governmental and regulatory agencies have jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.

END OF SECTION 01700

CLOSEOUT CHECKLIST

Owner		
Title		
Project #		Contract:
Contractor		
Substantial Completion Date:		Updated:
Refer to Specification Sections 01700 and 01900 for closeout requirements. All Warranties must have the Owner Name, Project Name, Project Number and Warranty Periods. As-Built drawings, O&M manuals, reports, certifications, warranties, punch list must be submitted to Engineer for review.		
Item No.	Documents & Warranties Required For Closeout	Status
1	Completed Operations Insurance Certificate ACORD Form	
2	Completed Operation Insurance Statement (Sample Enclosed)	
3	AIA Document G701 Certificate of Substantial Completion	
4	AIA Document G702 Affidavit of Payment of Debts & Claims	
5	AIA Document G706A Affidavit of Release of Liens	
6	AIA Document G707 Consent of Surety to Final Payment	
7	Certification that all wages have been paid - NJ Prevailing Wage Act, N.J.S.A. 34:11-56.25	
8	10% - one year Maintenance Bond - must be on form provided in spec book - sample attached	
9	Record Project Manual indicating changes or company letter stating no changes.	
10	One Year Contractor's Guarantee Covered by Maintenance Bond - Sample Attached	
11	Operation Instructions & Maintenance Manuals (2 each in 3-ring binder)	
12	Record Drawings. Indicate As-Built drawings with company name, address and date (1 Paper Set & 2 CD's)	
13	Final Payment Requisition & Board Voucher/Invoice (3) Contractor will not be closed out until all paperwork is submitted	
14	Certificate of Approval/Acceptance	
15	Confirmation that FVHD has received "hard copies" (not electronic) of all shop drawing submittals.	
16	Copies of all outstanding certified payroll reports or letter on Contractor's letterhead stating all outstanding certified payroll sheet and manning reports have been sent to the Owner.	
17	Letter on Contractor's letterhead stating date of substantial completion and requesting punch list review to Architect & Engineer	
18	Final Punch list signed and dated indicating completion of all work	
19	Accurate list of all subcontractors and suppliers	
20	Balancing & Testing Reports (HVAC)	
21	Fire Alarm Certification (ELECTRICAL)	
22	Warranties - Refer to Specification Section 01900 for required warranties for each trade	
23	All approvals and final releases from governmental and regulatory agencies have jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.	

SECTION 01800 - TIME OF COMPLETION AND LIQUIDATED DAMAGES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes the requirements for completion of interim milestone events and final completion of all work required by the contract documents.
- B. Related Sections:
 - 1. Items of Work attached to the "Certificate of Substantial Completion" and establishing "Final Completion Time" as per Section 00800.
- C. This section also establishes the relation of liquidated damages for failure to complete the interim milestone events or final completion requirements within the time requirements stated herein.
- D. **The building (or part of the building) will be occupied at all times. The Contractor shall maintain heat, electric, fire safety systems and emergency egress paths, control dust and water infiltration at all times.**

1.2 TIME FOR COMPLETION

- A. It is understood that the Contractor has mutual responsibility to complete its work in sequence with the work of the other Contractor(s) and to allow the other Contractor(s) access to the work site so that they may complete their work within the times established.
- B. Completion of the Contract Work by the Contractor shall be time of the essence.
- C. The Contractor shall work overtime, additional shifts, weekends or holidays to complete the work on time with no additional cost to the Owner.
 - 1. Scarce resources will be no excuse for not completing the work on time.
 - 2. **Work may take place during regular shift and second shift (7:00 AM - 10:00 PM) after June 17, 2024 until August 23, 2024; however, the Contractor is required to review and coordinate all work activities with the Architect and School Facilities Director prior to commencing with the work.**
 - a. **Contractor to review permitted work hours to comply with the local "Noise Ordinance".**
 - 4. **Contractor is required to include the cost of any premium time, second shift and weekend work which may be required in their bid to complete the work within the indicated milestone dates.**

- D. Substantial and final completion of the Work shall include but is not limited to final inspection and acceptance by the Local Building Officials.

1.3 SEQUENCE OF CONSTRUCTION

- A. In order to allow the Prime Contractor and Subcontractor(s) to understand the requirements of the Project, the following general sequence of construction Work will be followed:
 - 1. Generally, the General Construction Contractor is to schedule, sequence and coordinate the Work with Subcontractors, as required, to logically progress the Work, meeting the overall design intent, construction quality and time of completion. **Schedule inspections and obtain required approvals of all stages of the Work as required by the Local Construction Officials.**
 - 2. Proper scheduling of the Work includes timely sequencing, preparation, review and approval by the Prime Contractor and **submission of requisite technical and other project submittals and shop drawings** to the Architect / Engineer(s) for approval to advance the proper, logical progression of the Work.
 - 3. After mobilization and securing the work site, the General Construction Work Contractor is to perform selective demolition of existing general building construction, layout and coordinate the proposed new construction with existing construction to remain, as noted on the Construction Drawings.
 - a. Apply for and obtain demolition permit to allow commencement of the Work while permit applications for new Construction are under review by the Construction Official.
 - 4. Sequentially Work to achieve **weather-tight building enclosure** with completed selective roof repair construction and utilizing temporary partitions and barriers, as required, to facilitate interior Work including, but not limited to, interior partitions, insulation and building finishes.
 - 5. The Contractor is responsible to coordinate their Work with the general construction for installation of Plumbing, Drainage, and Electrical **construction Work**.
 - 7. Progress the Work of all Trades towards completion, as required, by the Contract Documents to obtain **Substantial Completion** including, inspection and testing by local construction officials, commissioning, Plumbing and Electrical Work to obtain the Certificate of Occupancy.
 - 8. Provide written formal notification of **Substantial Completion** to the Architect / Engineer and request Punch-List Observations.

9. Complete proper preparation, review and approval by the Prime Contractor and submission of all Close-out Documents, Operation and Maintenance Manuals, As-built surveys and drawings to the Architect / Engineer(s) within contract time required to achieve **Final Completion**.

1.5 PROJECT CONTRACT MILESTONE DATES

A. TIME OF COMPLETION

1. Milestone No. 1

- a. Sign Contract, no later than **fourteen (14)** calendar days, Sundays and Holiday's excepted, from **Notice of Award**; on or about **February 27, 2024**.
- b. Contractor submits Bonds and Insurance **ten (10) calendar days from Notice of Award, Sundays and holidays excepted**.
- c. **Notice to Proceed** shall be within **three (3) business days** of date of signing Contract; on or about **March 18, 2024**.

2. Milestone No. 2

- a. **Time Critical submittals** for special equipment, fixtures, etc. shall be submitted within **twenty (20) calendar days from Notice to Proceed**.

3. Milestone No. 3

- a. Submission of all remaining technical shop drawing submittals shall be submitted within **thirty (30) calendar days from Notice to Proceed**.

4. Milestone No. 4

- a. Physical work at the site shall commence on or about **June 17, 2024**.

5. Milestone No. 5

- a. Substantial Completion of the entire project shall be on or before **159 Calendar Days from the Notice to Proceed, August 23, 2024**.
- b. Liquidated Damages - \$2,000.00 / Calendar day of delay.

6. Milestone No. 6

- a. Final Completion of all Work including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion, September 23, 2024**.
- b. Liquidated Damages - \$2,000.00 / Calendar day of delay.

1.6 LIQUIDATED AND OTHER DAMAGES

- A. By bidding the Project, the Contractor is accepting that the time allotted for the completion of Work is reasonable. Completion of Work on or about these milestones are prerequisites for the coordinated Work of all Contractors. When the Owner will suffer financial loss and/or extra cost if a milestone task is not completed within the allotted time, the Contractor responsible for the delay in achievement of each milestone, as determined by the Owner's Project Manager and the Architect, shall pay

to the Owner a fixed, agreed sum as liquidated damages for each calendar day of delay until the milestone task is substantially completed.

- B. The Liquidated Damages set for above shall be in addition to other consequential losses or damages the Owner may incur by reason of such delay, such as, but not limited to, the cost of additional architectural and engineering, independent third party inspection and other services resulting from the delay, additional costs to the Owner for payments to other Contractors resulting from delay.
- C. Liquidated Damages are fixed and agreed upon by and between the Contractor and the Owner because of the impracticality and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amounts shall be retained from time to time by the Owner for the current periodical payments.
 - 1. The Liquidated Damages set for above are intended to compensate Owner for loss of use during the period of delay, for other delay during construction which may result further delay in substantial and/or final completion dates and for any acceleration costs by other contractors to recover the defaulting contractor's delay.
 - 2. In no way shall costs of Liquidated Damages be construed as a penalty to the Contractor.
- D. The Owner shall have the right to deduct the total amount any Liquidated Damages for which the Contractor may be liable from any monies otherwise due the Contractor, including any retainage under control of the Owner.
- E. The Surety providing the Performance Bond, furnished by the Contractor, will be liable for Liquidated Damages assessed against the Contractor, to the extent that the Contractor shall not make settlement thereof with the Owner.
- F. The Contractor agrees that in the event the Owner is required to incur or advance any additional necessary and reasonable costs (including but not limited to Architect, Attorney or other fees related expenses), as a result of the failure of the Contractor to perform any obligation of this Contract or to perform its obligations in a timely manner as required by the Contract Documents, the Contractor agrees that such additional necessary and reasonable costs shall be borne by the Contractor and may be deducted by the Owner from any payment due the Contractor.
- G. In accordance with N.J.S.A. 18A:18A-19, the Owner shall deduct from the Contract Price, for any wages paid by the Owner to any inspector or inspectors necessarily employed by for the work of this project, for any number of days in excess of the number of days or indicated dates allowed in milestones above. Such sums shall be part of the Liquidated Damages indicated herein after.

END OF SECTION 01800

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SECTION 01900 - GUARANTEES AND WARRANTIES

PART 1 - GENERAL

1.1 CONTRACT

- A. Period for all guarantees and warranties shall commence at date of substantial completion for the entire project, as determined by the Architect.
- B. The Contractor's guarantee on all work, covered by Maintenance Bond. . . . **One (1) Yr.**
 - 1. The Maintenance Bond shall represent a continuing obligation of the Prime Contractor and his/her Subcontractor(s) to repair/replace defective materials and/or labor of products installed in the project for **one (1) year** from the date of Substantial Completion.
- C. Provide all required warranties indicated in specification sections which include but not limited to the following:

1.2 GENERAL CONSTRUCTION WORK

- A. Unit Masonry Work as specified in Section 04200.
 - 1. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building and he/she shall, within such period at his/her own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he/she also agrees either that the materials and methods specified herein are such as to insure the results required or that he/she will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.
- B. Exterior Insulation and Finish System as specified in Section 07241.
 - 1. Special Project Warranty: Provide warranty signed by manufacturer's authorized representative/ installer/ contractor to warranty work of this section for period of **ten (10) years** which starts at the approved date of substantial completion.
- C. Agreement to Maintain Roofing
 - 1. Roofing Contractor shall agree to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of Owner's acceptance in accordance with special Maintenance Contract outlined herein.

2. During the Maintenance Period, the Roofing Contractor agrees that within 24 hours of receipt of notice from the Owner he/she will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He/She further agrees that within a reasonable time, he/she will restore the affected items to the standard of the original specifications. All emergency and permanent work during the life of the agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.
3. Agreement to maintain roofing system shall be in a written form acceptable to the Owner.

D. Flashing, Sheetmetal and Roof Accessories as specified in Section 07600.

1. Warrant Fluoropolymer coating to remain free, under various atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
 - a. The Warranty period shall be **twenty (20) years** which starts on the approved date of Substantial Completion.

E. Joint Sealer Assemblies as specified in Section 07900.

1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from date of Substantial Completion.
2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from date of Substantial Completion.
 - b. Submit two (2) copies of written guarantee for all sealant work of this section signed by the Contractor and the sealant manufacturer for a period of **five (5) years** from the date of acceptance by the Owner.
 - c. Guarantee shall further state that all exterior sealant will be guaranteed against:
 - 1) Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
 - 2) Any crazing greater than 3 mils in depth developing on surface of material.

- F. Wood Doors as specified in Section 08211 **Life of Installation.**
 - 1. Submit written agreement in door manufacturer's standard form signed by the manufacturer and contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show photographing of construction below its face veneers, or do not conform to tolerance limitations of NWMA.
 - 2. The warranty shall also include refinishing and reinstallation as may be required due to repair or replacement of defective doors.

- G. Aluminum / FRP Doors as specified in Section 08410.
 - 1. Provide written warranty signed by Manufacturer and Contractor, agreeing to replace aluminum entrance doors which fail in materials or workmanship within **ten (10) years** of acceptance. Failure of materials or workmanship includes excessive leakage or air infiltration, excessive deflections, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering, and defects in hardware, weatherstripping and other components of the work.

- H. Finish Hardware as specified in Section 08700.
 - 1. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of the hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Electrical component defects and failures within the systems operation.
 - 2. Warranty Period: Unless otherwise indicated, warranty shall be **one (1) year** from date of Substantial Completion.
 - 3. Warrantees:
 - a. Mechanical Locks and Latching Devices: Heavy duty mortise locks shall have a **ten (10) year** warranty.
 - b. Conventional Exit Devices: Exit devices shall have a **five (5) year** warranty.

- I. Glass and Glazing as specified in Section 08800.
 - 1. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.

2. Fabricator's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass fabricator agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.

- J. Security Window Film as specified in Section 08870.
 1. Manufacturer warrants the film for a period of **fourteen (14) years** when installed with 3M Impact Protection Attachment Sealant) from the date of installation against cracking, crazing, delaminating, peeling, or discoloration. If the product is found to be defective under warranty, Manufacturer will replace such quantity of the film proved to be defective and will additionally provide the removal and reapplication labor free of charge at current industry labor rates.
 - a. Manufacturer also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value \$500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the date of application. Any glass failure must be reviewed and approved by Manufacturer Representative prior to replacement and payment.
 - b. Additional warranty and limited remedy terms are contained in the Warranty, Limited Remedy, and Disclaimer and the Limitation of Liability.

- K. Glazed Curtain Wall System as specified in Section 08900.
 1. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
 - a. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1) Structural failures including, but not limited to, excessive deflection.
 - 2) Noise or vibration caused by thermal movements.
 - 3) Failure of system to meet performance requirements.
 - 4) Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 5) Failure of operating components to function normally.
 - 6) Water leakage.
 - 7) Glazing breakage.
 - b. Warranty Period: **Five (5) years** from date of Substantial Completion.

1.3 PLUMBING & DRAINAGE WORK

- A. General Requirements Plumbing as specified in Section 220010..
 1. Unconditionally guarantee in writing all materials, equipment and workmanship for a period of **one (1) year** from date of acceptance by Owner. During the guarantee

- period, repair or replace, at the Plumbing Trade Contractor's expense, any materials, equipment or workmanship in which defects may develop and provide free service for all equipment and systems involved in the contract during this guarantee period. Beneficial use of any system by the any of the Trade Contractors during construction does not constitute acceptance by the Owner. Time period of this beneficial use cannot be included in the guarantee period.
2. Guarantee must also include restoration to its original condition of all adjacent work that is disturbed in fulfilling this guarantee.
 3. All such repairs and/or replacements must be made without delay and at the convenience of the Owner.
 4. Guarantees furnished by Trade Contractors and/or equipment manufacturers must be counter-signed by the related Trade Contractor for joint and/or individual responsibility for subject item.
 5. Manufacturers' equipment guarantees or warranties extending beyond the guarantee period described in item 1 above must be transferred to the Owner along with the Trade Contractor's guarantees.

1.4 ELECTRICAL WORK

A. General Requirements Electrical as specified in Section 260010.

1. Unconditionally guarantee in writing all materials, equipment and workmanship for a period of **one (1) year** from date of acceptance by Owner. During the guarantee period, repair or replace, at the Electrical Trade Contractor's expense, any materials, equipment or workmanship in which defects may develop and provide free service for all equipment and systems involved in the contract during this guarantee period. Beneficial use of any system by any of the Trade Contractors during construction does not constitute acceptance by the Owner. Time period of this beneficial use cannot be included in the guarantee period.
2. Guarantee must also include restoration to its original condition of all adjacent work that is disturbed in fulfilling this guarantee.
3. All such repairs and/or replacements must be made without delay and at the convenience of the Owner.
4. Guarantees furnished by Trade Contractors and/or equipment manufacturers must be counter-signed by the related Trade Contractor for joint and/or individual responsibility for subject item.
5. Manufacturers' equipment guarantees or warranties extending beyond the guarantee period described in item 1 above must be transferred to the Owner along with the Trade Contractor's guarantees.

B. LED Exterior Lighting as specified in Section 265119.

1. LED light fixtures provided as a part of this project shall be provided with a **five (5) year** warranty.

END OF SECTION 01900

PART 2

GENERAL CONSTRUCTION WORK

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of selective demolition work is indicated on the drawings.
- B. Type(s) of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:
 - 1. Portion(s) of building structure as indicated on drawings, as required to accommodate new construction.
 - 2. Removal and protection of existing fixtures and equipment items indicated as "salvage", and reinstallation and/or deliver to the Owner.
- C. Related Work Specified Elsewhere:
 - 1. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.

1.3 SUBMITTALS

- A. Proposed Demolition Activities: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Provide starting and ending dates for each activity as appropriate.
 - 1. Include coordination for shut-off, capping, and continuation of utility services, as required, together with details for dust and noise control protection.
 - 2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 3. Sequence construction so as to minimize obstruction of exits and provide temporary alternate exits, as required by authorities having jurisdiction.
 - 4. Coordinate with Owner's continuing occupation of portions of existing building, and with Owner's reduced usage during summer months.
- B. Photographs: Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

- C. Project Record Documents: Indicate unanticipated structural, electrical, or mechanical conditions.

1.4 JOB CONDITIONS

- A. Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Protections: Provide temporary barricades and other forms of protection, as required, to protect Owner's personnel and general public from injury due to selective demolition work.
 - 1. Provide protective measures , as required, to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
 - 2. Protect existing finish work, from being damaged during the project, which is to remain in place and becomes exposed during demolition operations.
 - 3. Protect floors with suitable coverings so as to leave the flooring in same condition at end of job.
 - 4. Construct temporary insulated solid dustproof partitions, where required, to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors, if required.
 - 5. Remove protections at completion of work.
- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner, including but not limited to concealed interior and exterior utility lines not properly investigated by the contractor, prior to commencement of demolition work.
- E. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
 - 1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- F. Explosives: Use of explosives will not be permitted.

- G. Utility Services: Maintain existing interior and exterior utilities indicated to remain, keep in service, and protect against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed.
 - 1. **Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.**
 - 2. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.
 - 3. Prior to the commencement of work review the demolition activities with the Owner's representative to identify additional salvage items requested by the Owner.

3.2 PREPARATION

- A. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- B. Erect and maintain dust-proof partitions and closures, as required, to prevent spread of dust or fumes to occupied portions of the building.
 - 1. Provide weatherproof closures for exterior openings resulting from demolition work.
- C. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
 - 1. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change-over.

3.3 DEMOLITION

- A. Perform selective demolition work in a systematic manner. Use such methods, as required, to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 - a. The Contractor shall use caution when cutting into existing masonry construction (eg.: concrete slabs, single wythe and cavity wall construction) as there may be undocumented utilities within the cavity or built into the cores of cmu wall construction or under the floor slab. The contractor shall perform all necessary investigation prior to demolition work to determine the presence of existing utilities within construction to be demolished, including but not limited to radar, thermal, impact echo, etc. The Contractor shall pay for restoring / repairing the existing construction if utilities are cut and proper selective demolition investigation work was not performed. Refer to Section 01050.
 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
 3. Provide services for effective air and water pollution controls, as required by authorities having jurisdiction.
 4. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
- B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative / Architect in written, accurate detail. Pending receipt of directive from Owner's Representative / Architect rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.4 SALVAGE MATERIALS

- A. Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
1. Unless otherwise indicated all materials, items, equipment, etc. resulting from demolition work shall be removed from the site at the Contractor's expense.
- B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off-site.
- B. If hazardous materials are encountered during demolition operations, notify the Owner's Representative immediately, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. Burning of removed materials is not permitted on project site.

3.6 CLEAN-UP AND REPAIR

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02070

SECTION 02150 - SHORING AND BRACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Extent of shoring and bracing work includes, but is not limited to, the following:
 - 1. Shoring and bracing necessary to protect existing building, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.
 - 2. Maintenance of shoring and bracing.
 - 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing system include, but are not limited to the following:
 - 1. Soldier piles. (Earthwork)
 - 2. Lagging. (Earthwork)
 - 3. Trench shoring. (Earthwork)
 - 4. Sheet Pile Shoring. (Earthwork)
 - 5. Column shoring. (Building Structure)
 - 6. Scaffolding shoring. (Building Structure)
 - 7. Cantilever shoring. (Building Structure)

1.3 SUBMITTALS

- A. Layout Drawings: Provide layout drawings for shoring and bracing system and other data prepared and sealed by a registered Professional Engineer licensed in the State of the project. System design and calculations must be acceptable to local authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A. Supervision: Engage and assign supervision of shoring and bracing work to a qualified consultant.
- B. Submit name of engaged consultant and qualifying technical experience.
- C. Regulations: Comply with local codes and ordinances of governing authorities having jurisdiction.

1.5 JOB CONDITIONS

- A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.
- B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.
- C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer, licensed in the State of the project. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags or other damage is evident.

1.6 EXISTING UTILITIES

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.
- B. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

PART 3 - EXECUTION

3.1 SHORING

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces and all other materials. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.2 BRACING

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

- B. Do not place bracing where it will be cast into or included in permanent work, except as otherwise acceptable to Architect.
- C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.
- D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.
- E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION 02150

SECTION 02200 – SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

Soil Erosion and Sediment Control shall include implementation and maintenance of soil erosion and sediment control devices and construction procedures, as shown on the plans or as directed by the Engineer, which will reduce and prevent soil losses and associated damages from sedimentation during construction of this project.

All work will be in conformance with the contract documents and Standards for Soil Erosion and Sediment Control in New Jersey revised and adopted April, 1987, and the latest revisions thereof.

PART 2 - PRODUCTS

2.1 MATERIALS

Hay bales shall consist of timothy, redtop or native grasses bound together with nylon or wire.

Stabilize hay bales with two rebar, steel pickets or two 2"x2" wood stake anchors (length = 1.5' to 2.0') as may be required or as directed by the Owner. Contractor shall embed anchors a depth of 4" or as applicable with site conditions to stabilize hay bales. Stone aggregate shall be 1½ - 2" in diameter.

All other materials shall be as shown and called for on the plans as "Soil Erosion and Sediment Control Notes & Details".

PART 3 - EXECUTION

3.1 CONSTRUCTION

The work of soil erosion and sediment controls shall include, but not be limited to the following:

All soil erosion and sediment control practices on this project shall be constructed in accordance with the "Standards for Soil Erosion and Sediment Control in New Jersey" or as approved for this project.

1. The smallest practicable area of land shall be exposed at any one time during the project and, whenever feasible, natural vegetation shall be retained and protected. Stripping of vegetation, grading or other soil disturbance shall be completed in a manner which will minimize soil erosion.
2. A schedule of construction operations shall be submitted to the Engineer for his approval including staging areas, stockpile areas and disturbance outside the limits of work. All erosion control devices shall be inspected and maintained periodically.
3. Written notification must be provided to the Engineer and the Soil Conservation District or municipal agency having jurisdiction 72 hours prior to the start of any land disturbing activity.
4. The Applicant must obtain a district issued report of compliance prior to applying for the municipal certificate of occupancy. Please give the district one-week notice to schedule this inspection.
5. All soil erosion and sediment control devices shall be in place prior to any major soil disturbances or installed and removed in their proper sequence to allow for further operations on the site.
6. All sediment control structures shall be checked and maintained on a regular basis and basins shall be cleaned periodically when storage capacity is affected by siltation.
7. During construction, any additional control measures as deemed necessary to prevent erosion or control sediment beyond those measures shown on the approved plans shall be installed or employed at the direction of the Engineer.
8. After completion of construction, soil and sediment controls shall be left in place until all disturbed areas are stabilized.
9. Disturbed areas shall be maintained in a rough graded condition and temporarily seeded and/or mulched until proper weather conditions exist for the establishment or permanent vegetative cover.
10. All areas disturbed by grading on which permanent or semi-permanent seeding or temporary seeding have not been made and all slopes with a grade steeper than 2:1 shall be treated by mulching. The mulch shall be applied at a rate of 2 TO 2 1/2 tons per acre of equivalent measure, according to State standards.
11. All areas disturbed by grading including soil stockpiles which will not be used or constructed upon for a period greater than 30 days shall be temporarily seeded and protected as required.

12. All areas disturbed by grading which will not be constructed upon within six months are to be stabilized with a permanent type seeding and fertilizing.
13. All disturbed areas shall be treated with 6" of top soil, limed and fertilized prior to both temporary and permanent seeding as indicated on plans and in conformance with charts and tables as set forth in the "Standards for Soil Erosion and Sediment Control in New Jersey".
14. A crushed stone wheel cleaning "Tracking Pad" is to be installed at all site exits using 2-1/2 inch stone to a length of at least 50 feet. All driveways must exhibit this item in the drive during construction.
15. All paved roadways must be kept clean at all times. Do not use a fire or garden hose to clean roads unless runoff is directed to a proper sediment basin.
16. All storm drainage inlets are to be protected by temporary filter devices, as indicated on the plans, to prevent the entry of sediment carried by run-off water until vegetation and/or paving is established as planned.
17. Whenever well points, pumps or other dewatering methods are used, care shall be taken to provide for the elimination of erosion and entrapment of sediment at the outfall of said dewatering.
18. All drainage swales shall be parabolic in shape unless otherwise noted and shall conform to SCS design standards.
19. Drainage swales and other structures shall be located in the field so as to retain as much of the original vegetation as possible, especially large trees.
20. The Contractor shall be responsible to contact and obtain approval from the Soil Conservation District for staging/stockpiling areas over 5,000 square feet.
21. The Contractor must confine all phases of construction work within the permanent and temporary construction easements.
22. The Contractor shall be responsible to secure their own ingress and egress to the construction site. If construction driveways are required, they shall be provided in accordance with the detail. They shall be the width of opening shown on the plans or as required by the Soil Conservation District, a minimum of 50 feet in length and a minimum of one foot deep.

23. The Contractor will strictly adhere to all plans, specifications and details approved by the Soil Conservation District.
24. All erosion and sediment control practices shall be in place prior to any grading operations and installation of proposed structure or utilities.
25. To provide suitable conditions for growth and vegetation and to prevent the acidifying of drainage water in those areas underlain with acid formation having a pH below 4.0 the following requirements shall be met:
 - a. Grading shall be such that a minimum of acid formation shall be exposed.
 - b. All exposed material shall be covered with a minimum of one foot on non-acid (pH minimum 5.0) soil suitable for plant growth plus 6" of topsoil.
26. Seeding Dates: The following seeding dates are recommended to establish permanent vegetative cover:
Spring: March 15-May 30
Fall: August 15-October 15
27. Mulch material shall be unrotted salt hay or small grain straw applied at a rate of at least 2.0 Tons per acre, 90 pounds per 1000 square feet. In no case shall more than five days elapse between seeding and mulching, or by hydroseeding as per the manufacturer's specifications.
28. All damage incurred by erosion shall be rectified immediately by the contractor.
29. All plan revisions must be submitted to the district for proper review.
30. Maximum side slopes shall not exceed 2:1 unless approved by the district.
31. All dewatering operations shall discharge into an approved sediment basin.
32. The district must be notified, in writing, for the sale of any portion of the project or for the sale of any building lots. New Owner's name(s), addresses, and phone numbers shall be provided to the district.

All soil erosion and sediment control devices shall be installed prior to any major soil disturbance, or in their proper sequence, and maintained until permanent protection is established. During the length of the entire project, the Contractor shall be responsible for maintaining all soil erosion and sediment control devices in an efficient workable condition.

Hay bales shall be replaced as they become filled with silt. Stone at the construction entrances shall be respreads as existing stone becomes dirty and covered with silt.

END OF SECTION 02200

SECTION 02230– SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees and vegetation to remain.
 - 2. Removing trees and other vegetation.
 - 3. Clearing and grubbing.
 - 4. Topsoil stripping.
 - 5. Removing above-grade site improvements.
 - 6. Disconnecting, capping or sealing, and abandoning site utilities in place.
 - 7. Disconnecting, capping or sealing, and removing site utilities.
- B. Related Sections include the following:
 - 1. Division 2 Section 02300 “Earthwork” for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared and waste materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

- A. The contractor shall be responsible to provide photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing. The photographs or videotape must be submitted prior to any site clearing activity.
- B. Record drawings according to contract requirements.
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements of the Specifications.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section 02300 "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated.
- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. The Contractor shall coordinate with the Owner and the respective utility companies to arrange for the shut off of any utilities and irrigation lines within the scope of work.
 - a. Contractor shall coordinate with the Owner to understand the presence and location of any existing underground utilities within the scope of work that may not be identified through the One Call system or visibly present, such as but not limited to roof leader downspouts, electrical conduits, water services, etc. They shall coordinate their work efforts to properly protect these services unless directed otherwise by the Owner.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner and Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- C. Excavate for and remove underground utilities indicated to be removed. Provide watertight connections for all roof leader downspout connection locations.

3.3 CLEARING AND GRUBBING

- A. The contractor shall be responsible to remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
 - 4. Use only hand methods for grubbing within drip line of remaining trees.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth and compact each layer to a density equal to adjacent original ground.

3.4 TOPSOIL STRIPPING

- A. Remove vegetation, sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Coordinate the location of any unneeded topsoil placement with the Owner. Grade and shape material in desired location to provide positive drain of surface water. Cover to prevent windblown dust and provide temporary seeding as per the soil erosion and sediment control standards.
 - 1. Limit height of topsoil stockpiles to 48 inches.
 - 2. Do not stockpile topsoil within drip line of remaining trees.
 - 3. Stockpile surplus topsoil and allow for respreading deeper topsoil.
 - 4. Relocate any excess topsoil onsite as directed by Owner's facilities manager. Topsoil shall be spread and stabilized with seeding as per the soil erosion and sediment control standards.

3.5 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, aggregate base and all other items as indicated on the plans.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.6 DISPOSAL

- A. The Contractor to remove unsuitable topsoil, unsuitable soils, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property. Excess suitable fill and topsoil shall be relocated onsite to an area as directed by the Owner's facilities manager. All relocated material shall be spread and stabilized by the contractor in accordance with the soil erosion and sediment control standards.

END OF SECTION 02230

SECTION 02240- DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. This Section includes construction dewatering.
- B. Related Sections include the following:
 - 1. Division 2 Section 02300 "Earthwork" for excavating, backfilling, and site grading.

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
 - 1. Work includes removing dewatering system when no longer needed.
 - 2. Contractor to maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.
 - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 4. Accomplish dewatering without damaging existing buildings and site improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings: For dewatering system, where applicable show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.
 - 1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

- B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.
- C. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
- D. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform dewatering who has specialized in installing dewatering systems similar to those required for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Owner and/or Architect and then only after arranging to provide temporary utility services according to requirements indicated.
- B. The contractor shall make test borings and/or conduct other exploratory operations as required to design the dewatering system, if necessary.

PART 2 - PRODUCTS (Not Applicable)

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.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.2 DEWATERING

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
- B. Before excavation below ground-water level, place system into operation to lower water to specified levels and then operate it continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.
- E. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner to avoid inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

- F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense.
 - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 02240

SECTION 02260 – EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. This Section includes excavation support and protection systems.
- B. Related Sections include the following:
 - 1. Division 2 Section 02300 "Earthwork" for excavating and backfilling.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, provide, monitor, and maintain an anchored and braced excavation support and protection system capable of resisting soil and hydrostatic pressure and supporting sidewalls of excavations.
 - 1. Work includes removing excavation support and protection systems when no longer needed.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems. System design and calculations must be acceptable to authorities having jurisdiction.
 - 1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by excavation support and protection systems.

1.5 PROJECT CONDITIONS

- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Owner and/or Architect and then only after arranging to provide temporary utility services according to requirements indicated.
- D. Make test borings and/or conduct other exploratory operations as necessary.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials need not be new but must be in serviceable condition.
- B. Structural Steel: ASTM A 36 (ASTM A 36M).
- C. Steel Sheet Piling: ASTM A 328 (ASTM A 328M) or ASTM A 572 (ASTM A 572M).
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 3 inches (75 mm).

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 that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Locate excavation support and protection systems clear of permanent construction and to permit forming and finishing of concrete surfaces.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or

other evidence of movement to ensure excavation support and protection systems remain stable.

- E. Promptly repair damages to adjacent facilities caused by the use of excavation support and protection systems.

END OF SECTION 02260

SECTION 02300– EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements, landscaping, lawns and plantings.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for slabs-on-grade.
 - 4. Subbase course for concrete walks and pavements.
 - 5. Subbase and base course for asphalt paving.
 - 6. Subsurface drainage backfill for walls and trenches.
 - 7. Excavating and backfilling for utility trenches.
 - 8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections include the following:
 - 1. Division 2 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping, and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 2. Division 2 Section "Dewatering" for lowering and disposing of ground water during construction.
 - 3. Division 2 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.

1.3 UNIT PRICES

- A. Rock Measurement: No separate payment will be made for the removal of rock and replacement with approved material.

1.4 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.
1. This work shall include the removal of the existing rock and fill material as required to construct the proposed improvements, including the building, walls, utilities, foundations, roadways, sidewalk and all other structures that are constructed below existing grade.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. Yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows / 2 inches.
- J. 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.

- K. 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.
- L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Fill material laboratory testing data – gradation analysis and certified clean material certification.
2. Each type of plastic warning tape.
3. Drainage and separation fabric.

B. Samples: For the following:

1. Forty (40) pound bag samples of each material to be used as backfill and bedding shall be submitted to the Soils Engineer two (2) weeks minimum prior to commencing fill operations. This material shall not be used as a compacted fill until approved by the Engineer. By submitting samples of this material, the Contractor agrees and guarantees that the fill material used for construction will conform with the samples (s) supplied. Final acceptance of fill material rests with the Engineer, whose decision shall be final and binding upon the Contractor. However, the acceptance of any material by the Engineer shall not relieve the Contractor of his responsibility to have the fill material used conform to the sample(s) approved by the Engineer.
2. The Contractor shall supply data on the compaction equipment to the Engineer not less than two (2) weeks prior to the intended use of the equipment and the equipment shall be approved by the Engineer prior to commencing compaction operations.
3. 12-by-12-inch sample of drainage fabric.
4. 12-by-12-inch sample of separation fabric

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification and grain size analysis according to ASTM D 2487 and ASTM D 422 of each on-site or borrow soil material proposed for fill and backfill.

Select subparagraph above or below.

2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
- D. Blasting will not be permitted.

1.6 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548 and responsible to provide the necessary testing and approval determinations as the soils engineer.
- B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in specifications.

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the owner and then only after arranging to provide temporary utility services according to requirements indicated.
 1. Notify owner not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Owner's written permission.
 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations. A sample of any borrow soils shall conform to section 1.5 above.
- B. Satisfactory Soils:

1. Fill Classification:

- a. Type "S" Fill – shall be structural fill consisting of clean sand and gravel to be used in general, for the support of foundations and new structures. This fill shall be imported from off the site and shall meet the following gradation requirement.

U.S. Standard Sieve Size Percent Finer By Weight

1 inch	100
3/8 inch	65-100
No. 10	40-85
No. 30	20-65
No. 60	10-45
No. 200	5-12

- b. Type "G" Fill – shall be a granular fill consisting of a clean sand and gravel to be used, in general, for backfilling around and between structures and underneath paved areas, pipelines and utilities. This fill shall be imported from off the site and shall meet the gradation requirements as listed below. If suitable Type "G" materials are found on the site and is accepted by the Engineer, it shall be stored for use.

U.S. Standard Sieve Size Percent Finer By Weight

2 inch	100
1 inch	80-100
3/8 inch	70-100
No. 10	50-100
No. 30	30-85
No. 60	15-65
No. 200	5-15

- c. Type "W" Fill – shall be a structural fill consisting of clean stone conforming to New Jersey Department of Transportation coarse aggregate size No. 57, used to facilitate dewatering while providing a firm workmat subgrade onto which foundations may be constructed as well as providing a drainage blanket and pipe bedding. The fill material shall be imported from off-site and shall meet the following gradation requirements.

U.S. Standard Sieve Size Percent Finer By Weight

1 1/2 inch	100
1 inch	95-100
1/2 inch	25-60
No. 4	0-10

2. Unsatisfactory soils include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

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; colored as follows:
- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as per authority having jurisdiction, or as follows:
 1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

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 is specified in Division 2 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Soil Erosion and Sediment Control", during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system, specified in Division 2 Section "Dewatering", to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified 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.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. All excavations shall be in accordance with OSHA requirements.
- B. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. 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 higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit.
 - 2. 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.
 - 3. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 4. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 5. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 - 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

- A. Notify Architect and Engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 5 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed, without additional compensation.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.9 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 may be used when approved by Owner.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.10 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.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.

5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 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 of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches 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.
- E. Backfill voids with satisfactory soil while installing and removing shoring and bracing, and as sheeting is removed.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs or as directed by the utility company or authority having jurisdiction.

3.13 FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions and deleterious materials from ground surface before placing fills.

- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. 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 engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.14 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.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Compacting of prepared subgrade under Type "S", Type "G", and Type "W" Fills – after excavation to the required subgrade, the subgrade shall be compacted by approved equipment and methods to develop to a depth of at least twelve (12) inches below ground surface at least 95% of maximum dry density as determined by the Engineer in conformance with ASTM Standard D1557. Any soft or weak spots detected during the compaction operation or proof-rolling of subgrade must be removed and replaced with controlled fill as directed by the Engineer. The compaction shall be checked by the Engineer and lean concrete or fill shall not be placed until compaction of the existing subgrade is approved by the Engineer
- B. Placement of Type "S", "G", and "W" Fills – No backfill shall be placed until the excavation and subgrade has been approved by the Engineer and until backfill materials to be used are approved by the Engineer, and no backfill shall be placed on frozen or thawing ground. Fill shall be placed in uniform horizontal layers not more than twelve (12) inches in thickness and shall be compacted with a high energy self-propelled vibratory roller. Lift thickness may be adjusted in the field by the Engineer if required soil density is not being achieved.
- C. Compaction of Types "S", "G", and "W" Fills – the backfill shall be compacted near optimum moisture content by means of vibratory compactors to not less than 95% of the maximum density determined in accordance with ASTM Standard D1557. The Engineer shall check the obtained in-place density of the compacted fill using the

method of ASTM Standards D 1556 or D 2922 for in place density tests. Should the obtained density of the compacted fill be less than specified, the Contractor shall recompact the area until the required maximum density is reached. Only handheld compaction equipment shall be used within four (4) feet of foundation walls and structures.

- D. Moisture Control – the moisture-density curve for the fill used shall be used as a guide in controlling moisture to achieve the required degree of compaction. If, in the opinion of the Engineer, fill material becomes too wet for the required compaction, the fill shall be dried by a method approved by the Engineer prior to commencing or continuing compaction operations. Likewise, if the opinion of the Engineer, the fill material becomes too dry for the required compaction, the fill shall be moistened by a method approved by the Engineer prior to commencing or continuing compaction operations.
- E. Drainage of the Site – At all times, Contractor shall maintain and operate proper and adequate surface and subsurface drainage in order to keep the construction site dry and in such condition that placement and compaction of fill may proceed unhindered by saturation of the area.
- F. Backfill of Excavations – any excavation (e.g., utilities, walls, footings, etc.) made within the compacted fill areas shall be backfilled with the same type of fill as removed and in accordance with Specifications herein. Where compacted fill is placed adjacent to walls, if the difference in elevation of the top of the fill on either side of the wall is more than one (1) foot, the wall is to be adequately braced. Any excavation made in virgin material shall be backfilled with Type “G” fill as herein specified unless otherwise shown on the Contract Drawings or directed by the Engineer.
- G. Maintenance of Fills – all vehicles passing over the fill areas shall use diverse routes to insure uniform compaction of the fill.

Before shutdown of the work for any cause, and at the conclusion of work for the day, fill shall be bladed to a grade which will insure drainage away from the unfinished surface of the fill.

Excess materials shall be stored as directed by the Owner and following completion of the work shall be removed from the site.

3.16 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.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

- 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.
 - 2. Walks: Plus, or minus 1 inch.
 - 3. Pavements: Plus, or minus 1/2 inch.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: The contractor is responsible to engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing and approval determinations as the soils engineer. The contractor is to cooperate with the soils consultant in all respects and shall provide samples of each type of fill material used so that various tests may be performed to ascertain compliance with the specifications.
- 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. 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. Tests will be performed at the following locations and frequencies:
 - 1. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.
- D. 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 with no additional compensation from the owner.

3.18 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.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- 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.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal:

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
2. Satisfactory excess clean fill material and topsoil shall be relocated to an area onsite as directed by the Owner's facilities manager and shall be spread and stabilized in accordance with the soil erosion and sediment control standards.

END OF SECTION 02300

SECTION 02630 – STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. This Section includes storm drainage outside the building.

1.3 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete manholes and other structures, including frames, covers, and grates.
 - 2. Cast-in-place concrete manholes and other structures, including frames, covers, and grates.
 - 3. Storm drainage piping materials, cleanouts and bedding.
 - 4. Connections to existing structures.
 - 5. Bolted frames cover and grates.
- B. Coordination Drawings: Show manholes and other structures, pipe sizes, locations, and elevations. Include details of underground structures and connections. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.
- C. Design Mix Reports and Calculations: For each class of cast-in-place concrete.
- D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.
- B. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.
- C. Do not store plastic structures, pipe and fittings in direct sunlight.

1.6 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect and Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

- A. High Density Polyethylene Pipe- smooth interior, AASHTO M 294-94, Type S, O-Ring rubber gasket joints meeting ASTM F477 as specified on the plans or approved equal.

2.2 MANHOLES

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
 - 1. Diameter: 48 inches minimum, unless otherwise indicated.
 - 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 - 3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section and having separate base slab or base section with integral floor.

4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
 5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 6. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
 8. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 60 inches deep.
 9. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for manholes less than 60 inches deep.
 10. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 60 inches deep.
 4. Steps: Manufactured from deformed, 1/2-inch steel reinforcement rod or as indicated on the plans and details complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 60 inches deep.
- C. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.3 CATCH BASINS

- A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 3. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 5. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and grate.
 6. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12- to 16-inch intervals. Omit steps for catch basins less than 60 inches deep.
 7. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for catch basins less than 60 inches deep.
 8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include bolted frame and grates as indicated on the plans.
1. Size: 24 by 24 inches minimum, unless otherwise indicated.
 2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
- C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings.
1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.4 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
 2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.
 4. Water: Potable.
- B. Portland Cement Design Mix: 4500 psi minimum, with 0.45 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.
- C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4500 psi minimum, with 0.45 maximum water-cementitious ratio.
1. Include channels and benches in manholes.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - b. Benches: Concrete, sloped to drain into channel.
 2. Include channels in catch basins.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

2.5 PROTECTIVE COATINGS

- A. Description: One- or two-coat, coal-tar epoxy; 15-mil minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:
1. Concrete Manholes: On exterior surface.
 2. Manhole Frames and Covers: On entire surfaces.
 3. Catch Basins: On exterior surface.
 4. Catch Basin Frames and Grates: On entire surfaces.
 5. Stormwater Inlets: On exterior surface.
 6. Stormwater Inlet Frames and Grates: On entire surfaces.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earthwork."

3.2 PIPING APPLICATIONS

- A. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

3.3 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

3.4 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping and connect to storm drains, of sizes and in locations indicated. Terminate piping as indicated.
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

3.5 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated and manufacturer's specifications.
- B. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:
 - 1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.
- C. High density Polyethylene pipe and fittings as follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Install in accordance with ASTM D 2321 and the manufacturers' specifications.
- D. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.6 CATCH-BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.8 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Place plug in end of incomplete piping at end of day and when work stops.
 - 3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:

- a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.

END OF SECTION 02630

SECTION 02741– ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- i. Hot-mixed asphalt paving.
- ii. Pavement marking paint.

- B. Related Sections include the following:

Division 2 Section 02300 "Earthwork" for aggregate sub-base and base courses and aggregate pavement shoulders.

1.3 SYSTEM DESCRIPTION

- A. Provide hot-mix asphalt pavement according to the materials, workmanship and other applicable requirements for the standard specifications for the state or of authorities having jurisdiction.

Standard Specification: As indicated.

1.4 SUBMITTALS

- A. Product Data: For each product specified, include technical data and tested physical and performance properties.
- B. Job Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners and other information specified.

- D. Material Certificates: Certificates signed by manufacturers certifying that each material complies with specified requirements.
- E. Installer Qualifications: Engage an experienced installer who has complete hot-mix asphalt paving similar in material, design and extent to that indicated for this Project and with a record of successful in-service performance. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the DOT of the state in which the project is located.
- F. Asphalt-paving Publication: Comply with AI's "The Asphalt Handbook," except where more stringent requirements are indicated.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements related to asphalt paving including, but not limited to, the following:
 - 1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - 2. Review condition of substrate and preparatory work performed by other trades.
 - 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - 4. Review and finalize construction schedule for paving and related work. Verify availability of materials, paving Installer's personnel and equipment required to execute the Work without delays.
 - 5. Review inspection and testing requirements, governing regulations and proposed installation procedures.
 - 6. Review forecasted weather conditions and procedures for coping with unfavorable conditions.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture and directions for storage.
- B. Store pavement-marking materials in a clean, dry protected location and within temperature range by manufacturer. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt material if substrate is wet or excessively damp or if the following conditions are not met:
 - 1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
 - 2. Asphalt Base Course: Minimum surface temperature of 60 deg f at time of placement.
 - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 50 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 BASE COURSE

- A. All Hot-mix Asphalt shall be constructed on a dense graded aggregate base course as shown on the plans.

2.2 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: Sound, angular crushed stone, crushed gravel, complying with ASTM D 692.
- C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone, gravel or combinations thereof, complying with ASTM D 1073.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.3 ASPHALT MATERIALS

- A. Asphalt Cement: ASTM D 3381 for viscosity-graded material.
- B. Prime Coat: Asphalt emulsion prime conforming to state DOT requirements.

- C. Tack Coat: ASTM D 977; emulsified asphalt for ASTM D2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.
- D. Water: Potable.

2.4 AUXILIARY MATERIALS

- A. Sand: ASTM D 1073, Grade Nos. 2 or 3.
- B. Pavement-Marking Paint: Alkyd-resin type, ready-mixed, complying with FS TT-P-115, Type I, or AASHTO M 248, Type N.
 - 1. Color: As indicated on plans and details or as directed by the Owner.
- C. Glass Beads: AASHTO M-247.

2.5 MIXES

- A. Hot-mix Asphalt: Provide dense, hot laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI's "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - a. Base Course: Bituminous Stabilized Base Course Mix I-2.
 - b. Surface Course: Bituminous Concrete Surface Course Mix I-5.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that sub-grade is dry and in suitable condition to support paving and imposed loads.
- B. Proof-roll sub-base using heavy, pneumatic-tired rollers to located areas that are for unstable areas and require further compaction.
- C. Notify Engineer and Owner in writing of any unsatisfactory conditions. Do not

begin paving installation until these conditions have been satisfactorily corrected.

3.2 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared sub-grade is ready to receive paving.

3.3 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt mix on prepared surface, spread uniformly and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section and thickness when compacted.
 - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated. The Hot-Mix base course must remain in place for a minimum of 2 months, or as directed by the owner, prior to placement of the asphalt surface course.
 - 2. Place hot-mix asphalt surface course in single Lift.
 - 3. Spread mix at minimum temperature of 250 deg F.
 - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide, except where infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

- A. Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surface and apply tack coat.
 - 2. Offset longitudinal joints in successive courses a minimum of 6 inches.
 - 3. Offset transverse joints in successive course a minimum of 24 inches.
 - 4. Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's "The Asphalt Handbook."
 - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 - 6. Compact asphalt at joints to a density within 2 percent of specified course density.
 - 7. Provide waterproof tar strip along all pavement joints.

3.5 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt and re-rolling to required elevations.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 96 percent of reference laboratory density according to ASTM D 1559, but not less than 94 percent nor greater than 100 percent.

- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign material. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus ½ inch.
 - 2. Surface Course: Plus ¼ Inch, no minus.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: ¼ inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is ¼ inch.

3.7 PAVEMENT MARKING

- A. Do not apply pavement marking paint until layout, colors, and placement have been verified with the Architect and Owner.

- B. Sweep and clean the surface to eliminate loose material and dust.
- C. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 1. Broadcast glass spheres uniformly into wet pavement markings at a rate of 6 lb/gal.

3.8 TRAFFIC AND LANE MARKINGS

- A. Cleaning: Sweep and clean surface to eliminate loose material and dust.
- B. Striping: Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and nonbleeding.
- C. Do not apply traffic and lane marking paint until layout and placement have been verified with Architect and the Owner.
- D. Apply paint with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates to provide minimum 12 to 15 mils dry thickness.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: The contractor is responsible for engaging a qualified independent testing agency to perform field inspections and tests and prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt course will be determined according to ASTM D 3549.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D 979.

1. Reference laboratory density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 1559, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples according to AASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, but in no case will fewer than 3 cores be taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
3. The Contractor shall be responsible to remove and replace or install additional hot-mix asphalt where test results or measurement indicate that it does not comply with specified requirements and with no additional compensation from Owner.

END OF SECTION 02741

SECTION 02920 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Meadow grasses and wildflowers.
4. Turf renovation.
5. Erosion-control material(s).

- B. Related Sections:

1. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
2. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and

slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 1. Certification of each seed mixture for turfgrass. Include identification of source and name and telephone number of supplier.
- C. Qualification Data: For qualified landscape Installer.
- D. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- E. Material Test Reports: For standardized ASTM D 5268 topsoil existing native surface topsoil existing in-place surface soil and imported or manufactured topsoil.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf and meadow establishment.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Experience: Five years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
 - a. Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT-Exterior.
 - b. Certified Turfgrass Professional, designated CTP.
 - c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.
 5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
 6. Pesticide Applicator: State licensed, commercial.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 3. Report suitability of tested soil for turf growth.
 - a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash

nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

- b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

- D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following period:

1. Seeded Turf: 120 days from date of planting completion.
 - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
- B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 90 days from date of planting completion.
- C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species as follows:
- C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 1. Full Sun: Bermudagrass (*Cynodon dactylon*).
 2. Full Sun: Kentucky bluegrass (*Poa pratensis*), a minimum of three cultivars.
 3. Sun and Partial Shade: Proportioned by weight as follows:
 - a. 50 percent Kentucky bluegrass (*Poa pratensis*).
 - b. 30 percent chewings red fescue (*Festuca rubra* variety).
 - c. 10 percent perennial ryegrass (*Lolium perenne*).
 - d. 10 percent redtop (*Agrostis alba*).
 4. Shade: Proportioned by weight as follows:
 - a. 50 percent chewings red fescue (*Festuca rubra* variety).
 - b. 35 percent rough bluegrass (*Poa trivialis*).
 - c. 15 percent redtop (*Agrostis alba*).

- D. Grass Seed Mix: Proprietary seed mix as follows:

2.2 MEADOW GRASSES AND WILDFLOWERS

- A. Wildflower Seed: Fresh, clean, and dry new seed, of mixed species as follows:

- 1. See Landscape Plan.

- B. Native Grass Seed: Fresh, clean, and dry new seed, of mixed species as follows:

- 1. See Landscape Plan.

- C. Wildflower and Native Grass Seed: Fresh, clean, and dry new seed, of mixed species as follows:

- 1. See Landscape Plan.

- D. Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

- 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

- 2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

- 3. Provide lime in form of ground calcitic limestone.

- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

- D. Aluminum Sulfate: Commercial grade, unadulterated.

- E. Perlite: Horticultural perlite, soil amendment grade.

- F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

- G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
- H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
 - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS

- A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - 1. Ratio of Loose Compost to Topsoil by Volume: 1:4.
 - 2. Ratio of Loose Sphagnum Peat to Topsoil by Volume:
 - 3. Weight of Lime per 1000 Sq. Ft.:
 - 4. Weight of Aluminum Sulfate per 1000 Sq. Ft.:
 - 5. Weight of Agricultural Gypsum per 1000 Sq. Ft.:
 - 6. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.:
 - 7. Weight of Bonemeal per 1000 Sq. Ft.:
 - 8. Weight of Superphosphate per 1000 Sq. Ft.:
 - 9. Weight of Commercial Fertilizer per 1000 Sq. Ft.:
 - 10. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Unamended or raw topsoil and surface soil, including agricultural topsoil, in first three paragraphs below seldom contain more than 1 or 2 percent organic matter.

- B. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

1. Mix existing, native surface topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - a. Ratio of Loose Compost to Topsoil by Volume: 1:4.
 - b. Ratio of Loose Sphagnum Peat to Topsoil by Volume:
 - c. Weight of Lime per 1000 Sq. Ft.:
 - d. Weight of Aluminum Sulfate per 1000 Sq. Ft.:
 - e. Weight of Agricultural Gypsum per 1000 Sq. Ft.:
 - f. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.:
 - g. Weight of Bonemeal per 1000 Sq. Ft.:
 - h. Weight of Superphosphate per 1000 Sq. Ft.:
 - i. Weight of Commercial Fertilizer per 1000 Sq. Ft.:
 - j. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.:

- C. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 1. Ratio of Loose Compost to Surface Soil by Volume: 1:4.
 2. Ratio of Loose Sphagnum Peat to Surface Soil by Volume:
 3. Ratio of Loose Wood Derivatives to Surface Soil by Volume:
 4. Weight of Lime per 1000 Sq. Ft.:
 5. Weight of Aluminum Sulfate per 1000 Sq. Ft.:
 6. Weight of Agricultural Gypsum per 1000 Sq. Ft.:
 7. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.:
 8. Weight of Bonemeal per 1000 Sq. Ft.:
 9. Weight of Superphosphate per 1000 Sq. Ft.:
 10. Weight of Commercial Fertilizer per 1000 Sq. Ft.:
 11. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.:

- D. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.
 1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge,

nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2. Mix imported topsoil or manufactured topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - a. Ratio of Loose Compost to Topsoil by Volume: 1:4.
 - b. Ratio of Loose Sphagnum Peat to Topsoil by Volume:
 - c. Ratio of Loose Wood Derivatives to Topsoil by Volume:
 - d. Weight of Lime per 1000 Sq. Ft.:
 - e. Weight of Aluminum Sulfate per 1000 Sq. Ft.: Weight of Agricultural Gypsum per 1000 Sq. Ft.:
 - f. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.:
 - g. Weight of Bonemeal per 1000 Sq. Ft.: Weight of Superphosphate per 1000 Sq. Ft.:
 - h. Weight of Commercial Fertilizer per 1000 Sq. Ft.:
 - i. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.:

E. Lightweight On-Structure Planting Soil: Mix produced by modifying planting soil as follows:

1. Planting Soil: One part(s), except replace all of sand content with perlite.
2. Additional Perlite: One part.
3. Additional Sphagnum Peat: One part.
4. Additional Lime: Ground calcitic limestone applied at the rate of 3 lb per cu. yd.

2.7 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-

inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.9 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.
- C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 4-inch nominal

mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

- a. Invisible Structures, Inc.; Slopetame 2.
- b. Presto Products Company, a business of Alcoa; Geoweb.
- c. Tenax Corporation - USA; Tenweb.
- d. <Insert manufacturer's name; product name or designation>.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 1. Protect adjacent and adjoining areas from hydroseeding and hydro mulching overspray.
 2. Protect grade stakes set by others until directed to remove them.

- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 8 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply superphosphate fertilizer directly to subgrade before loosening.
 - 2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 3. Spread planting soil to a depth of 8 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
 - b. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - 2. Loosen surface soil to a depth of at least 8 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply superphosphate fertilizer directly to surface soil before loosening.
 - 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

- A. Prepare area as specified in "Turf Area Preparation" Article.
- B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
- C. Fill cells of erosion-control mat with planting soil and compact before planting.
- D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.
- C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

- E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.
- F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
 - 2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft.. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.
- G. Protect seeded areas from hot, dry weather or drying winds by applying planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch and roll surface smooth.

3.6 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 - 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
 - 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
 - 3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre

3.7 TURF RENOVATION

- A. Renovate existing turf.
- B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 - 1. Reestablish turf where settlement or washouts occur or where minor regrading is required.

2. Install new planting soil as required.
- C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
- D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.
- E. Mow, dethatch, core aerate, and rake existing turf.
- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.
- J. Apply seed and protect with straw mulch as required for new turf.
- K. Water newly planted areas and keep moist until new turf is established.

3.8 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow Kentucky bluegrass buffalograss annual ryegrass chewings red fescue to a height of 1-1/2 to 2 inches.
 2. Mow bahiagrass turf-type tall fescue St. Augustinegrass to a height of 2 to 3 inches.
- D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.9 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.10 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.11 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 02920

SECTION 03300 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.3 SUBMITTALS

- A. General: In addition to the following, comply with submittal requirements in ACI 301.
- B. Product Data: For each type of manufactured material and product indicated.
- C. Design Mixes: For each concrete mix.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- C. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- D. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
 - 1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
 - 2. Formwork and form accessories.
 - 3. Steel reinforcement and supports.
 - 4. Concrete mixtures.

5. Handling, placing, and constructing concrete.

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Furnish formwork and form accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Wire: ASTM A 82, as drawn.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Types I or II or Type I/II.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 3/4-inch (20-mm) nominal size.
- C. Water: Potable and complying with ASTM C 94.

2.4 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.

2.5 RELATED MATERIALS

- A. Vapor Retarder: Multi-ply reinforced polyethylene sheet, ASTM E 1745, Class C, not less than 7.8 mils (0.18 mm) thick; or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a No. 4 (4.75-mm) sieve and 10 to 30 percent passing a No. 100 (0.15-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

- C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Water: Potable.

2.7 CONCRETE MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Compressive Strength (28 Days): 4500 psi (27.6 MPa).
 - 2. Slump: 4 inches (100 mm).
 - a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches (200 mm) after adding admixture to plant- or site-verified, 2- to 3-inch (50- to 75-mm) slump.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.
- D. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with ASTM C 94 and ASTM C 1116.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.

2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

3.2 VAPOR RETARDER

- A. Install, protect, and repair vapor-retarder sheets according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
 1. Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

3.3 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Architect.
- C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
- D. Contraction (Control) Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment.

3.6 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.
 1. Do not further disturb surfaces before starting finishing operations.

- C. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

3.8 TOLERANCES

- A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. 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 (1 kg/sq. m 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.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 REPAIRS

- A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION 03300

SECTION 03310 - CONCRETE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Extent of concrete work is shown on the drawings.
- B. Concrete footings.
- C. Concrete paving and walks are specified elsewhere in Division 2.

1.3 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds and others, as required by Architect.
- B. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.
- D. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- E. Shop Drawings: Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing diagrams of bent bars, arrangement of concrete reinforcement.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

ASTM C94/C94M "Specification for Ready-Mixed Concrete"

ACI 117 "Tolerances for Concrete Construction and Materials"

ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete"

ACI 301/301M	"Structural Concrete for Buildings."
ACI 302.1R	"Guide for Measuring, Mixing, Transporting and Placing Concrete"
ACI 305R	"Hot Weather Concreting"
ACI 306R	"Cold Weather Concreting"
ACI 308.1	"Standard Specification for Curing Concrete"
ACI 311.1R	"ACI Manual of Concrete Inspection (SP-2)"
ACI 311.4R	"Guide for Concrete Inspection"
ACI 318	"Building Code Requirements for Reinforced Concrete", except as modified in accordance with International Building Code.

Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

- B. Concrete Testing Service: The Contractor shall engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
 - 1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

- C. Water: Drinkable.
- D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Air-Mix"; Euclid Chemical Co.
 - b. "Sika Aer"; Sika Corp.
 - c. "MB-VR or MB-AE"; Master Builders.
 - d. "Darex AEA" or "Daravair"; W.R. Grace.
 - e. Or approved equal
- E. Prohibited Admixtures: Calcium chloride thycyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

2.4 RELATED MATERIALS

- A. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
 - 1. Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Non-metallic:
 - 1) "Masterflow 713"; Master Builders
 - 2) "Euco-NS"; Euclid Chemical Co.
 - 3) "Five Star Grout"; U.S. Grout Corporation.
 - 4) Or approved equal
- B. Absorptive Cover: Burlap cloth made from jute or kenaf weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- D. Clear curing and sealing compound (VOC Compliant): The compound shall have 30% solids content minimum, and will not yellow under ultra violet light after 500 hours of test in accordance with ASTM D 4887 and will have test data from an independent testing laboratory indicating a maximum moisture loss of 0.039 grams per sq. cm. when applied at a rate of 300 sq. ft. per gallon. Sodium silicate compounds are not permitted.
 - 1. Product: "Super Diamond Clear Vox" by Euclid Chemical Co.; or approved equal.

2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
 - 1. 3500 psi 28-day compressive strength; W/C ratio, 0.47 maximum.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be admitted to and accepted by Architect before using in work.
- E. Admixtures:
 - 1. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits.
 - a. 5% for maximum 2" aggregate
 - b. 6% for maximum 3/4" aggregate
 - c. 7% for maximum 1/2" aggregate
- F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Reinforced foundation systems: Not less than 1" and not more than 3".

2.6 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

PART 3 - EXECUTION

3.1 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structure are of correct size, shape, alignment, elevations and position.
- B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

3.2 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
 - 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.3 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate at a maximum spacing of 90 feet, so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Control Joints: Locate and install control joints as indicated or at a maximum spacing of 30 feet. Locate at a spacing which does not impair appearance of the structure as acceptable to Architect.
- C. Joint filler and sealant materials are specified in Section 07900.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

3.5 CONCRETE PLACEMENT

- A. Pre-placement inspection: Before placing concrete, inspect and complete reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.
- B. General: Comply with ACI 304R-00 "Guide for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein

specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

- D. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- E. Maintain reinforcing in proper position during concrete placement operations.
- F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which would be caused by frost, freezing actions or low temperatures, in compliance with ACI 306R.
- G. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- H. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R.

3.6 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 308 (latest edition) procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 12" lap over adjacent absorptive covers.
- F. Provide moisture-cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, place in widest practicable width with sides and ends lapped at least 12" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- G. Curing Unformed Surfaces: Cure unformed surfaces by application of appropriate curing method.

3.8 MISCELLANEOUS CONCRETE ITEMS

- A. Foundations: Provide foundations, as shown on drawings.

3.9 CONCRETE SURFACE REPAIRS

- A. Repair of Unformed Surfaces: Test unformed surfaces, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- B. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.
- C. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- D. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Contractor will employ and pay for a testing laboratory to perform the following tests, inspect reinforcement placement and to submit test reports. Testing laboratory must be pre-approved by the Architect.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- D. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing, if required.

- F. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
- G. Test results will be reported in writing to Architect, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- H. Nondestructive Testing: Impact hammer, sonoscope or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03300

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of each type of masonry work is indicated on drawings and schedule.

- B. Type of masonry work required includes:

1. Concrete unit masonry.
2. Brick masonry.
3. Cast Stone.
4. Slate Stools.
5. Concrete masonry lintels and bond beams.
6. Mortar and grout.
7. Reinforcement, anchorage, and accessories.
8. Concealed Flashing

- C. Related Work:

1. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
2. Section 07900 - Joint Sealer Assemblies.
3. Section 08110 - Hollow Metalwork.
4. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems.
5. Section 08900 - Glazed Curtain Wall.
6. Section 09900 - Painting of exposed to view CMU surfaces.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made for color and textural characteristics, under sample

submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials and construction.

- E. Build mock-up(s) in size of approximately 18" long by 18" high, brick panel to confirm selection of brick and mortar match.
- F. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
- G. Masonry Pre-Installation Meeting: Prior to installation of any above-grade masonry work, there shall be a Masonry Pre-Installation Meeting between the General Construction Work Contractor, all masonry Subcontractors (if any) and the Architect. At this meeting, all masonry construction products and procedures shall be reviewed.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Samples for Verification Purposes: Submit the following samples:
 - 1. For selection of brick, submit products of all local manufacturers that the manufacturers consider to be their closest match. Resubmit until match meets approval of Architect.
 - 2. Cast Stone samples not less than 12 inch square showing full range of exposed color and texture to be expected in finish work.
 - 3. Colored masonry mortar samples for each color required showing the full range of color which can be expected in the finished work. Label samples to indicate type and amount of colorant used.
- C. Shop Drawings: Submit shop drawings for the following:
 - 1. All locations of Vertical Control Joints for interior concrete masonry unit walls including control joints shown.
 - 2. Cast Stone Wall Coping.
- D. Cast Stone Standards:
 - 1. Cast stone mix and certification of compliance with standard ASTM C1364 testing requirements. Include testing for freezing and thawing resistance.
 - 2. Cast Stone Institute Standard Specification (latest edition).

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.

- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.
- C. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
- D. Store cementitious materials off the ground, under cover and in dry location.
- E. Store aggregates where grading and other required characteristics can be maintained.
- F. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.6 REFERENCE STANDARDS

- A. Comply with the current applicable provisions of all codes, regulations, industry standards and specifications referenced in this section, unless otherwise modified by the requirements of the Contract Documents, including but not limited to the following:
 1. ACI 531 Building Code Requirements for Masonry Structures.
 2. ACI 531 Commentary on Building Code Requirements for Masonry Structures.
 3. ACI 530.1 Specification for Masonry Construction.
 4. ASTM C-90 Load Bearing Masonry Units.
 5. ASTM C-129 Non-Load Bearing Masonry Units.
 6. ASTM C 140 Testing Concrete Masonry Units.
 7. ASTM C 216 Testing Facing Brick (Solid Masonry Units Made from Clay or Shale).
 8. ASTM C 270 Standard Specification for Mortar for Unit Masonry
 9. ASTM C 780 Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 10. ASTM C 1586 Standard Guide for Quality Assurance of Mortars.
 11. ASTM E - 119 Fire Tests with Building Construction and Materials.
 12. BIA Technical Notes on Brick Construction.
 13. BIA Technical Notes on Brick Construction: Technical Note #46 "Maintenance of Brick Masonry.
 14. NCMA TEK Bulletins.
 15. ASTM C1364 Standard for Architectural Cast Stone

16. ASTM D7957/D7957M - Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement.
17. ASTM C1194 Standard Test Method for Compressive Strength of Architectural Cast Stone.
18. ASTM C1195 Standard Test Method for Absorption of Architectural Cast Stone.
19. Cast Stone Institute® Technical Manual (Current Edition).

1.7 PROJECT CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls.
- C. Do not apply concentrated loads for at least 3 days after building masonry walls.
- D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
- E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- F. Protect sills, ledges and projections from droppings of mortar.

1.8 WARRANTY

- A. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building and he shall, within such period at his own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he also agrees either that the materials and methods specified herein are such as to insure the results required or that he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
 1. Brick: Subject to compliance with requirements, manufacturers of brick units which may be incorporated in the work include, but are not limited to, the following:
 - a. Church Brick Company.

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- b. Consolidated Brick.
 - c. Diener Brick Company.
 - d. Tri-State Brick & Building Materials, Inc.
 - e. The Belden Brick Company.
 - f. Or approved equal.
2. Concrete Masonry Units: Subject to compliance with requirements, manufacturers of concrete masonry units which may be incorporated in the work include, but are not limited to, the following:
- a. Anchor Concrete Products Inc.
 - b. Clayton Block Co., Inc.
 - c. EP Henry Corporation.
 - d. York Building Products, a Stewart Company.
 - e. Or approved equal.
3. Masonry Anchors, Joint Reinforcing, Accessories, etc.: Subject to compliance with requirements, manufacturers of masonry anchors, joint reinforcing, accessories which may be incorporated in the work include, but are not limited to, the following:
- a. Heckman Building Products, Inc.
 - b. Hohmann & Barnard, Inc.
 - c. Or approved equal.

2.2 BRICK MADE FROM CLAY OR SHALE

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
- B. Size: Provide bricks manufactured to the following actual dimensions:
 - 1. Utility: 3-5/8 inch x 3-5/8 inch x 11-5/8 inch (Match existing).
- C. Facing Brick: ASTM C 216, and as follows.
 - 1. Grade SW.
 - 2. Type: FBS.
 - 3. Compressive Strength: 8,000 psi, average, per ASTM C67.
 - 4. Application: Use where brick is exposed, unless otherwise indicated.
 - 5. Texture and Color: Match existing.
 - 6. Wherever shown to "match existing", provide face brick of matching color, texture and size as existing adjacent brickwork.
- D. Efflorescence: Provide brick tested and rated in compliance with ASTM C67.

2.3 CONCRETE MASONRY UNITS

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Concrete Block: Provide units complying with characteristics indicated below for face size, exposed face and under each form of block included, for weight classification.

- C. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated.
- D. Hollow Loadbearing Block: ASTM C90 and as follows:
 - 1. Weight Classification: Lightweight.
- E. Solid Loadbearing Block: ASTM C90 and as follows: (Below grade and wherever else solid CMU is indicated).
 - 1. Weight Classification: Lightweight.

2.4 CAST STONE COPING

- A. Basis of Design: Provide cast stone as manufactured by Reading Rock®, Inc.; or approved equal.
 - 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - a. Custom Cast Stone, Inc.
 - b. American Artstone
 - c. Or approved equal
 - 2. Other acceptable manufacturers shall have a recommended minimum of ten (10) years of continuous operation and adequate facilities for producing and curing machine-made Cast Stone units as described herein.
 - 3. Manufacturer shall be a member of the Cast Stone Institute.
- B. Provide cast stone of size, shape and thickness indicated.
- C. Cast Stone Type(s):
 - 1. Dry Cast Concrete Products: Manufactured from zero-slump concrete.
 - a. Vibrant Dry Hand Tamp Casting Method: Vibratory compaction by hand tamp of earth-moist, zero-slump concrete against rigid mold until it is densely compacted.

Or/

 - 2. Wet Cast Concrete Products: Manufactured from measurable slump concrete.
 - a. Wet Casting Method: Manufactured from measurable slump concrete and consolidated into a mold.
- D. Physical Properties:
 - 1. Compressive Strength: ASTM C1194 - 6,500 psi minimum at 28 days.
 - 2. Absorption, Cold Water: ASTM C1195 - 6.0% maximum at 28 days.

3. Linear Drying Shrinkage – ASTM C426: Test and report in accordance with ASTM C1364.
 4. Surface Texture: ASTM C1364.
 5. Cast Stone Materials:
 - a. Portland Cement: ASTM C150, Type I, white/or gray, as required, to match specified color,
 - b. Coarse Aggregate: ASTM C1364, Granite, quartz, or limestone,
 - c. Fine Aggregate: ASTM C1364, Natural or manufactured sands,
 - d. Coloring Pigments: ASTM C1364, Inorganic iron oxides,
 - e. Chemical Admixtures: ASTM C1364.
 - f. Water: Potable.
 6. Air Content – Provide sufficient air content to meet the freeze-thaw requirements for wet cast products, when the air content is tested in accordance with Test Method C173/C173M or Test Method C231/C231M. Air entrainment is not required for Vibrant Dry Tamp (VDT) products.
 7. Freeze-thaw – ASTM C666/C666M in accordance with ASTM C1364. The CPWL shall be less than 5.0% after 300 cycles of freezing and thawing.
- E. Casting Method: Vibrant dry hand tamp or wet cast, as specified and/or required.
- F. Color and Finish: To be selected by the Architect from manufacturer's available full range of standard colors and finishes.
1. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. and the density of such voids shall be less than 3 occurrences per any 1 in.² and not obvious under direct daylight illumination at a 5 ft distance.
 2. Variation:
 - a. Must match color and finish of approved sample when viewed in direct light at a 10 foot distance.
 - b. Permissible Variation in Color:
 - 1) Hue Difference - ASTM C1364, 2 units.
 - 2) Total Color Difference - ASTM C1364, 6 units.
- G. Materials:
1. Portland Cement: ASTM C 150, Type I or III. White and/or gray as required to match specified color.
 2. Coarse Aggregates: ASTM C 33, except for gradation. Granite, quartz, or limestone.
 3. Fine Aggregates: ASTM C 33, except for gradation. Manufactured or natural sands.
 4. Pigments: ASTM C 979, except do not use carbon black pigments. Inorganic iron oxide pigments.

5. Admixtures:
 - a. Water Reducing, Retarding, and Accelerating Admixtures: ASTM C 494.
 - b. ASTM C 260 for air-entraining admixtures.
 - c. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
 - d. ASTM C 618 for mineral admixtures.
 - e. ASTM C 989 for ground granulated blast-furnace slag.
 6. Water: Potable.
 7. Reinforcing Bars: ASTM A 615, deformed steel bars. Epoxy coated or galvanized when covered with less than 1-1/2 inches of material.
 - a. Galvanized Coating: ASTM A 767.
- H. Anchors: Non-corrosive type, sized for conditions:
1. Provide stainless steel type 304 anchors, pins, dowels and clip angles as indicated or if not indicated as required for each cast stone units and panels.
 2. Shelf angles and other similar structural items shall be galvanized steel.
- I. Reinforcement:
1. As required by ASTM C1364 and D7957 / D7957M.
 2. Minimum reinforcing shall be 0.25 percent of the cross section area.
 3. Reinforcement shall be non-corrosive where faces exposed to weather are covered with less than 1.5 in. of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
 4. Panels and similar stones greater than 24 in. (600 mm) in one direction shall be reinforced in that direction. Units less than 24 in. (600 mm) in both their length and width dimension shall be non-reinforced unless otherwise specified.
 5. Welded wire fabric reinforcing shall not be used in dry cast products.
- J. Fiber Reinforcement: ASTM C1116, fibrous nylon and CSI Technical Bulletin #51.
- K. Mortar: Cast Stone Institute Standard Specification.
- L. Curing, Finishing and Cleaning:
1. Provide methods and products which had been approved or recommended by manufacturer of the cast stone units.
 2. Cure units in a warm curing chamber approximately 100°F (37.8°C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70°F (21.1°C) for 16 hours after casting. Additional yard curing at 95 percent relative humidity shall be 350 degree-days (i.e. 7 days @ 50°F

(10°C) or 5 days @ 70°F (21°C) prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

M. Manufacturing Tolerances:

1. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. from approved dimensions.
2. Length of units shall not deviate by more than length/ 360 or $\pm 1/8$ in., whichever is greater, not to exceed $\pm 1/4$ in.
3. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
4. Warp, bow or twist of units shall not exceed length/ 360 or $\pm 1/8$ in., whichever is greater.
5. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – On formed sides of unit, $1/8$ in., on unformed sides of unit, $3/8$ in. maximum deviation.

N. Cleaner:

1. Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces.
2. Approved for intended use by cast stone manufacturer and approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.5 MASONRY LINTELS

A. General: Provide the following:

1. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMU's matching adjacent CMU's in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, anti-freeze compounds or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Limit cementitious materials in mortar to portland cement-lime.

C. Portland Cement: ASTM C150, Type 1, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

- D. For colored aggregate mortars use masonry cement, ASTM C91, of natural color or white as required to produce mortar colors required.
- E. Hydrated Lime: ASTM C207, Type S.
- F. Aggregate for Mortar: ASTM C144, except for joints less than 1/4 inch use aggregate graded with 100% passing the No. 16 sieve.
 - 1. White Mortar Aggregates: Natural white sand or ground white stone.
 - 2. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
- G. Mortar: ASTM C387, Type N. Provide mortar for face brick and accessories to match original mortar in color, texture, strength and hardness (density and porosity). Determine existing mortar mix constituents and ratios by analysis. Review laboratory evaluations with Architect before proceeding with the work. Match color of existing mortar by use of aggregates matching original aggregate color where possible. Use inorganic coloring pigments if satisfactory color match cannot be attained with natural materials.
 - 1. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.
 - 2. Use Type S mortar for exterior, above-grade loadbearing and non-loadbearing CMU walls; for interior loadbearing CMU walls; and for other applications where another type is not indicated.
- H. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification, for types of mortar required, unless otherwise indicated.
- I. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143.
- J. The proper use of ASTM C270 and Test Method ASTM C780 for evaluating masonry mortars produced in the laboratory and the construction site is in accordance with ASTM C1586.
- K. Aggregate for Grout: ASTM C404.
- L. Water: Clean and potable.
- M. Colored Aggregate Mortar: Produce mortar of color required by use of colored aggregates in combination with selected cementitious materials.
 - 1. Colors as selected by the Architect from manufacturer's available full range of colors.

2.7 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

- A. Materials: Comply with requirements indicated below for basic materials and with

requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:

1. Hot-Dip Galvanized Steel Wire: ASTM A82 for uncoated wire and with ASTM A153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.
- B. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
1. Width: Fabricate joint reinforcement in units with widths of approximately 2 inch less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and 1/2 inch elsewhere.
 - a. Wire Size for Side Rods: 9 gauge.
 - b. Wire Size for Cross Rods: 9 gauge.
 2. Ladder design rods spaced not more than 16 inch o.c.
 3. Number of Side Rods: One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.
 4. Configuration:
 - a. Applications of Single Wythe Wall width: Ladder type design rods at not more than 16 inches on center.
 - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 220, Ladder-Mesh; or approved equal.
 - b. Applications of more than one unit width (Composite Wall): Ladder type design rods at not more than 16 inches on center:
 - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 240, Ladder-Twin-Mesh; or approved equal.
- C. Reinforcing Bars: Deformed steel, ASTM A615, Grade 60 for bars No. 3 to No. 18.

2.8 CONCEALED FLASHING MATERIALS

- A. **Type 5:** Parapet / Coping, Thru-Wall Flashing: Basis of Design "Dovetail Design", as manufactured by Cheney Flashing Co.; or approved equal.
1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - a. Keystone Flashing Co.,
 - b. Or approved equal.
 2. Provide 0.018" (26 gauge) thick 302/304 dead soft stainless steel, interlocking thru-wall flashing, factory formed, to provide a three way mechanical bond in the mortar bed and provides it's own drainage weep holes @ 3" o.c..
 3. Provide specially fabricated units and exterior and interior corner conditions. Lap flashing a minimum of 4-inches and seal laps with mastic or as recommended by manufacturer.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D1056, Grade 2A1, capable of compression up to 35%, of width and thickness indicated.
- B. Compressible Insulation at Top of Walls: A high-density mineral fiber insulation rated non-combustible as tested per ASTM E136.
 - 1. Basis of Design: Provide "TopStop - Head-of Wall"; Thermafiber with 3M "Firedam" fire rated sealant; or approved equal. Refer to Section 07840 for Fire-Resistive Joint Systems.
 - 2. Insulation shall sustain temperature above 2,000°F in accordance with ASTM E119 and comply with ASTM E84 for the following:
 - a. Flame Spread: 0
 - b. Smoke Developed: 0
 - 3. Provide size and shape to suit indicated conditions.
- C. Fire Rated Control and Expansion Joints, Joint Filler and Sealant:
 - 1. Provide fire-rated sealant in accordance with UL Listed design for fire-rated joint assemblies.
 - 2. For expansion and control joint filler and sealant, as specified in Section 07900.
- D. Weepholes: Provide the following for weepholes:
 - 1. Plastic, Rectangular with screen: Item # 342 W/S; Hohmann & Barnard, Inc.; or approved equal
 - a. Medium density polyethylene 3/8 inch x 1-1/2 inch x 3-1/2 inch clear color plastic with stainless steel screens and cotton wicks.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.
- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.
- D. Thickness: Build composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.

- E. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible. No discoloration of units caused by cutting will be acceptable.
- F. Pattern Bond:
 - 1. Brick: Running bond, unless otherwise shown.
 - 2. Concrete masonry units: Running bond, unless otherwise shown.
 - 3. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches.
- G. All concrete masonry units and courses below grade shall be filled solid with grout.

3.2 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4 inch in 10 feet, or 3/8 inch in a story height not to exceed 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4 inch in 10 feet, 1/2 inch maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay or 20 feet maximum, nor 1/2 inch in 40 feet or more. For top surface of bearing walls do not exceed 1/8 inch between adjacent floor elements in 10 feet or 1/16 inch within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not exceed head joint thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

- C. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- D. Built-in Work: As the work progresses, built-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.
- E. Extend all interior walls full height to underside of structure of deck, unless otherwise indicated. Include compressible insulation at top to completely close space between wall and structure above.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay solid brick size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Set stone units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor and similar holes solid. Wet stone joint surface thoroughly before setting; for stone surfaces which are soiled, clean bedding and exposed surfaces with fiber brush and soap powder followed by thorough rinsing with clear water.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8 inch joints.
- E. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- F. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.
- G. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.5 HORIZONTAL JOINT REINFORCEMENT

- A. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
 - 1. Space continuous horizontal reinforcement as follows:
 - a. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcement acts as structural bond or tie between wythes, space reinforcement as required by code but not more than 16 inches o.c. vertically.
 - b. For single-wythe walls, space reinforcement at 16" o.c. vertically, unless otherwise indicated.
 - 2. Provide control joints with fire-rated sealant as indicated in Section 07900.
- D. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

3.6 ANCHORING MASONRY WORK

- A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved.
 - 1. Strap anchors for masonry at existing walls.
 - 2. Do not anchor fire walls to Structural Steel, intersecting and/or abutting walls.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry maximum 30 feet on center. Build-in related items as the masonry work progresses.
 - 1. Coordinate location of all control and expansion joints in the field with Architect prior to commencement of work.
- B. Build in joint fillers where shown: See Section 07900, Joint Sealers. Joint width for sealants: 3/8 inch unless otherwise indicated. Include straight joints at vertical recessed brick detail.

3.8 FLASHING OF MASONRY WORK

- A. General: Provide concealed flashing in masonry work to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free

from projections which could puncture flashing. Place through-wall flashing in wall and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.

1. Contractor shall provide mechanically keyed through wall flashings where indicated. Flashings shall be typical and/or similar for all building conditions when details and notes are shown on drawings.

- a. Set mechanically keyed through wall flashing in thin layer of mortar. Set masonry course above flashing in light layer of mortar.
- B. Extend flashing the full length of ledges. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within third of width of the inner wythe as indicated on drawings.
- C. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer.
- D. Provide weep holes in the head joints of the same course of masonry bedder in the flashing mortar. Space 24 inches o.c., unless otherwise indicated.

3.9 PARGING

- A. Parge exterior face of above-grade masonry walls, in two uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm).
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.10 CAST STONE CAPS

A. EXAMINATION

1. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. INSTALLATION

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
2. Drench units with clear water just before setting.
3. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build

anchors and ties into mortar joints as units are set.

4. Fill dowel holes and anchor slots with mortar.
5. Fill collar joint solid as units are set.
6. Leave head joints open in coping and other units with exposed horizontal surfaces. Keep joints clear of mortar, and rake out to receive sealant.
7. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
8. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
9. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
10. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated, or as recommended by units manufacturer.
11. Sealing joints is specified in Section 07900 - Joint Sealer Assemblies.
12. Keep joints free of mortar and other rigid materials.

C. INSTALLATION TOLERANCES

1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
2. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet.
3. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

D. ADJUSTING AND CLEANING

1. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
2. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
3. In-Progress Cleaning: Clean cast stone as work progresses. Remove mortar fins and smears before tooling joints.

4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - b. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

3.11 QUALITY CONTROL TESTING

- A. Engage an independent testing and inspection agency to inspect engineered masonry and to perform tests and prepare test reports.
 1. Perform tests for condition, size, location and spacing of reinforcement and anchorage of engineered masonry assemblies.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with design requirements and indicated standards, and specifically state any deviations therefrom.
 1. Provide access for testing agency to places where structural steel reinforcement and anchorage work is being fabricated or produced so that required inspection and testing can be accomplished.
 2. Testing agency may inspect structural steel reinforcement and anchorage work at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- C. Correct deficiencies in structural steel reinforcement and anchorage work which inspections and laboratory test reports have indicated to be not in compliance with requirements.
 1. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

3.12 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20 "Cleaning Brick Masonry".
 1. Use commercial cleaning agents in accordance with manufacturer's instructions.

- D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.
 - 1. Prepare exposed to view CMU surfaces to receive paint coatings in accordance with Section 09900.

END OF SECTION 04200

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Extent of structural steel work is shown on drawings, including notes and details to show size and location of member(s), typical connections and type of steel required.
- B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
 - 1. Section 2.1; to include "Lintels shown or otherwise enumerated or scheduled".
 - 2. Section 4.2; The first two sentences of this section are to be replaced with the following:
 - a. Shop drawings shall be prepared by the fabricator, prints thereof are to be submitted to the Architect for their examination and approval. These shop drawings are to be submitted in minimum of the following phases:
 - 1) Anchor bolt plans and advanced shipment pieces;
 - 2) Erection plans and thirdly;
 - 3) Piece details (maximum of 100 sheets per submission.
 - b. The fabricator is to include an allowance of a minimum of fifteen (15) calendar days in his schedule for the review and return the drawings by the Architect. The required time shall start from the time the drawings are received by the Architect."
- C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
- D. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 1. Promptly remove and replace materials or fabricated components which do not comply.
- E. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify all dimensions at site without causing delay in the work.
 - 1. Notify Architect immediately whenever design of members and connections for any portion of structure are not clearly indicated.

1.3 SUBMITTALS

- A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - 3. Structural steel primer paint.
 - 4. Galvanized-steel primer.
 - 5. Galvanized repair paint.
- B. Shop Drawings: Submit shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.
- C. Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols; and show size, length and type of each weld.
 - 1. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
- D. Test Reports: Submit copies of tests conducted on shop and field bolted and welded connections. Include data on type (s) of tests conducted and test results.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
- B. AISC "Code of Standard Practice for Steel Buildings and Bridges".
 - 1. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:
 - a. This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of this preparation of these shop drawings.
- C. AISC "Specifications for Structural Steel Building Allowable Stress Design and Plastic Design", including "Commentary" and supplements thereto as issued.
- D. AISC "Specifications for Architecturally Exposed Structural Steel".
- E. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

- F. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
- G. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
- H. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - 1. If re-certification of welders is required, retesting will be Contractor's responsibility.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in masonry in ample time to not delay work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. Structural Steel Wide Flange Shapes: ASTM A 992/A572, Grade 50
- C. Structural Steel Shapes, Plates and Bars: ASTM A 36.
- D. Electrodes for Welding: Comply with AWS Code.
- E. Galvanizing: ASTM A123/A123M.
- F. Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces complying with Military Specifications MIL-P-21035 (Ships).
- G. Structural Steel Primer Paint: Red Oxide.

2.2 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

- C. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- D. Connections: Weld shop connections, as indicated.
- E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds and methods used in correcting welding work.
- F. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
- G. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
 - 1. Galvanize structural steel lintels, and shelf angles attached to structural-steel frame and located in exterior walls.

2.4 SHOP PAINTING

- A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.
- B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - 1. SP-1 "Solvent Cleaning".
 - 2. SP-3 "Power Tool Cleaning".
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.
- D. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with Manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.

PART 3 - EXECUTION

3.1 ERECTION

- A. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustment to structural steel work have been agreed upon with Architect.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
- C. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- D. Level and plumb individual members of structure within specified AISC tolerances.
- E. Splice members only where indicated and accepted on shop drawings.
- F. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.
- G. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- H. Touch-Up Painting: Immediately after erection, clean field welds and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
- I. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.2 QUALITY CONTROL

- A. The Contractor will engage and pay for an independent testing and inspection agency to inspect welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

- D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- E. 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 non-compliance of original work, and as may be necessary to show compliance of corrected work.
- F. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 - 1. Certify welders and conduct inspections and tests, as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
- G. Field Welding: Inspect and test during erection of structural steel, as follows:
 - 1. Certify welders and conduct inspections and tests, as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
- H. Testing agency shall confirm that the structure is square, plumb and level in accordance with AISC tolerances.

END OF SECTION 05120

SECTION 06100 - CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Type of work in this section includes rough carpentry for wood nailers and blocking.

1.3 SUBMITTALS

- A. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in form of a signed copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.
- B. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.
- C. Fire-Retardant Treatment: Include certification by treating plant that treated material complies with specified standard and other requirements.

1.4 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
- B. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.5 PROJECT CONDITIONS

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.
- B. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

WWPA - Western Wood Products Association.
- C. Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
- E. Provide dressed lumber, S4S, unless otherwise indicated.
- F. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing.

2.2 MISCELLANEOUS LUMBER

- A. Provide wood for support or attachment of other work including nailers, blocking, and similar members. Provide lumber of sizes indicated or required, worked into shapes shown, and as follows:
 - 1. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
 - 2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards or No. 2 Boards.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.
- B. Where rough carpentry work is exposed to weather, in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).
- C. Building Paper: ASTM D 226, Type I; asphalt saturated felt, non-perforated, 15-lb. type.

2.4 WOOD TREATMENT BY PRESSURE PROCESS

- A. Fire-Retardant Treatment: Where fire-retardant treated wood ("FRT") is indicated or required, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWPA C20 and C27, respectively, identify "FRT" lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire treated wood shall have a flame spread of 25 or less and shall be dried to 19% moisture content for lumber and 15% for plywood. Exposed wood or wood subject to high humidity conditions shall be identified that the moisture content shall not exceed 28% when tested at 92% relative humidity in accordance with ASTM D3201.
 - 2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
 - a. "Dricon"; Hickson Corporation.
 - b. "Flame Proof LHC"; Osmose Wood Preserving, Inc.
 - c. "Pyro-Guard"; Hoover Treated Wood Products, Inc.
 - d. Or approved equal.
 - 3. Treat members shown on drawings and/or as required to meet the all State and Local Codes and Regulations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- B. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.
- D. Countersink nail heads on exposed carpentry work and fill holes.
- E. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD NAILERS AND BLOCKING

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

- C. Height of nailers shall be matched to that of the insulation being used. Nailers shall be firmly anchored to the deck to resist a force of seventy-five pounds per lineal foot. The type of anchors shall be as recommended by the roofing manufacturer and shall be secured at intervals required to ascertain a resistance force of seventy-five pounds per lineal foot.

END OF SECTION 06100

SECTION 07070 - SELECTIVE ROOF DEMOLITION

PART 1- GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. The Contractor will be responsible for the removal and disposal of all materials generated from work of this contract.
- B. Provide all labor, material, equipment, and tools as required to prepare the existing roof section for selective demolition work and installation of new RTU curbs, vents, etc. as specified in this Section and other Division 7 Sections.
- C. Provide for the proper disposal of all existing materials designated to be removed. Use approved trash receptacles in areas designated by the Owner's Representative.
- D. Coordinate work, in such a manner as to keep the new insulation and roofing materials, building, and building interior absolutely clean, dry and watertight.
- E. Contractor is to maintain the building roof in a watertight condition at the completion of each day's work and ensure that no water enters into the building. Roof areas are to be "watertight at night" at all times during the job. Failure to do so is grounds for dismissal. Contractor will reimburse Owner the cost to repair interior damages resulting from roof leaks during construction.
- F. Contractor is to maintain the building and site in a neat and orderly fashion at all times. Completely remove all scrap and debris on a daily basis. Failure to do so is grounds for dismissal.

1.3 SUBMITTALS

- A. Proposed Selective Demolition Activities:
 - 1. Submit proposed schedule of demolition activities. Indicate:
 - a. Starting and ending dates for each activity as appropriate.
 - b. Interruption and restoration of utility services.
 - 2. Submit proposed methods of operations.
- B. Project Record Documents:
 - 1. Indicate unanticipated structural, electrical, or mechanical conditions.
- C. Photographs: Before starting work, file with the Architect photographs documenting existing conditions that later could be mistaken for damage caused by demolition operations.

1.4 PROJECT CONDITIONS

- A. Occupancy:
 - 1. The Owner will continue to occupy portions of the existing building.
- B. Unforeseen Conditions:
 - 1. Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the Owner / Architect. While awaiting the Owner / Architect's response, reschedule operations if necessary to avoid delay of overall project.

PART 2

2.1 EQUIPMENT

- A. Demolition equipment and materials are provided by the Contractor.

PART 3

3.1 EXECUTION

- A. Contractor shall take all necessary precautions during roof preparation work to protect the building exterior, building interior, and adjacent surfaces from being soiled or damaged.
- B. When weather threatens, cease work under this Section and return roof to a watertight condition.
- C. Contractor shall restore to original condition any damages caused during work on this project. Damages found on this project prior to start of work must be documented by contractor and brought to Owner's attention prior to start of work.
- D. All roof drains are assumed to be in good operating condition. Contractor is to verify good operating condition of roof drains prior to start of work on this project. Damaged, clogged or partially clogged drains must be documented by Contractor and brought to Owner's attention prior to start of work on this project.
- E. Return all roof drains to operating condition at the end of each working day.
- F. Immediately prior to insulation attachment, sweep the deck surface. Do not allow foreign objects to become trapped under the insulation board by being left on the deck surface.
- G. If, during observation of the prepared surface, the Architect or the manufacturer's representative determined the deck surface was not prepared properly, Contractor shall re-prepare the surface to the satisfaction of the Architect or manufacturer's representative.
- H. Properly dispose of all debris from roof preparation on a daily basis.
- I. Do not store debris on roof. Contractor shall take care not to over stress roof deck.

- J. Provide closed trash chutes or other approved means for removal of debris.
- K. Construct all necessary barricades, fencing, warning sign, scaffolding, etc., required to protect personnel and property.
- L. Prior to the completion of the work, remove from the job site all tools, equipment, debris and waste.

END OF SECTION 07070

SECTION 07200 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Work included in this Contract: Contractor shall include all labor, materials, services, installation, equipment, etc., necessary to complete all referenced fire stopping work.
 - 1. Provide indicated types of insulation as shown on drawings, as specified herein, and/or as required by all job conditions and building assemblies, whether clearly shown or not to achieve included work.
 - 2. Insulation type includes but is not limited to fire safing insulation with UL approved coating,
 - 3. Related Work:
 - a. Section 07840 - Through-Penetration Fire-Stop Systems.
 - b. Section 04200 - Unit Masonry.
 - c. Division 22: Mechanical Work.
 - d. Division 26: Electrical Work.

1.3 QUALITY ASSURANCE

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75°F) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thicknesses.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.
- C. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with governing regulations as interpreted by authorities.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions for each

type of insulation required. Include data substantiating that materials comply with specified requirements.

- B. Samples: Submit triplicate samples of the following listed items, in accordance with Contract Documents. Obtain Architect's approval before proceeding with ordering or fabrication of items of this section:

1. Each type of insulation specified - 12 inches square.

1.5 DELIVERY, STORAGE AND HANDLING

- A. General Protection and Handling: Protection from Deterioration: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Fire Safing Insulation:
- a. Industrial Insulation Group, LLC
 - b. Fibrex Insulations.
 - c. Isolatek International.
 - d. Owens Corning.
 - e. Rockwool, North America.
 - f. Or approved equal.

- B. Mineral-Wool Board Insulation:

1. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with a flame-spread index of 15 and a smoke-developed index of zero, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- a. Nominal density of 4 lb/cu. ft., Types IA and IB, thermal resistivity of 4°F x h x sq. ft./Btu x in. at 75°F.
2. At all rated masonry and wallboard walls and partitions, rated slabs and exterior wall panels, the fire safing insulation shall be coated with 3M Firedam products, or approved equal, to achieve indicated UL design requirements.

- C. Product: Insulation; unfaced.

1. Formaldehyde Free (FF)
2. GREENGUARD GOLD Certified.
3. ULE Validated Formaldehyde Free

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
 - 1. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
 - 2. Provide indicated type of insulation as shown on drawings, as specified herein, and/or as required by all job conditions, building assemblies, and whether clearly shown or not.
- C. Fire Safing Insulation
 - 1. Install fire safing insulation at all indicated locations, as required by authorities having jurisdiction and in accordance with manufacturer's instructions.
 - 2. Provide sealant material and type required for indicated applications. Provide fire rated type at rated assemblies.
 - 3. Provide coating materials at indicated UL rated assemblies.
- D. All installations of insulation and work of this section shall meet approval of Architect and all code authorities having jurisdiction at no additional cost to the Owner.

END OF SECTION 07200

SECTION 07241 - WATER MANAGED EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide air and moisture barrier and compatible EIFS for vertical above grade existing exterior wall.
- B. Related Sections:
 - 1. Section 07900 - Joint Sealer Assemblies
 - 2. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems

1.3 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data.
- B. Manufacturer's code compliance report.
- C. Manufacturer's standard warranty.
- D. Applicator's industry training credentials.
- E. Samples for approval as directed by Architect.
- F. Sealant manufacturer's certificate of compliance with ASTM C 1382.
- G. Prepare and submit project-specific details (when required by contract documents).

1.4 REFERENCES

- A. ASTM Standards:
 - B 117 Test Method for Salt Spray (Fog) Testing
 - C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
 - C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
 - C 1177 Specification for Glass Mat Gypsum for use as Sheathing
 - C 1382 Test Method for Determining Tensile Adhesion Properties of Sealants when used in Exterior Insulation and Finish Systems (EIFS) Joints

- D 968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
- D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity STO GUIDE SPECIFICATION A100G – StoTherm ci Classic
- D 3273 Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 96 Test Methods for Water Vapor Transmission of Materials
- E 119 Method for Fire Tests of Building Construction and Materials
- E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- E 1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference
- E 2098 Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish System after Exposure to a Sodium Hydroxide Solution
- E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)
- E 2178 Test Method for Air Permeance of Building Materials
- E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish System (EIFS) Clad Wall Assemblies
- E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- E 2485 Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water Resistive Barrier Coatings.
- E 2486 Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS).
- E 2568 Standard Specification for PB Exterior Insulation and Finish Systems.

- E 2570 Test Method for Water-Resistive (WRB) Coatings used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage.
- G 153 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials.
- G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials.
- B. Building Code Standards:
 - AC 235 Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (November, 2009).
- C. National Fire Protection Association (NFPA) Standards:
 - NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
 - NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus.
- D. Other Referenced Documents
 - 1. American Association of Textile Chemists and Colorists AATCC-127 Water Resistance: Hydrostatic Pressure Test.
 - 2. APA Engineered Wood Association E 30, Engineered Wood Construction Guide.
 - 3. ICC-ES ESR-1233, StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-Resistive Barriers and StoEnergy Guard.
 - 4. ICC-ES ESR-1748, StoTherm@ci.

1.5 DESIGN REQUIREMENTS

- A. Wind Load.
 - 1. Design for maximum allowable system deflection, normal to the plane of the wall, of $L/240$.
 - 2. Design for wind load in conformance with code requirements.
 - 3. Maximum wind load resistance: + 188 psf (9.00 kPa), provided structural supports and sheathing/sheathing attachment are adequate to resist these pressures.
- B. Moisture Control
 - 1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly:

- a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall.
- b. Air Leakage Prevention – Provide continuity of the air barrier system at foundation, roof, windows, doors, and other penetrations through the wall with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
- c. Vapor Diffusion and Condensation – Perform a dew point analysis and/or dynamic hygrothermal modeling of the wall assembly to determine the potential for accumulation of moisture in the wall assembly by diffusion. Adjust insulation thickness and/or other wall assembly components accordingly to minimize risk. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

C. Impact Resistance

1. Provide ultra-high impact resistance of the EIFS to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Indicate the areas with impact resistance other than "Standard" on contract drawings.

D. Color Selection

1. Select finish coat with a light reflectance value of 20 or greater. (The use of dark colors is not recommended over expanded polystyrene [EPS]. EPS has a service temperature limitation of approximately 165°F [74°C]).

E. Joints

1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS where they exist in the substrate or supporting construction, where the cladding adjoins dissimilar construction or materials, at changes in building height, at expansion, control, and cold joints in construction. Size joints to correspond with anticipated movement. Align terminating edges of EIFS with joint edges of through wall expansion joints and similar joints in construction. Refer to manufacturer's details.
2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (doors, mechanical, electrical, and plumbing penetrations, etc.).
3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning.
4. Provide joints so that air barrier continuity is maintained across the joint, and drain joints to the exterior, or provide other means to prevent or control water infiltration at joints.

F. Grade Condition

1. Do not specify or install EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 6 inch (152 mm) clearance above grade or as required by code.

G. Trim, Projecting Architectural Features and Reveals

1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All reveals must have minimum ¾ inch (19 mm) insulation thickness at the bottom of the reveal. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS finish on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate and minimize maintenance. Refer to manufacturer's details.
2. Do not use the EIFS on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Detail 52s.60A; or approved equal.

H. Insulation Thickness (refer to the construction documents for thickness).

1. Minimum EPS insulation thickness is 1 inch (25 mm).
2. Maximum EPS insulation thickness is 12 inches (305 mm), except as noted below for fire-resistance rated wall assemblies.

I. Fire Protection

1. Do not use EPS foam plastic in excess of 12 inches (305 mm) thick on types I, II, III, or IV construction unless approved by the code official.
2. Where a fire-resistance rating is required by code use the EIFS over a rated concrete masonry assembly. Maximum allowable EPS thickness: 4 inches (102 mm).
3. Refer to manufacturer's testing or applicable code compliance report for other limitations that may apply.

1.6 PERFORMANCE REQUIREMENTS

- A. Comply with ASTM E 2570 (Air/Moisture Barrier) and ASTM E 2568 (EIFS):

Table 1 - Air/Moisture Barrier Performance

TEST	METHOD	CRITERIA	RESULT
1. Weathering	AATCC 127 (Water Column)	No cracking, bond failure or water penetration after 210 hours UV exposure, 25 wet/dry cycles, and 21.6 in (55 cm) water column	Pass
2. Durability	ASTM E 1233 / ASTM E72/ ASTM E 331	No cracking or water penetration at sheathing joints after 10 cycles transverse loading, 1 cycle racking, 5 cycles environmental conditioning, and 15 minute water spray at 2.86 psf (137 kPa) pressure differential	No cracking or water penetration
3. Water Resistance	ASTM D 2247	Absence of deleterious effects after 14 day exposure	No deleterious effects
4. Water Vapor Transmission	ASTM E 96 Method B (Water Method)	Measure	Sto Gold Fill®: 7.10 perms [408 ng/(Pa·s·m ²)] Sto Gold Coat: > 10 perms [574 ng/(Pa·s·m ²)] Sto AirSeal: > 12 perms [689 ng/(Pa·s·m ²)]
5. Air Leakage (material)	ASTM E 2178	< 0.004 cfm/ft ² at 1.57 psf (0.02 L/s·m ² at 75 Pa)	Pass
6. Air Leakage (assembly)	ASTM E 2357	< 0.04 cfm/ft ² (0.2 L/s·m ²)	Pass ¹
7. Freeze-Thaw	ASTM E 2485	No delamination or surface changes after 10 cycles when viewed under 5X magnification	No delamination or surface changes
8. Surface Burning	ASTM E 84	Flame Spread less than or equal to 25 Smoke developed less than or equal to 450	Flame Spread: < 25 Smoke Density: < 450
9. Tensile Bond	ASTM C 297	Greater than 15 psi (103 kPa)	Pass over Plywood, OSB, GlassMat Faced Gypsum sheathing, CMU

1. Based on testing of air barrier joint treatment material at sheathing joints and no top coat

Table 2 - EIFS Weather Resistance and Durability Performance*

TEST	METHOD	CRITERIA	RESULTS
1. Accelerated Weathering	ASTM G 153 ASTM G 155	No deleterious effects* at 2000 hours	Pass (Stolit) Pass (Stolit X)
2. Freeze/Thaw Resistance	ASTM E 2485	No deleterious effects* at 10 cycles when viewed under 5x magnification	Pass
3. Water Penetration	ASTM E 331 (modified per ICC-ES AC 235)	No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes at 6.24 psf (299 Pa)	Pass
4. Drainage Efficiency	ASTM E 2273	90% minimum	> 90%
5. Tensile Adhesion	ASTM E 2134	Minimum 15 psi (103kPa) tensile strength	Pass
6. Water Resistance	ASTM D 2247	No deleterious effects* at 14 day exposure	Pass @ 28 days
7. Salt Spray	ASTM B 117	No deleterious effects* at 300 hours	Pass @ 300 hrs
8. Abrasion Resistance	ASTM D 968	No cracking or loss of film integrity at 528 quarts (500 L) of sand	Pass @ 528 quarts (1000 L) (Stolit)
9. Mildew Resistance	ASTM D 3273	No growth supported during 28 day exposure period	Pass @ 28 days (Stolit)
10. Impact Resistance	ASTM E 2486	Standard: 25-49 in-lbs (2.83-5.54J) Medium2: 50-89 in-lbs (5.65-10.1J) High: 90-150 in-lbs (10.2-17J) Ultra-High: >150 in-lbs (>17J)	Pass with one layer Sto Mesh Pass with two layers Sto Mesh Pass with one layer Sto Intermediate Mesh Pass with one layer Sto Armor Mat and one layer Sto Mesh

* No deleterious effects: no cracking, checking, crazing, erosion, rusting, blistering, peeling or delamination

Table 3 - Air/Moisture Barrier and EIFS Fire Performance

TEST	METHOD	CRITERIA	RESULT
1. Fire Endurance	ASTM E 119	Maintain fire resistance of existing rated assembly	Pass (4 inch [102 mm] maximum allowable insulation thickness)
2. Intermediate Scale MultiStory Fire Test	NFPA 285 (formerly UBC Standard 26-9)	1. Resistance to vertical spread of flame within the core of the panel from one story to the next 2. Resistance to flame propagation over the exterior surface 3. Resistance to vertical spread of flame over the interior surface from one story to the next 4. Resistance to significant lateral spread of flame from the compartment of fire origin to adjacent spaces	Pass with 12 inches (305 mm) insulation
3. Radiant Heat Ignition	NFPA 268	No ignition @ 20 minutes	Pass with 1 and 12 inches (25 and 305 mm) insulation
4. Surface Burning (individual components)	ASTM E 84	Individual components shall each have a flame spread of 25 or less, and smoke developed of 450 or less	Flame Spread: < 25 Smoke Developed: < 450

Table 4 - EIFS Component Performance

TEST	METHOD	CRITERIA	RESULT
1. Alkali Resistance of Reinforcing Mesh	ASTM E 2098	Greater than 120 pli (21 dN/cm) retained tensile strength	Pass
2. Requirements for Rigid PVC Accessories	ASTM D 1784	Meets cell classification 13244C	Pass

1.7 QUALITY ASSURANCE

A. Manufacturer Requirements:

1. Member in good standing of the EIFS Industry Members Association (EIMA).
2. Air/moisture barrier and EIFS manufacturer for a recommended minimum of thirty (30) years.
3. Manufacturing facilities ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System.

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B. Contractor Requirements

1. Engaged in application of similar systems for a recommended minimum of three (3) years.
2. Knowledgeable in the proper use and handling of materials.
3. Employ skilled mechanics who are experienced and knowledgeable in air/moisture barrier and EIFS application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with the manufacturer's published specifications and details and the project plans and specifications.

C. Insulation Board Manufacturer Requirements

1. EPS board listed by an approved agency.
2. EPS board manufactured under Sto licensing agreement and recognized by the manufacturer as being capable of producing EPS insulation board to meet EIFS requirements.
3. EPS board labeled with information required by the manufacturer, the approved listing agency, and the applicable building code.

D. Mock-up Testing

1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, ASTM E 331 and ASTM E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.

E. Inspections:

1. Provide independent third party inspection where required by code or contract documents.
2. Conduct inspections in accordance with code requirements and contract documents.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

- B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
- C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.9 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24 hours after application of Air/Moisture barrier and EIFS products.
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of products.

1.10 COORDINATION/SCHEDULING

- A. Provide site grading such that the EIFS terminates above grade a minimum of 6 inches (150 mm) or as required by code.
- B. Coordinate installation of foundation parging, roofing membrane coping, doors and other wall penetrations to provide a continuously connected air and moisture barrier.
- C. Provide protection of rough openings before installing doors, and other penetrations through the wall.
- D. Install door head flashing immediately after doors are installed.
- E. Install diverter flashing wherever water can enter the wall assembly to direct water to the exterior.
- F. Install splices or tie-ins from air/moisture barrier over back leg of flashings, starter tracks, and similar details to form a shingle lap that directs incidental water to the exterior.
- G. Install coping and sealant immediately after installation of the the EIFS when coatings are dry, and such that, where sealant is applied against the EIFS surface, it is applied against the base coat or primed base coat surface.
- H. Schedule work such that air/moisture barrier is exposed to weather no longer than 30 days if Sto Gold Coat, or approved equal, is used, 90 days if Sto AirSeal, or approved equal, is used.
- I. Attach penetrations through the EIFS to structural support and provide water tight seal at penetrations.

1.11 WARRANTY

- A. Provide manufacturer's standard **twelve (12) year** Limited Warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide Air/Moisture Barrier and EIFS coatings and accessories from single source manufacturer or approved supplier.
- B. Basis of Design Manufacturer:
 - 1. Sto Corp. – Air/Moisture Barrier, EIFS; or approved equal.
 - 2. Plastic Components, Inc. – EIFS Accessories; or approved equal.
- C. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
 - 1. Dryvit Systems, Inc.
 - 2. Master Wall Inc.
 - 3. Senergy - BASF Wall Systems.
 - 4. Or approved equal.

2.2 AIR/MOISTURE BARRIER

- A. StoGuard®, or approved equal:
 - 1. Joint Treatment, Rough Opening Protection, and Detail Components:
 - a. StoGuard RapidSeal™; or approved equal – one component rapid drying gun-applied rough opening protection for frame and CMU walls without mesh or fabric reinforcement. Also use as a joint treatment for sheathing when used with StoGuard Mesh, or approved equal. Also used to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard, or approved equal, air barrier materials.
 - 2. Waterproof Coating:
 - a. Sto AirSeal™, or approved equal - ready mixed medium-high build waterproof coating for concrete masonry.
 - 3. Transition Membrane: StoGuard Transition Membrane, or approved equal – flexible air barrier membrane for continuity at transitions such as sheathing to foundation, dissimilar materials, wall to balcony floor slab or ceiling, flashing shingle lap transitions, floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.

2.3 ADHESIVE

- A. Sto TurboStick™; or approved equal – one component polyurethane spray foam adhesive.

2.4 INSULATION BOARD

- A. Sto EPS Insulation Board, or approved equal: nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E 2430 and ASTM C 578 Type I requirements and listed, labeled, and furnished in accordance with Section 1.7C.

2.5 BASE COAT

- A. Cementitious Base Coat
 - 1. Sto BTS Plus, or approved equal – factory blended one component polymer modified portland cement based high build base coat. Also used as a leveler for concrete and masonry surfaces.
- B. Non-cementitious Base Coat
 - 1. Sto RFP, or approved equal – ready mixed acrylic based plaster base coat material.
- C. Waterproof Base Coat
 - 1. Sto Flexyl, or approved equal – Fiber reinforced acrylic based waterproof base coat mixed with portland cement (for use as a waterproof base coat over Sto BTS Plus or BTS Xtra, or approved equal, for foundations, parapets, splash areas, trim and other projecting architectural features).

2.6 REINFORCING MESHES

- A. Standard Mesh
 - 1. Sto Mesh, or approved equal – Nominal 4.5 oz/yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto, or approved equal, materials (achieves Standard Impact Classification).
- B. Ultra-High Impact Mesh
 - 1. Sto Armor Mat, or approved equal – Nominal 15 oz/yd² (509 g/m²), ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating for compatibility with Sto, or approved equal, materials (recommended to a minimum height of 6'-0" [1.8m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Achieves Ultra-High Impact Classification when applied beneath Sto Mesh, or approved equal).
- D. Specialty Meshes
 - 1. Sto Detail Mesh, or approved equal – Nominal 4.2 oz/yd² (143 g/m²), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto, or approved equal, materials (used for standard back wrapping, aesthetic detailing, and reinforcement of sheathing joints and protection of rough openings with trowel applied air/moisture barrier).

2.7 PRIMER

- A. StoPrime Sand, or approved equal – Acrylic based tintable primer with sand for roller application.

2.8 FINISH COAT

- A. Stolit®, or approved equal – Acrylic based textured wall finish with graded marble aggregate.

2.9 JOB MIXED INGREDIENTS

- A. Water – Clean and potable.
- B. Portland cement – Type I, Type II, or Type I-II in conformance with ASTM C 150.

2.10 ACCESSORIES

- A. Starter Track – Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc.; or approved equal.
- B. Sto-Mesh Corner Bead Standard, or approved equal – One component PVC (polyvinyl chloride) accessory with integral reinforcing mesh for outside corner reinforcement; or approved equal.
- C. Sto Drip Edge Profile, or approved equal - One component PVC (polyvinyl chloride) accessory with integral reinforcing mesh that creates a drip edge and plaster return; or approved equal.

2.11 MIXING

- A. Sto Gold Fill, or approved equal – Mix with a clean, rust-free high speed mixer to a uniform consistency.
- B. Sto Gold Coat, or approved equal – mix with a clean, rust-free high speed mixer to a uniform consistency.
- C. Sto AirSeal, or approved equal – mix with a clean, rust-free high speed mixer to a uniform consistency.
- D. Sto BTS Plus, or approved equal – mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 47 pound (21.3 kg) bag of Sto BTS Plus, or approved equal. Pour water into a clean mixing pail. Add Sto BTS Plus, or approved equal, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Plus, or approved equal, or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum water amount in mix ratio.
- E. Sto BTS Xtra, or approved equal – mix ratio with water: 4.75- 5 quarts (4.5-4.7 L) of clean potable water per 38 pound (17.2 kg) bag of Sto BTS Xtra, or approved equal. Pour water into a clean mixing pail. Add Sto BTS Xtra, or approved equal, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS

Xtra, or approved equal, or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum amount of water in mix ratio.

- F. Sto Flexyl, or approved equal – mix ratio with portland cement: 1:1 ratio by weight. Pour Sto Flexyl, or approved equal, into a clean mixing pail. Add portland cement, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary with additional Sto Flexyl, or approved equal, and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.
- G. Sto Watertight Coat, or approved equal – pour liquid component into a clean mixing pail. Add dry component, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.
- H. Sto primer, or approved equal – mix with a clean, rust-free high speed mixer to a uniform consistency.
- I. Stolit, or approved equal – mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- J. Mix only as much material as can readily be used.
- K. Do not use anti-freeze compounds or other additives.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (paragraph 1.06 B).

3.2 EXAMINATION

- A. Inspect masonry substrate prior to start of application for:
 - 1. Contamination—algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
 - 2. Surface absorption and chalkiness.
 - 3. Cracks—measure crack width and record location of cracks
 - 4. Damage and deterioration such as voids, honeycombs and spalls
 - 5. Moisture content and moisture damage—use a moisture meter to determine if the surface is dry enough to receive the products and record any areas of moisture damage.
 - 6. Compliance with specification tolerances—record areas that are out of tolerance (greater than ¼ inch in 8-0 feet [6mm in 2438 mm] deviation in plane).
- B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the General Contractor. Do not start work until deviations are corrected.

3.3 SURFACE PREPARATION

- A. Remove surface contaminants on concrete masonry surface.
- B. Repair cracks, spalls or damage in concrete masonry surfaces and level masonry surfaces to comply with required tolerances.
- C. Apply conditioner (consult Sto) by spray or roller to chalking or excessively absorptive surfaces or pressure wash to remove surface chalkiness.
- D. Remove fasteners that are not anchored into supporting construction and seal holes with air barrier material.
- E. Seal over-driven fasteners with air barrier material and install additional fasteners as needed to comply with fastener spacing requirement.
- F. Fill large gaps between sheathing or voids around pipe, conduit, scupper, and similar penetrations with spray foam and shave flush with surface (refer to Sto Details, or approved equal).

3.4 INSTALLATION

3.4.1 Air/Moisture Barrier Installation over Existing Masonry Wall Construction

- A. Transition Detailing with StoGuard Transition Membrane, or approved equal:
 - 1. At floor line deflection joints up to 1 inch (25 mm) wide, and static joints and transitions such as dissimilar materials flashing shingle-lap transitions:
 - a. Apply waterproof coating (Sto Gold Coat or Sto AirSeal, or approved equal) liberally to properly prepared surfaces with brush, roller, or spray.
 - b. Place pre-cut lengths of StoGuard Transition Membrane, or approved equal, centered over the transition in the wet coating. At changes in plane crease the membrane and similarly place the membrane material in the wet coating. At floor line deflection joints achieve a slightly concave profile (recessed into the joint) of the membrane.
 - c. Immediately top coat the membrane with additional coating and apply pressure with brush or roller to fully embed the membrane in the coating and achieve a smooth and wrinkle-free surface without gaps or voids.
 - d. Apply coating liberally along all top horizontal edges on walls and along all edges on balcony floor slabs to fully seal the edges.
 - e. Overlap minimum 2 inches (51 mm) at ends and adhere lap seams together with coating. Shingle lap vertical seams and vertical to horizontal intersections with minimum 2 inch (51 mm) overlap.
 - 2. At movement joints up to 1 inch (25 mm) wide with up to + 50% movement such as masonry control joints, and through wall joints in masonry construction:
 - a. Insert backer rod sized to friction fit in the joint (diameter 25% greater than joint width).
 - b. Recess the backer rod ½ inch (13 mm).
 - c. Apply the waterproof coating liberally to properly prepared surfaces with brush,

- roller, or spray along the outer surface on each side of the joint (not in the joint).
 - d. Immediately place the membrane by looping it into the joint against the backer rod surface to provide slack.
 - e. Embed the membrane in the wet coating along the outer surface on the sides of the joint by top coating with additional coating material and applying pressure with a brush or roller.
 - 3. For all applications, after the membrane installation is complete and the waterproof coating is dry:
 - a. Apply a final liberal coat of the waterproof coating to all top horizontal edges on walls to ensure waterproofing integrity.
 - b. Inspect the installed membrane for fish mouths, wrinkles, gaps, holes or other deficiencies. Correct fish mouths or wrinkles by cutting, then embedding the area with additional coating applied under and over the membrane.
 - 4. Seal gaps, holes, and complex geometries at three dimensional corners with StoGuard, RapidFill, StoGuard RapidSeal, or approved equal.
- B. Transition Detailing with StoGuard RapidFill, or approved equal.
- 1. At flashing shingle laps, and through wall penetrations such as pipes, and electrical boxes:
 - a. Flashing leg or penetration flange must be seated flat against the wall surface without gaps. Apply StoGuard RapidFill, or approved equal, liberally with a caulking gun in a zig-zag pattern across the flashing leg or flange/wall surface seam and spread to a thickness that covers the flange and fastener penetrations and directs water away from the wall. Extend application minimum 1 inch (25 mm) onto both surfaces (flashing leg/flange and wall surface).
 - b. At through wall penetrations without flanges ensure the penetrating element (i.e., pipe) is fitted snug against abutting wall surfaces. Apply a fillet bead with a caulking gun around the penetration and tool against both surfaces (penetration and wall surface) to create a bead profile that directs water away from the penetration. Extend application minimum 1 inch (25 mm) onto both surfaces.
 - 2. Rough Opening Protection (For concrete masonry rough openings with wood bucks and similar openings with complex 3-dimensional geometry, select no. 3, StoGuard RapidSeal, or approved equal):
 - a. StoGuard RapidSeal, or approved equal: apply a generous bead of StoGuard RapidSeal, or approved equal with a caulking gun in a zig-zag pattern along the inside and outside surface of the rough opening. Spread with a 6 inch (152 mm) wide plastic drywall knife all the way around the opening (refer to Sto Details 20.20R and 21.20R, or approved equal)
 - 3. Sheathing Joint Treatment
 - a. Sto Gold Fill with StoGuard Mesh, or approved equal: place 4 inch (102 mm) wide mesh centered along sheathing joints and minimum 9 inch (229 mm) wide mesh centered and folded at inside and outside corners. Immediately apply Sto Gold Fill, or approved equal, by spray or trowel and spread with a trowel to create a smooth surface that completely covers the mesh.

4. Air/Moisture Barrier Coating Installation

a. CMU Surfaces:

- 1) Repair static cracks up to 1/2 inch (13 mm) wide with StoGuard RapidFill, or approved equal. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oilfree compressed air. Apply the crack filler with a trowel or putty knife over the crack and tool the surface smooth. (Note: For moving cracks or cracks larger than 1/2 inch [13mm]), consult with a structural engineer for repair method). Protect repair from weather until dry.
- 2) Liberally apply coating to the surface with a 3/4 inch nap roller or spray equipment to a wet thickness of 10-30 mils (Sto Gold Coat, or approved equal) or 20-40 wet mils (Sto AirSeal, or approved equal), depending on surface condition. Apply to a uniform thickness. Additional coats may be necessary to provide a void and pinhole free surface. Protect from weather until dry.

IMPORTANT: The Sto, or approved equal, coating functions as an air and moisture barrier on normal weight concrete masonry wall construction with flush (struck flush with the surface of the CMU) or concave joints when minimum two liberal coats are applied. Additional coats may be necessary depending on the condition of the CMU wall surface, CMU porosity, joint profile, and other variables that may exist. For "rough" CMU wall surfaces, skim coat the entire surface with one of Sto's cementitious levelers (Sto BTS Plus or Sto BTS Xtra, or approved equal) before application of coating. A VOID AND PINHOLE FREE SURFACE must be achieved for the coating to properly function as an air and moisture barrier on CMU wall surfaces.

5. Air /Moisture Barrier Connections and Shingle Laps

- a. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
- b. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
- c. Splice-in head flashings above doors, floor lines, roof flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

NOTE: Doors are typically installed immediately following installation of the air/moisture barrier and work should be sequenced accordingly. Consult with window manufacturer for installation requirements to maintain air barrier continuity and for head, jamb, sill flashing and perimeter sealant requirements needed to prevent leaks into the wall assembly.

3.4.2 EIFS INSTALLATION

A. Starter Track

1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.

2. Attach the starter track even with the line into structural supports with the proper fastener:
 - a. Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) and three thread penetration, galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration, and corrosion resistant concrete or masonry screws with minimum 1 inch (25 mm) penetration for concrete or CMU. Attach between studs into blocking as needed to secure the track flat against the wall surface. Attach at maximum 16 inches (406 mm) on center into framing. For solid concrete/masonry surfaces, attach directly at 12 inches (305 mm) on center maximum.
 3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut.
 4. Install Starter Track at other EIFS terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing (refer to Sto Details, or approved equal).
- B. Detail Splice Strips for Starter Track, Flashing at Head Doors
1. Starter Track Door Head Flashing, and Roof Parapet Wall Flashing: Install minimum 4 inch (100 mm) wide detail component over back flange of starter track, head flashing, and roof wall flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated sheathing. Make a smooth transition to the coated sheathing with a trowel, knife, or roller, depending on the detail component material being used. When Sto Gold Fill with StoGuard Mesh, or approved equal, is the detail component apply another coat of the waterproof coating over the detail area. Do not leave detail components exposed for more than 30 days.
- C. Backwrapping
1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2½ inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed. Alternatively, pre-wrap terminating edges of insulation board.
- NOTE: Backwrapping can be replaced by “pre-wrapping” terminating edges of insulation board with Sto Mesh or Sto Detail Mesh, or approved equal, embedded in the Sto base coat, or approved equal. This method is often preferred to facilitate installation in the field. This method may also be used in conjunction with flashing at the base of the wall, roof/wall intersections, floor lines, and similar terminations to replace the starter track.
- D. Adhesive Application and Installation of Insulation Board
1. Ensure the air/moisture barrier surface (Sto Gold Coat, or approved equal) is free of surface contamination. Install the insulation board within 30 days of the application of the

air/moisture barrier coating (Sto Gold Coat, or approved equal), or clean the surface and recoat with Sto Gold Coat, or approved equal.

2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. (Note: rasping prevents an outward bow at the Starter Track).
3. Use either polyurethane spray foam adhesive (Sto TurboStick, or approved equal) or cementitious adhesive (Sto BTS Plus or Sto BTS Xtra, or approved equal):
 - a. Polyurethane Spray Foam Adhesive (Sto TurboStick, or approved equal): apply adhesive to the back of the insulation board with the dispensing pistol approximately $\frac{3}{4}$ inch (19 mm) from ends. Apply 5 additional ribbons spaced equally at no greater than 7 inches (177 mm) apart between the end ribbons. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive ribbons approximately $\frac{1}{2}$ inch (51 mm) in diameter which will expand to $\frac{3}{4}$ – 1 inch (19 – 25 mm). Keep adhesive $\frac{1}{2}$ inch (51 mm) short of board edges. Apply adhesive uniformly so ribbons of adhesive do not converge. Allow adhesive to “dwell” and become “tacky” before placing boards on wall. Adhesive will look smooth, not jagged, when ready to apply to wall surface. Place boards while adhesive is “tacky” and before adhesive “skins”.

IMPORTANT: Adhesive tack time varies with temperature and humidity. High temperature or high humidity decreases tack time. Low temperature or low humidity increases tack time. Generally adhesive will remain tacky between 1-5 minutes. If adhesive “skins” remove it and apply fresh adhesive. Place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply light pressure when placing the boards. After boards have been in place for 5-10 minutes use a straight edge to lightly press the boards inward and keep board joints flush, as post expansion of the adhesive may force boards slightly outward.

- b. Cementitious Adhesive (Sto BTS Plus or Sto BTS Xtra, or approved equal): apply adhesive to the back of the insulation board with the proper size ($\frac{1}{2}$ x $\frac{1}{2}$ x 2 inch [13 x 13 x 51 mm]) stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. IMPORTANT: do not delay installation once adhesive is applied. If adhesive “skins” remove it and apply fresh adhesive.
4. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.
5. Butt all board joints tightly together to eliminate any thermal breaks. Care must be taken to prevent any adhesive from getting between the joints of the boards.

6. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.
 7. Check for satisfactory contact of the insulation board with the substrate. If any boards have loose areas use the spray foam adhesive dispensing pistol to create a hole through the board and inject adhesive to attach the loose area. Allow the adhesive to expand to the outer face of the board while withdrawing the pistol. Cut excess adhesive flush with the surface of the insulation. Do not use nails, screws, or any other type of non-thermal mechanical fastener.
- E. Slivering and Rasping of Insulation Board Surface
1. Make sure insulation boards are fully adhered to the substrate before proceeding to steps 3.4, E.2 and 3.4, E.3 below.
 2. Fill any open joints in the insulation board layer with slivers of insulation or the spray foam adhesive.
 3. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.
- F. Reveal Aesthetic Features
1. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
 2. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.
 3. Do not locate reveals/aesthetic grooves at high stress areas.
 4. Ensure minimum $\frac{3}{4}$ inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves.
- G. Completion of Backwrapping
1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.
- H. Accessory Installation
1. Corner Bead: cut the corner bead accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of $\frac{1}{8}$ inch (3 mm) to the outside corner area that will receive the accessory. Immediately place the accessory directly into the wet base coat material. Do not slide into place. Press the accessory into place. A corner trowel is best for this purpose. Embed and completely cover the mesh and PVC by troweling from the corner to the edge of the mesh so that

no mesh or PVC color is visible. Avoid excess build-up of base coat and feather along mesh edges. Adjoin separate pieces by abutting PVC to PVC and overlapping the mesh "tail" from one piece onto the next piece. Fully embed the accessory and mesh "tail" in base coat material. When installing field mesh reinforcement overlap accessory mesh and PVC. Remove any excess base coat from the outside corner.

NOTE: Install the corner bead accessory prior to the application of field mesh. If installing a multi-layer mesh system such as StoTherm ci high impact systems with Sto Armor Mat or Sto Armor Mat XX, or approved equal, install the corner bead accessory over the first layer of mesh and before the final layer of mesh is installed. For additional reinforcement at the corner the field mesh (paragraph 3.4.2 I5 below) may be wrapped around the corner and extend a minimum of 6 inches (152 mm) in one or both directions.

2. Drip Edge: install the drip edge accessory prior to application of field mesh (paragraph 3.4.2, I.5 below). Install with arrow on mesh pointing UP. Cut the accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of 1/8 inch (3 mm) to the area that will receive the accessory. Immediately place the accessory directly into the wet base coat material and press into place. Do not slide into place. Embed and completely cover the mesh and PVC by troweling from the drip edge screed rail to the edge of the mesh. Avoid excess build-up of base coat, feather along mesh edges, and remove any excess base coat from the drip edge nosing. Abut adjoining pieces and install as described above. When installing field mesh reinforcement overlap accessory mesh 4 inches (10 cm) on both vertical and horizontal faces so the PVC is overlapped, and remove any excess base coat from the drip edge nosing. On vertical and horizontal faces of the accessory install finish to the drip edge lines and remove any protruding finish from the drip edge nosing.

I. Base Coat and Reinforcing Mesh Application

1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly rasped before commencing the base coat application.
2. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.
3. Apply detail mesh at trim, and reveals. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
4. Ultra-High impact mesh application (recommended to a minimum height of 6'-0" [1.8 m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact, and where indicated on contract drawings): apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry.

5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High, or approved equal, impact mesh, or approved equal, with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2½ inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 6 inch (152 mm) overlap in each direction (optional if corner bead accessory is used – see NOTE to paragraph 3.4.2,H.1 above). Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible.
6. Sloped Surfaces: For reveals, and other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2½ inches (65 mm).
7. Allow base coat to thoroughly dry before applying primer or finish.

NOTE: All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the weather exposed sloped surface with waterproof base coat. Maximum insulation board thickness is 12 inches (305 mm), which includes architectural features. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS on sloped, weather exposed surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto Details, or approved equal. Refer to Sto Detail 10.61, or approved equal.

J. Primer Application:

1. Ensure the base coat surface is free of surface contamination before commencing the primer application.
2. Apply primer evenly with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

K. Finish Coat Application

1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application.
2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
 - a. Avoid application in direct sunlight.
 - b. Apply finish in a continuous application, and work to an architectural break in the wall.

- c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results. Cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
- d. Do not install separate batches of finish side-by-side.
- e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
- f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.5 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
- B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.6 CLEANING, REPAIR AND MAINTENANCE

- A. Clean and maintain the EIFS for a fresh appearance and to prevent water entry into and behind the system. Repair cracks, impact damage, spalls or delamination promptly.
- B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into or behind the EIFS and anywhere into the wall assembly.
- C. Refer to Sto reStore Repair, or approved equal, and Maintenance Guide (reStore Program) for detailed information on restoration – cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding

END OF SECTION 07241

12/28/12
CARLISLE Greater Egg 4250/54 Holt 12-28-12

GOLDEN SEAL TOTAL ROOFING SYSTEM WARRANTY

SERIAL NO. 10087317 REV.01

004

DATE OF ISSUE: December 28, 2012

BUILDING OWNER: GREATER EGG HARBOR REGIONAL SCHOOL DISTRICT
NAME OF BUILDING: ABSEGAMI HIGH SCHOOL - ROOF AREA 1 & 2 (GALLOWAY)
BUILDING ADDRESS: 201 S. WRANGLEBORO ROAD, SMITHVILLE, NJ
DATE OF COMPLETION OF THE CARLISLE TOTAL ROOFING SYSTEM: 10/17/2012
DATE OF ACCEPTANCE BY CARLISLE: 12/28/2012

CMD1117394

Carlisle Roofing Systems, Inc., warrants to the Building Owner (Owner) of the above described building, that; subject to the terms, conditions, and limitations stated in this warranty, Carlisle will repair any leak in the Carlisle Golden Seal™ Total Roofing System (Carlisle Total Roofing System) installed by a Carlisle Authorized Roofing applicator for a period of 20 years commencing with the date of Carlisle's acceptance of the Carlisle Total Roofing System installation. However, in no event shall Carlisle's obligations extend beyond 20.5 years subsequent to the date of substantial completion of the Carlisle Total Roofing System. See below for exact date of warranty expiration.

The Carlisle Total Roofing System is defined as the following Carlisle brand materials: Membrane, Flashings, Counterflashings, Adhesives and Sealants, Insulation, Recovery Board, Fasteners, Fastener Plates, Fastening Bars, Metal Edging, Metal Termination Bars, and any other Carlisle brand products utilized in this installation.

TERMS, CONDITIONS, LIMITATIONS

- Owner shall provide Carlisle with written notice within thirty (30) days of the discovery of any leak in the Carlisle Total Roofing System. Owner should send written notice of a leak to Carlisle's Warranty Services Department at the address set forth at the bottom of this warranty. By so notifying Carlisle, the Owner authorizes Carlisle or its designee to investigate the cause of the leak. Should the investigation reveal the cause of the leak to be outside the scope of this Warranty, investigation and repair costs for this service shall be paid by the Owner.
- If, upon inspection, Carlisle determines that the leak is caused by a defect in the Carlisle Total Roofing System's materials, or workmanship of the Carlisle Authorized Roofing Applicator in installing the same, Owner's remedies and Carlisle's liability shall be limited to Carlisle's repair of the leak.
- This warranty shall not be applicable if, upon Carlisle's inspection, Carlisle determines that any of the following has occurred:
 - The Carlisle Total Roofing System is damaged by natural disasters, including, but not limited to, lightning, fire, insect infestations, earthquake, tornado, hail, hurricanes, and winds of peak gust speeds of 90 mph or higher measured at 10 meters above ground; or
 - The Carlisle Total Roofing System is damaged by any intentional or negligent acts, accidents, misuse, abuse, vandalism, civil disobedience, or the like.
 - Deterioration or failure of building components, including, but not limited to, the roof substrate, walls, mortar, HVAC units, non-Carlisle brand metal work, etc., occurs and causes a leak, or otherwise damages the Carlisle Total Roofing System; or
 - Acids, oils, harmful chemicals and the like come in contact with the Carlisle Total Roofing System and cause a leak, or otherwise damage the Carlisle Total Roofing System.
 - The Carlisle Total Roofing System encounters leaks or is otherwise damaged by condensation resulting from any condition within the building that may generate moisture.
- This Warranty shall be null and void if any of the following shall occur:
 - If, after installation of the Carlisle Total Roofing System by a Carlisle Authorized Roofing Applicator there are any alterations or repairs made on or through the roof or objects such as, but not limited to, structures, fixtures, or utilities are placed upon or attached to the roof without first obtaining written authorization from Carlisle; or
 - Failure by the Owner to use reasonable care in maintaining the roof, said maintenance to include, but not be limited to, those items listed on Carlisle's Care & Maintenance Information sheet which accompanies this Warranty.
- Only Carlisle brand insulation products are covered by this warranty. Carlisle specifically disclaims liability, under any theory of law, for damages sustained by or caused by non-Carlisle brand insulation products.
- During the term of this Warranty, Carlisle shall have free access to the roof during regular business hours.
- Carlisle shall have no obligation under this Warranty while any bills for installation, supplies, service, and warranty charges have not been paid in full to the Carlisle Authorized Roofing Applicator, Carlisle, or material suppliers.
- Carlisle's failure at any time to enforce any of the terms or conditions stated herein shall not be construed to be a waiver of such provision.
- Carlisle shall not be responsible for the cleanliness or discoloration of the Carlisle Total Roofing System caused by environmental conditions including, but not limited to, dirt, pollutants, or biological agents.
- Carlisle shall have no liability under any theory of law for any claims, repairs, restoration, or other damages including, but not limited to, consequential or incidental damages relating, directly or indirectly, to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in the building or in the air, land, or water serving the building.
- This warranty is not assignable by operation of law or otherwise. Application may be made by a new building owner for reissuance of the warranty during the original warranty period. Certain procedures including, but not limited to, an inspection of the Roofing System by a Carlisle representative and fees will apply to any reissuance. Carlisle reserves the right, in its sole discretion, to refuse to reissue this warranty.

CARLISLE DOES NOT WARRANT PRODUCTS UTILIZED IN THIS INSTALLATION WHICH IT HAS NOT FURNISHED; AND SPECIFICALLY DISCLAIMS LIABILITY, UNDER ANY THEORY OF LAW, ARISING OUT OF THE INSTALLATION AND PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY CARLISLE.

THE REMEDIES STATED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES FOR FAILURE OF THE CARLISLE TOTAL ROOFING SYSTEM OR ITS COMPONENTS. THERE ARE NO WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHICH EXTEND BEYOND THE FACE HEREOF. CARLISLE SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGE TO THE BUILDING OR ITS CONTENTS UNDER ANY THEORY OF LAW.

*THIS WARRANTY SHALL NOT APPLICABLE IF, UPON CARLISLE'S INSPECTION, CARLISLE DETERMINES THAT THE CARLISLE TOTAL ROOFING SYSTEM IS DAMAGED BY WINDS OF PEAK GUST SPEED OF (90) OR HIGHER MEASURED AT 10 METERS ABOVE GROUND WITH RESPECT TO THE COMPONENTS OF THE SECUREDGE SYSTEMS.

BY: Robert H. McNeill
AUTHORIZED SIGNATURE 
TITLE: Director, Technical and Warranty Services
This Warranty Expires: December 27, 2032



SYNTEC SYSTEMS

Certificate of ANSI/SPRI ES-1 Compliance

Carlisle SynTec Incorporated hereby certifies that the Product(s) listed below have been tested in accordance with the protocols of the ANSI/SPRI ES-1 Roof Edge Standard, and that when installed as required by our provided instructions will meet the ES-1 standards for the listed project as prescribed by Section 1504.5 of the International Building Code. The Product(s) are UL Classified by Underwriters Laboratories, Inc. for compliance with ANSI/SPRI ES-1 Roof Edge Standard.

Project Name: ABSEGAMI HIGH SCHOOL - ROOF AREA 1 & 2 (GALLOWAY)

Building Location: 201 S. WRANGLEBORO ROAD, SMITHVILLE, NJ

Building Owner: GREATER EGG HARBOR REGIONAL SCHOOL DISTRICT

Completion Date: 10/17/2012

Installer: NOLT, D.A., INC.

Design Wind Speed: 90

Certificate Number: 10087317 REV.01

A handwritten signature in black ink, appearing to read "Paul W. ...", written over a horizontal line.

Authorized Signature for Carlisle SynTec Incorporated:

View

Greater Egg 4250/54 12-28-12 Kilt

CARLISLE

20-YEAR KYNAR® FINISH WARRANTY

SERIAL NO. 10087317 REV.01

DATE OF ISSUE: December 28, 2012

BUILDING OWNER: GREATER EGG HARBOR REGIONAL SCHOOL DISTRICT
NAME OF BUILDING: ABSEGAMI HIGH SCHOOL - ROOF AREA 1 & 2 (GALLOWAY)
BUILDING ADDRESS: 201 S. WRANGLEBORO ROAD, SMITHVILLE, NJ

DATE OF ACCEPTANCE BY CARLISLE: 12/28/2012

CMD1117394

Carlisle Roofing Systems, Inc., ("Carlisle") warrants to the building owner named above ("Owner") that the Carlisle brand metal cap with Kynar 500® finish ("Product") will be free from defects in material at the time of its delivery to the project site; and that if the Product is properly installed and maintained, it will not, under normal conditions, for a period of twenty (20) years from the date of delivery: (1) chip, peel, or crack; (2) change color by more than 5E units; or (3) chalk in excess of a rating of five (5) arrived at pursuant to ASTM D659-80. The term "free from defects in material" does not include industry recognized anomalies including, but not limited to, waviness present in the flat area of the Products due to inconsistency in the alloys, galvanizing process, light gauge metals, uneven substrates, installation and/or misalignment of support systems over which the Products are applied. Any such waviness cannot be the basis for a claim under this or any other Carlisle warranty under any theory of law whatsoever.

This warranty is subject to the following conditions:

1. This Warranty covers the Product as exposed to normal atmospheric conditions, and excludes coverage for corrosive or aggressive atmospheric conditions such as, but not limited to, chemical fume contamination or salt spray.
2. The Warranty does not cover damage caused by other trades or by materials substituted for, or used in addition to, the Product, or for failing to provide reasonable maintenance to the Product, or for improper installation.
3. This warranty extends only to Kynar 500® colors approved by Carlisle.
4. The Warranty expressly excludes any coverage for defect, damage or failure, which is caused by acts of God, falling objects, external forces, explosion, fire, riot, civic commotion, acts of war, vandalism, mishandling, or any occurrences beyond Carlisle's control.
5. This Warranty expressly excludes any coverage for Product failure caused by improper handling by the purchaser or Owner including, but not limited to, improper equipment fabrication, storage, transportation, erection, or placement, or failure to immediately remove strippable protective coating, and ferrous or non-ferrous shavings, which will rust or stain finish and may damage the Product.
6. In the event the Product is determined by Carlisle to be in need of repair within the terms, conditions and limitations herein, Carlisle shall have the option, in its absolute discretion, to either repaint or replace the effected Product.
7. It is understood and agreed that Carlisle's liability herein, whether in contract, in tort, under any warranty, in negligence or otherwise, shall not exceed the purchase price of the Product. Under no circumstances shall Carlisle be liable for special, direct, indirect, or consequential damages.
8. All claims under this warranty must be made to Carlisle in writing within thirty (30) days after the Owner discovers, or should have reasonably discovered, the subject defect, and Carlisle must be given a reasonable opportunity to inspect any material claimed to be defective.
9. This warranty will be effective only if normal maintenance and cleaning practices are followed in maintaining and cleaning dirt, salt accumulation, and other foreign matter from the coated metal. This warranty does not extend to or cover damage to the coating occasioned by moisture, condensation or other contamination resulting from improper storage, improper packaging, improper handling, improper shilling, improper processing and/or installation of any of the covered materials by parties other than a Carlisle Authorized Roofing Applicator or damages as a result of standing water in a non-vertical application.
10. This warranty shall be null and void if, in the sole judgment of Carlisle, any of the following shall occur:
 - (a) The product is not installed in strict accordance with Carlisle specifications and printed installation instructions.
 - (b) If, after installation of the Product, there are any alterations or repairs made to the system without first obtaining written approval from Carlisle, or,
 - (c) Failure of the Owner or lessee to use reasonable care in maintaining the Product, or
 - (d) The Owner fails to comply with every term or condition stated herein

11. During the term of this warranty, Carlisle, its agents or employees shall have free and reasonable access to the installed Product during regular business hours.
12. Carlisle shall have no obligation under this warranty until all bills for installation, supplies and service have been paid in full to the installing contractor, and to Carlisle.
13. Carlisle's failure at any time to enforce any of these terms or conditions stated herein shall not be construed to be a waiver of such provisions.
14. This warranty supersedes and is in lieu of any and all other express warranties that are in conflict with the terms and conditions stated herein.
15. Carlisle shall have no liability under any theory of law for any claims, repairs, restoration, or other damages including, but not limited to, consequential or incidental damages relating, directly or indirectly, to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in the building or in the air, land or water serving the building.
16. This warranty is not assignable by operation of law or otherwise. Application may be made by a new building owner for reissuance of the warranty during the original warranty period. Carlisle reserves the right, in its sole discretion, to refuse to reissue this warranty.

CARLISLE DOES NOT WARRANT PRODUCTS UTILIZED IN THIS INSTALLATION WHICH IT HAS NOT FURNISHED; AND SPECIFICALLY DISCLAIMS LIABILITY, UNDER ANY THEORY OF LAW, ARISING OUT OF THE INSTALLATION AND PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY CARLISLE.

THE REMEDIES STATED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES FOR FAILURE OF THE CARLISLE PRODUCT OR ITS COMPONENTS. THERE ARE NO WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHICH EXTEND BEYOND THE FACE HEREOF. CARLISLE SHALL NOT BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS OR DAMAGE TO THE BUILDING OR ITS CONTENTS UNDER ANY THEORY OF LAW.

Carlisle Roofing Systems, Inc.



Authorized Signature

Vision

Guatu Egg 4250/54

5yr. Maintain
Roof

D.A. NOLT, INC.

53 Cross Keys Road
Berlin, NJ 08009

COMMERCIAL ROOF WARRANTY

To: Greater Egg Harbor Regional High School District Name of Project: Absegami High School

1824 Dr. Dennis Foreman Drive

201 S. Wrangleboro Road

Mays Landing, NJ 08330

Galloway, NJ 08205

Date of Completion: November 16, 2012

Date of Expiration: November 15, 2017

TERM: five (5) YEARS

D.A. Nolt, Inc. (hereinafter "D.A. Nolt") hereby warrants, subject to the terms and conditions set forth herein, that for a period of 5 years from the date of completion, D.A. Nolt will, free of charge to the Owner, make repairs to leaks in the roof membrane and membrane flashing installed by D.A. Nolt resulting from defects in workmanship applied by or through D.A. Nolt. D.A. Nolt shall, within the warranty period and during normal working hours, inspect and furnish the labor and materials to repair leaks covered under this Warranty at no cost to the Owner.

This Warranty is made under and subject to the following terms and conditions:

1. In order for this Warranty to be effective, the Owner must first notify D.A. Nolt of any repairs required under this Warranty. Notice may be given orally, but in order to pursue any claim that DA Not has not honored this Warranty, notification of a leak must be given to D.A. Nolt in writing at the address shown above within five (5) days after a leak is experienced. D.A. Nolt shall make repairs as soon as practicable after notification.

2. This Warranty does not extend to conditions caused by, and D.A. Nolt shall not be responsible for, leaks caused by (1) abuse, misuse, lack of maintenance, accident or negligence in maintaining the roof by any person other than D.A. Nolt; (2) lightning, hail, windstorm, hurricane, earthquake, acid rain, thermal shock or ice storm or other acts of God; (3) other building components, including cracking, building movement, settlement, deflection of roof deck, deterioration of walls, water entry through masonry or other points other than the roof, and defects in the materials used as a base under the roof; (4) faulty vents, equipment supports, and other penetrations of the roof work and edge conditions, unless such work was performed by D.A. Nolt; (5) service to or maintenance of any roof top equipment or traffic of any nature on the roof; (6) acts or omissions of other trades or contractors; (7) movement of metal work; (8) ponding of water; (9) discharge of vegetable, mineral, animal oils, greases, solvents or chemicals, such as industrial wastes upon the roof surface; or (10) damage caused by birds or animals.

3. No work shall be done on said roof, including, but without limitation, openings made for flues, vents, drains, sign braces, railings, or other equipment fastened to or set on the roof, and no repairs or alterations shall be made to the roof, unless D.A. Nolt shall first be notified and be given the opportunity, at the expense of the Owner, to make the necessary roofing application thereto. Failure to observe this condition shall render this Warranty null and void with respect to any area of the roof affected thereby.

4. Nothing in this Warranty shall render D.A. Nolt liable in any respect for any damage to the Owner's building, or any components or contents thereof, or interruption of any business conducted in the building. Owner should inspect ceilings and overhangs periodically for signs of leakage.

**D.A. NOLT SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR
CONSEQUENTIAL DAMAGES.**

5. This Warranty is intended solely for the benefit of the Owner named above and is not transferable or assignable by the Owner without the express written consent of D.A. Nolt.

6. This Warranty shall not be effective unless D.A. Nolt has received full payment for installation, repairs, or service in connection with the roofing system covered by this Warranty. If D.A. Nolt is called upon to investigate a reported leak and the condition is determined not to be covered under this warranty, Owner will compensate D.A. Nolt for repairs, if any, and time expended by D.A. Nolt.

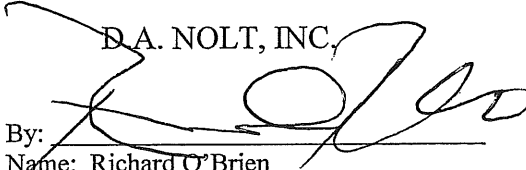
7. D.A. Nolt's obligation to make repairs to leaks resulting from a deficiency in workmanship during the term of this Warranty is its sole and exclusive obligation to Owner and Owner's exclusive remedy against D.A. Nolt. This warranty is not a maintenance contract. Upon expiration of the warranty, D.A. Nolt shall have no further obligations.

THIS WARRANTY IS GIVEN AND ACCEPTED IN LIEU OF ALL OTHER LIABILITY OR WARRANTIES ON THE PART OF D.A. NOLT EXPRESS OR IMPLIED, IN FACT OR IN LAW. ALL IMPLIED WARRANTIES AND SPECIFICALLY THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED AND DISCLAIMED.

8. Any claim alleging any breach of this Warranty or any other claim against D.A. Nolt shall be resolved through arbitration and must be initiated no later than one (1) year after expiration of this Warranty.

MEMBER

N.E.R.C.A.
Building Contractors Association of South Jersey
National Roofing Contractors Association
New Jersey Chapter, ABC Inc.
Southern New Jersey Chamber of Commerce

D.A. NOLT, INC.

By: _____
Name: Richard O'Brien
Title: Vice President

SECTION 07530 - REPAIRS TO SINGLE PLY EPDM ROOFING MEMBRANE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The extent of the all roofing repairs work to an existing warranted Carlisle roofing system, as shown on the drawings or as required to provide weather/water tight conditions.
- B. Existing System Type: Fully Adhered System.
- C. Section Includes:
 - 1. Substrate preparation;
 - 2. Flashings;
 - 3. All manufacturer's approved and /or recommended materials for repair work.
- D. Furnish all labor, materials and incidentals required to complete roofing repair work, flashing, and all other re-roofing components supplied by the roofing membrane manufacturer and as shown on the drawings and/or specified herein.

1.3 SUBMITTALS

- A. Product Data: Submit technical product information and installation instructions for each major roofing product or system required as necessary to demonstrate products comply with project requirements. Transmit a copy to the installer.
- B. Shop Drawings: Submit roofing membrane layout drawings showing outline of roof and roofing size, seam locations, specific roofing details illustrating relationships with adjacent construction, and flashing details at roof perimeter and roof penetrations.
 - 1. Shop drawings must be submitted to the roofing manufacturer and the Architect for review and obtaining approvals. The Architect shall not provide final review on shop drawings, unless manufacturer's review and stamped approval are indicated. Contractor to allow sufficient time required for shop drawings reviews.
 - 2. Shop drawings shall include, but not limited to the following:
 - a. Completely executed Notice of Awards roofing repair work from the roofing membrane manufacturer.
 - b. Outline of roof and size.
 - c. Roof deck type.
 - d. Roof slope and designated direction of slope.
 - e. Location and type of all penetrations.
 - f. Roof perimeter condition.
 - g. All roofing items which will be supplied by the roofing membrane manufacturer.

3. Submit installation diagrams and instructions for installation of roofing system.
- C. Submit Installer Certification that Installer is franchised and/or approved by the roofing material manufacturer for installation of a fully guaranteed roof.
 1. The installer certification shall be submitted on the manufacturer's letterhead.
- D. Certifications: The Contractor / Installer (grantor) shall submit certifications to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results.

1.4 QUALITY ASSURANCE

- A. Roofing and associated work must be performed by a single firm, called the "Installer" in this section, so that there will be undivided responsibility for the specified performance of all component parts, including the following:
 1. Elastic roofing and base flashing.
 2. Sealant.
- B. Installer: The roofing contract shall be carried out only by an installer who is franchised or otherwise accepted in writing by the roofing materials manufacturer for installation of a fully guaranteed roof in accordance with the manufacturer of the roofing membrane system requirements.
- C. Roofing Contractor: The roofing contractor shall have a recommended minimum of five (5) years experience in the installation of the specified roofing system, with roofing projects of magnitude equivalent to the required work. Foreman employed for this project must submit evidence of having been trained by the roofing manufacturer.
 1. Minimum experience: Not less than a recommended five (5) years experience with roofing projects of magnitude equivalent to the required work.
 2. Maintenance Proximity: Recommended location of not more than two hours normal travel time from Installer's maintenance plant to project site.
- D. Manufacturer of Roofing Materials: Obtain primary roofing materials from a single manufacturer, who has published complete information on the required roofing system, and offers to guarantee the completed roofing installation as required. Obtain secondary materials from sources acceptable to the manufacturer of the primary roofing materials.
 1. Manufacturer of Roofing System is further limited to one who will fulfill the following requirements:
 - a. Participates in a pre-roofing conference.
 - b. Shows a record of continued production of the specified materials for at least twenty (20) years.
 - c. Provides a list of executed projects in the State of New Jersey.
 - d. Provides complete manufacturer's produced printed manuals describing the roofing membrane and accessory materials, technical specifications, method of installation,

- including manufacturer's standard detailed drawings.
 - e. Furnishes guarantee as per Section 01900.
2. The roofing materials shall meet 1A-90 criteria as shown in Factory Mutual Loss Prevention Data Bulletin I-28.
 3. Inspection: Upon completion of the installation, an inspection shall be made by a technical representative of the roofing manufacturer to ascertain that the roofing system has been installed according to roofing manufacturer's latest published specifications and details.
 - a. There shall be no deviation made from this specification without prior written approval by the manufacturer and the Architect.
- E. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Architect for review and approval.
1. This Project must receive Architect's approval through this process prior to shipment of materials to the project site.
 2. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Owner.
 3. Any unusual conditions or requirements must be brought to the attention of the manufacturer of the roofing membrane system.
 4. When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawings which include outlining all modifications shall be submitted to the manufacturer for revisions and obtaining his approval.
- F. Final Inspection:
1. Approved Applicators must supply the roofing manufacturer with an As-Built shop drawing for final inspection.
 2. As-Built shop drawings must be approved and given a shop drawing number by the roofing manufacturer's construction materials department.
- G. Agreement to Maintain Roofing:
1. Provide Roofing subcontractor's agreement to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of approved substantial completion date and in accordance with special Maintenance Contract outlined herein.
 - a. During the Maintenance Period, the Roofing subcontractor agrees that within 24 hours of receipt of notice from the Owner he will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He further agrees that within a reasonable time, he will restore the affected items to the standard of the original specifications and without voiding the Manufacturer guarantee. All emergency and permanent work during the life of the

agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.

- b. Agreement to maintain roofing system shall be in a written form acceptable to the Architect/Owner and before final payment is released for the project..
- c. If, 48 hours after notification of roof leakage, Contractor has not responded, Owner shall have the right, without invalidating his warranties and at the expense of the Contractor, to make any emergency temporary repairs that are required in order to protect the building and its contents from damage due to roof leakage.

1.5 PROJECT CONDITIONS

- A. Begin roofing repairs work when weather conditions are within acceptable limits according to manufacturer's installation instructions.

1.6 PRODUCT HANDLING

- A. Deliver materials to project site in manufacturer's unopened sealed containers or unopened packages, with manufacturer's labels intact.
- B. Store materials in weather-protected environment, clear of ground and moisture.
 1. Storage of Materials will not be permitted on the roof, unless guaranteed, in writing, by the contractor, not to damage existing roofing.

1.7 JOB CONDITIONS

- A. Proceed with roofing work only after substrate and penetrating work and repair of any damage, have been completed.
- B. Pre-Roofing Installation Conference:
 1. Prior to the installation of the roofing and associated work, meet at the project site with the installer, the installer of each component of associated work, the Architect, and other representatives directly concerned with performance of the work including, the roofing membrane system manufacturer and the Owner.
 2. Provide Record of the discussions of the conference and the decisions and agreements (or disagreements) reached, and furnish a copy for the record, to each party attending.
 3. Provide at least 48 hours advance notice to participants prior to convening pre-roofing conference.
 4. Review foreseeable methods and procedures related to the roofing work, including but not limited to the following;
 - a. Review Project requirements (Drawings, Specification and other Contract Documents).
 - b. Review status of conditions and substrates (by the roofing installer), including extent of moisture penetration in existing work, drying and similar considerations.

- c. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - d. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
 - e. Review regulations concerning code compliance environmental protection, health, safety, fire and similar considerations.
 - f. Establish units of work, including scheduling removals, preparation and replacement, such that each unit may be completed prior to end of each day's work.
 - g. Review the schedule for the work.
- C. Weather Conditions: Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.
- D. Certification: The contractor/installer (guarantor) shall submit a certification to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results. In so doing, the Guarantor also agrees either that the materials and methods specified herein are such as to insure the result required or he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the contract documents.
- E. Conditions not as Anticipated: The contractor shall immediately notify the Architect of upon discovery of conditions which may jeopardize successful accomplishment of and prevent execution of the work as intended by the Architect, as provided in, or not anticipated by the contract.

1.8 PERFORMANCE REQUIREMENTS

- A. Initial Weather Resistance: It is required that the roofing and associated work be durable in normal weather exposure and not leak water. After completion of the roofing and associated work, and either during or immediately after a rain storm, (and before final acceptance of the work) the installer shall inspect the building for evidence of leaks in the roofing and associated work. Prepare a written report, within five (5) working days, covering the inspection, and submit to Owner (with a copy to the Architect).
- 1. The installer shall repair or replace roofing and associated work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.
 - 2. Abnormal weather is recognized to include hailstorms, lightning strikes, hurricanes and tornadic winds and other unusual phenomena of the weather as frequently covered by the buildings insurance.

PART 2 - PRODUCTS

2.1 MANUFACTURER / MATERIALS / REPAIR WORK

- A. Basis of Design: Provide all required roofing repairs materials and accessories by Carlisle Syntec Inc.. Products shall include but are not limited to the following:

FVHD-5369-5

2:07530-5

1. Splice Repairs:
 - a. Using a cotton rag or HP Splice Wipe, scrub the area in a circular motion until the surface is a consistent matte black color without any streaking.
 - b. Pull any loose edges of the splice apart, reapply splice adhesive and mate the two surfaces together.
 - c. Clean the splice area with Sure-Seal HP – 250 Primer on both sides extending past the width of the 6" cover strip.
 - d. Overlay the splice area with 6" wide Pressure-Sensitive Flashing, cover strip, or uncured Elastoform Flashing centered over the edge of the splice.
2. Flashing Repairs:
 - a. Flashing areas are to be cleaned using Weathered membrane Cleaner and then HP-250 Primer following the above instructions.
 - b. Flashings that are loose are to be re-secured.
 - c. Flashings are then to be overlaid with Pressure-Sensitive Elastoform.
3. All Components of the Roofing Repairs Work shall be products indicated in manufacturer's product data for indicated repairs work.
4. In Seam Sealant: Furnished by membrane manufacturer.
5. Splicing Tape: Furnished by the membrane manufacturer, 3" and 6" wide splicing tape for indicated applications and as per manufacturer's requirements for each indicated warranty.
6. Splicing Cement: Furnished by membrane manufacturer.
7. Lap Sealant: Compatible with existing and new materials with which it is used, shall be trowel or gun consistency furnished by membrane manufacturer.
8. Water Cut-Off Mastic: Compatible with materials with which it is used, furnished by membrane manufacturer.
9. Splice Cleaner or Primer: Furnished by membrane manufacturer.
10. Expansion Joints: Sure-Seal joint supports as indicated.
11. Reinforced Securement Strips: Manufacturer's standard 6 inch or 9 inch wide by 100 feet long reinforced membrane perimeter fastening strip.
 - a. Seam Fastening Plates: 2 inch diameter FM approved metal plates used in conjunction with reinforced securement strip.
12. MANUFACTURED FLASHING MATERIALS:
 - a. Manufacturer's standard in accordance with his detailed drawings and printed specifications and instructions for installation.
13. Thermal Barrier Board:
 - a. Basis of Design: "Securerock Gypsum-Fiber" Roof Board as manufactured by USG; or approved equal.
 - 1) Water-resistant and silicone-treated gypsum core board, UL 790 Class A listing

- as a barrier board, and tested in accordance with ASTM E-84;
- a) Flame Spread: 0
 - b) Smoke developed: 0
- 2) Board Size: 4' x 4'.
 - 3) Thickness (Uniform): Match existing.
 - 4) FM approved for Wind Uplift, tested for 60 and 90 psf.
 - 5) Stagger all joints with bottom layer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all work in conformance with the manufacturers printed specifications, as shown on approved shop drawings.
- B. Cautionary Requirements:
 1. Do not use oil base or plastic roof cement.
 2. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with EPDM roofing system.
 3. Do not expose membrane and accessories to a constant temperature in excess of 180°F.
 4. Cement and bonding adhesives contain petroleum distillates and are extremely flammable. Do not breath vapors or use near fire.
 5. Splice wash: Furnish by membrane manufacturer.
 6. Splicing and bonding surfaces shall be dry and clean.
 7. Roof surface shall be free of ponded water, ice, or snow to eliminate future condensation problems.
 8. Seal Splice Wash used in the splicing procedure is extremely flammable; do not use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.
- C. Delivery, Storage and Handling:
 1. Deliver materials in original unopened containers.
 2. Containers labeled with manufacturer's name, brand name, installations, instructions and identification of various items.
 3. Store materials, except membrane, between 60°F and 80°F. If exposed to lower temperature, restore to proper temperature before using.
 4. Store materials, except membrane in a dry area and protect. Do not install damaged material. Damaged materials shall be replaced at contractor's expense.

3.2 INSPECTION

- A. Installer must examine substrates and conditions under which roofing work is to be performed and must notify contractor in writing of unsatisfactory conditions. Do not proceed with roofing work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.3 PREPARATION OF SUBSTRATES

- A. Roof substrate shall be dry and free of foreign materials. Remove nails, nail heads and other protrusions from existing deck.
 - 1. Roof substrate shall be free of ponded water to eliminate future condensation problems.

3.4 INSTALLATION (GENERAL)

- A. Comply with instructions of the primary roofing materials manufacturer.
- B. Coordinate with all roof mounted items to facilitate roofing installation.
- C. Coordinate with the re-installation of all existing metal flashing.
- D. Confinement of Materials: Do not allow fluid and plastic to spill or migrate beyond surfaces of intended application.
 - 1. Contractor to clean all migrated materials exposed to view.
- E. Performance: It is required that roofing work be water-tight for normal weather exposure and not deteriorate in excess of normal weathering.
- F. Clean site of all debris and contractor materials; restore damaged site work, (i.e.; shrubs, turf, curbs, etc.) to conditions prior to start of this work.
- G. Install accessories as shown and as recommended by the prime materials manufacturer.
- H. Coordinate Roofing repairs with flashing and other adjoining work to ensure proper sequencing of entire work.

3.5 PROTECTION

- A. Contractor shall provide protection for roofing during construction period, so that the work will be without damage or deterioration except for normal weathering at time of acceptance.
- B. Daily Seal: Care should be exercised to ensure that water does not flow beneath any complete sections of roof. Temporarily seal loose edge of membrane when weather is threatening.

END OF SECTION 07530

SECTION 07600 - FLASHING, SHEET METAL AND ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pre-manufactured/pre-engineered coping systems.
 - 2. Miscellaneous sheet metal accessories.
- B. Related Sections:
 - 1. Wood nailers and blocking: Section 06100.
 - 2. Roofing Materials: Elsewhere in Division 7.
 - 3. Roofing Manufacturer's furnished metal: Section 07531.
 - 4. Joint Sealer Assemblies: Section 07900.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Requirements: Design and install work of this section, including attachment to the structure, to safely withstand dead, live and wind loads prescribed by the International Building Code.
- B. Environmental Requirements: Provide for expansion and contraction of system components due to air temperature and solar heat gain. Provide systems which will accommodate movement due to temperature change without buckling, failure of seals, undue stress on structural elements, reduction of performance, or other detrimental effects.
 - 1. Anticipated air temperature range: Minus 10°F to +105°F.

1.4 REFERENCES

- A. Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).
- B. ASTM B 32; Standard Specification for Solder Metal.
- C. ASTM B 209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. Aluminum Association, Design System for Aluminum Finishes (AA).
- E. American Architectural Manufacturers Association (AMMA), standards as referenced herein.
- F. ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roof Systems.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's specifications, standard details, and installation recommendations.
- B. Shop Drawings: Submit manufacturer's shop drawings showing material types, thickness, sizes, shapes, connections, layout, joining, profiles and anchorage of fabricated work and relation to adjacent work. edited product data or shop drawings, or a combination thereof, as required to accurately describe products to be provided. Show elevations, field measurements, reinforcement, expansion provisions, installation accessories, and detail sections of composite members. Draw layouts at scale of 1/4 inch per foot, details at scale of 3 inches per foot.
 - 1. **Provide shop drawings for, but not limited to, the following:**
 - a. Covering on minor flat, pitched or curved surfaces.
 - b. Parapet coping.
 - c. Base flashing and counterflashing.
 - d. Details of all joints for above.
 - 2. Sheet metal shop drawings shall be prepared to reflect SMACNA detail standards and in accordance with ANSI/SPRI ES-1 Test Protocols.
- C. Samples for Color Selection of Coated Finishes: Coating manufacturer's color selection data.
- D. Samples for Color Verification of Coated Finishes: For each type and color of coated finish submit 12-inch-long sections of extrusions and formed sections and 6-inch-square sheets.
- E. Pre-engineered fabricated and pre-finished sheet metal manufacturer's product literature, finish specification and sample finish warranty.
- F. Sheet metal fabricators and installers qualifications.

1.6 QUALITY ASSURANCE

- A. Listing - Roof Perimeter Flashing System: Provide system listed in Factory Mutual System's "Approval Guide," classified for Zone 2 (I-90 windstorm resistance).
- B. Fabricator / Installer: A firm having a recommended minimum of 5 years of successful experience in fabrication and installation of sheet metal work of type and scope equivalent, to work of this section.

NOTE: Metal Coping shop fabricated by Contractor is unacceptable and will not be approved by Architect. These metals shall be pre-engineered, fabricated and furnished by the roofing manufacturer and or approved manufacturers below.

- 1. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**
- C. Pre-engineered and Contractor: Fabricate and install sheet metal work in accordance with indicated reference standards.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials off ground, under cover. Protect from damage and deterioration.
- B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Damaged material shall be rejected and removed from the site.

1.8 WARRANTY

- A. Warrant coping work to be free of defects in materials and workmanship, to resist blow-off and to be leak tight, due to conditions within stated design limits.
- B. Warrant Fluoropolymer coating to remain free, under normal atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
 - 1. The Warranty period shall be **twenty (20) years** which starts the approved date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide pre-engineered manufactured products approved by the roofing system manufacturer(s) which may include but not limited to the following:
 - 1. Formed-Aluminum Gravel Stops, Metal Edging, Copings and Fascia:
 - a. Hickman: W.P. Hickman Co.,
 - b. Imetco, an ESOP Company.
 - c. Metal-Era, Inc.,
 - d. Southern Aluminum Finishing Co.,
 - e. or approved equal.

2.2 METALS

- A. Type "C"; Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
 - 1. Type "C-4"; Factory-Painted Aluminum Sheet: ASTM B 209, 3003-H14, with a minimum thickness of 0.040 inch, unless otherwise indicated.

2.3 COPING

- A. Provide pre-engineered manufactured exposed coping components fabricated from the following metal:
 - 1. Formed-aluminum sheet in thickness indicated. Refer to Architectural drawings for thickness / height requirement(s).

2. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**

2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. GENERAL REQUIREMENTS:

1. All miscellaneous materials, accessories or other items essential to the completion of sheet metal installation, though not specifically shown or specified, must be provided.
 2. All such items, unless otherwise indicated on drawings or specified herein, shall be applied using sheet metal gauges which conform to recognized industry standards of sheet metal practices and without additional cost to the Owner. For sheet metal and pre-manufactured units, provide type of solder, ASTM B23, and corrosion-resistant metal as recommended by the producer of the metal sheets for fabrication and installation.
 3. Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.
- B. Fasteners: Same metal as flashing/sheet metal, as indicated or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- C. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- D. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-00227, TT-S-00230, or TT-S-001543.
- F. Epoxy Seam Sealer: 2-part non-corrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- G. Paper Slip Sheet: 15-lb. rosin-sized building paper.
- H. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.

2.5 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
1. Seams (Metal other than Aluminum): Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 2. Seams (Aluminum): Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 3. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
 5. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
 6. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
 7. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
 - B. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.6 ALUMINUM FINISHES

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight;
 - a. Color: Match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence.
- B. Verify that substrates and openings are rigidly set, at proper lines and elevation, properly sized, and ready to receive units.
- C. Do not proceed with installation until conditions detrimental to proper installation have been corrected.
- D. Coordinate installation with roofing repair work and other adjacent elements of building envelope to ensure watertight construction.

3.2 PREPARATION

- A. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Isolate all dissimilar metals by means of a heavy bituminous coating, approved paint coating, adhered polyethylene sheet, or other means recommended by SMACNA.

3.3 INSTALLATION

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion in metal units. Set units true to line and level indicated. Install work with laps, joints, and seams permanently weatherproof and watertight.
- B. Sealed Joints: Form minimum 1-inch hooked joints and embed flange into sealant or adhesive. Form metal to completely conceal sealant or adhesive.
 - 1. Use joint adhesive for nonmoving joints specified not to be soldered.
 - 2. Moving Joints: When ambient temperature is moderate (40-70°F) at time of installation, set joined members for 50% movement either way. Adjust setting position of joined members proportionally for temperatures above 70°F. Do not install sealant at temperatures below 40°F. Refer to section on sealants elsewhere in Division 7 for handling and installation requirements for joint sealers.
- C. Workmanship: Install sheet metal work with lines, arises, and angles sharp and true. Exposed surfaces shall be free from visible waive, warp, buckle, and tool marks. Exposed edges shall be folded back neatly to form a 1/2-inch hem on the concealed side. Sheet metal exposed to the weather shall be watertight with provisions for expansion and contraction.
- D. Nailing: Nailing of sheet metal shall be confined generally to sheet metal having a maximum width of 18 inches. Nailing of flashings shall be confined to one edge only. Nails shall be evenly spaced not over 3 inches on centers and approximately 1/2-inch from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is

applied to other than wood surfaces, detailed shop drawings shall include locations for sleepers and nailing strips required to properly secure the work.

- E. Cleats: Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on centers unless otherwise specified or indicated. Unless otherwise specified, cleats shall be not less than 2 inches wide by 3 inches long, and of the same material and thickness as the sheet metal being installed. One end of the cleat shall be secured with two nails and the cleat folded back over the nailheads. The other end shall be folded back over the nailheads. The other end shall be locked into the seam. Cleats for soldered seams shall be pretinned.
- F. Bolts, Rivets and Screws: Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.
- G. Seams; General: Comply with SMACNA, Figures 3-2 & 3-3, Tables 2-1 & 3-1R, and other applicable designs to specific installation.
 - 1. Seams: straight and uniform in width and height with no solder showing on the face.
 - 2. Flat-lock Seams for All Non-Moving Seams; Finish not less than 3/4-inch wide.
 - 3. Loose-lock Expansion Seams: Not less than 3 inches wide, and shall provide minimum one-inch movement within the joint. Joint shall be completely filled with the specified sealant, applied at no less than 1/8 inch thick bed. Sealants are specified in Section 07900 - Joint Sealer Assemblies and shall be completely concealed.
 - 4. Flat Seams: Make seams in the direction of the flow.
- H. Soldering, Welding, and Mechanical Fastening: Where soldering is specified herein, it shall apply to copper and lead coated copper and galvanized metal items.
 - 1. Soldering: Cretin edges of sheet metals, except lead coated material, before soldering is begun. Soldering shall be done slowly with well heated soldering irons, so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead-coated material to be soldered shall be scraped or wire-brushes to produce a bright surface, and seams shall have a liberal amount of flux brushed in before soldering is begun.
- I. Cap Fascia Coping: Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Provide prefabricated mitered corners for internal and external corners.
 - 1. Conceal Splice Plates: 6" wide with vertical legs as required to match coping. Install a continuous bead of sealant on both sides of joint before installing coping to form a watertight gutter.
 - 2. Hook Strips: The lower edge of fascias shall be hooked at least 3/4 inch over a continuous hook strip of the same material bent outward at an angle of 45° to form a drip. Nail hook strip to a wood nailer at 6 inches maximum on centers.

3. Where fastening is made to concrete or masonry, screws spaced 12 inches o.c. shall be used and shall be driven in expansion shields set in the concrete or masonry. Where necessary, install hook strips over 1/16 inch thick compatible spacers or washers.
4. Mechanically fasten fascia at roof side with a stainless steel fastener with a neoprene washer at 2'-0" o.c.

3.4 PROTECTION FROM CONTACT OF DISSIMILAR MATERIAL

- A. Copper or Copper-Bearing Alloys: Surfaces in contact with dissimilar metal shall be painted with heavy bodied bituminous paint, or shall be separated by means of moisture-proof building felts.
- B. Aluminum: Surfaces shall not contact other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, the dissimilar metal shall be painted with a primer followed by two coats of aluminum paint.
- C. All Metal: Surfaces in contact with mortar, concrete, or other masonry materials shall be painted with alkali-resistant coatings such as heavy-bodied bituminous paint.
- D. Wood or Other Absorptive Materials: Surfaces that may become repeatedly wet and in contact with metal shall be painted with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.
- E. Dissimilar Metal: Paint with a non-lead pigmented paint if drainage from it passes over aluminum.
- F. All fasteners shall be compatible with the metal with which it is connected.

3.5 PROTECTION OF ROOFING

- A. Protection of Applied Insulation: Completely cover each day's installation with finished roofing specified. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing is applied. Storing, walking, wheeling, or trucking will not be permitted directly on insulation or on roofed surfaces. Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary to distribute weight to conform to indicated live load limits of roof construction.
- B. Upon completion of roofing work (including associated work) Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Installer shall make a final inspection of roofing and prepare a written report to Contractor with copy to Owner) describing nature and extend of deterioration or damage found in the work.
- C. Installer shall repair or replace (as required) deteriorated or defective work found at time of final inspection. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection.

- D. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

3.6 CLEAN-UP

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Upon completion of the specified work, remove all waste, debris, unused material and equipment from the site. Remove all misplaced material from nearby surfaces. Leave the job in a clean condition, acceptable to Owner.
- C. Advise Contractors of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION 07600

SECTION 07840 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Walls and partitions.
 - 2. Smoke barriers.
 - 3. Construction enclosing compartmentalized areas.
- B. Related Sections include the following:
 - 1. Section 04200 - Unit Masonry.
 - 2. Section 07200 - Building Insulation, for safing insulation and accessories.
 - 3. Division 7 Section "Sprayed Fire-Resistive Materials."
 - 4. Section 07900 - Joint Sealer Assemblies.
 - 5. Division 22/23 Sections specifying duct and piping penetrations and firestop systems to be performed by the Plumbing and HVAC work Subcontractors.
 - 6. Division 26 Sections specifying cable and conduit penetrations and firestop systems to be performed by the Electrical Subcontractor.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.

- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - 1. Penetrations located in construction containing fire-protection-rated openings.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architect and Owner, and other information specified.

- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Contractor's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Contractor's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PRODUCTS / MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application in the Through-Penetration Firestop System Schedule at the end of Part 3 and as shown on drawings and as produced by one of the following manufacturers:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hilti Construction Chemicals, Inc.
 - 2. Isolatek International.
 - 3. Nelson Firestop Products.
 - 4. 3M Fire Protection Products.
 - 5. Or approved equal.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multi component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as

possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: The Contractor will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
 1. Firestop Systems with No Penetrating Items: Comply with the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.

END OF SECTION 07840

SECTION 07900 - JOINT SEALER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Part 1 through Part 6 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealant assemblies for the following applications which include performances of materials, installation requirements, as indicated herein in this specification and as specified by cross references in other Parts 1 through 6 specification sections.
- B. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - 1. Joints in exterior insulation and finish systems.
 - 2. Joints between different materials.
 - 3. Perimeter joints between materials listed above and frames of curtainwall system and adjacent wall system, as applicable.
 - 4. Other joints, as indicated.
- C. Exterior joints in the following horizontal traffic surfaces:
 - 1. Control, expansion, and isolation joints in cast-in-place concrete slabs / sidewalk.
 - 2. Joints between different materials.
 - 3. Other joints as indicated.
- D. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - 1. Perimeter joints of exterior openings, where indicated.
 - 2. Vertical control joints on exposed surfaces of interior unit masonry walls and partitions.
 - a. Perimeter joints between interior wall surfaces and frames of interior doors, curtainwall system.
 - b. Other joints, as indicated.
 - 3. Interior joints in the following horizontal traffic surfaces:
 - a. Joints, as indicated.
- E. Preparation of all joints to be sealed.
- F. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - 1. Cutting out as needed to give proper depth.

2. Installation of proper back up material for each joint.
3. Cleaning to remove all dust, dirt, oil films, loose material etc.
4. Masking of adjacent surfaces.
5. Priming of joint surfaces.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Where fire rated joint assemblies are indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with the following requirements, tested by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
 1. Fire Testing: ASTM E 119/UL 263.
 2. Surface Burning Characteristics: ASTM E84/UL 723.
 - a. Flame Spread: 15
 - b. Smoke Developed: 0
 3. Through - Penetration Firestopping: ASTM E814/UL 1479.
 4. Fire Resistance of Building Joint Systems: UL 2079
- B. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Sealants: Not more than 250 g/L.
 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.
- C. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
 1. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
 2. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - a. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - b. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion

- to, and compatibility with, joint substrates and other materials matching those submitted.
- c. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
- (1) Locate test joints where indicated or, if not indicated, as directed by Architect.
 - (2) Conduct field tests for each application indicated below:
 - (a) Each type of elastomeric sealant and joint substrate indicated.
 - (b) Each type of nonelastomeric sealant and joint substrate indicated.
 - (3) Notify Architect seven days in advance of dates and times when test joints will be erected.
 - (4) Sealant Manufacturer Responsibility:
 - (a) Manufacturer shall provide Technical Representative to perform Sealant Joint Field Pull Test. Manufacturer Sales representative is not acceptable to perform Field Pull Test.
 - (b) Technical Representative performing Field Pull Test must be an employee of the Sealant Manufacturer. Outside Sales Agent or Contract Technical Representative is not acceptable to perform Field Pull Test.
 - (5) Test Method: Test joint sealants by hand-pull method described below:
 - (a) Install joint sealants in 60-inch long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
 - (b) Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - (c) Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - (d) For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
 - (6) Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - (7) Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
3. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
- a. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
 - b. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

4. PROJECT CONDITIONS

- a. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - (1) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - (2) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40°F.
 - (3) When joint substrates are wet.
- b. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- c. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

D. Special Project Warrantee and Guarantee:

1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
3. Guarantee shall further state that all exterior sealant will be guaranteed against:
 - a. Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
 - b. Any crazing greater than 3 mils in depth developing on surface of material.

1.4 SUBMITTALS

- A. Product Data from manufacturers for each joint sealer product required, including instructions for joint preparation and joint sealer application, include color samples showing full range of colors available, for each product exposed to view.
 1. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- B. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

- B. Store and handle materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.
 - 2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40°F (4.4°C).
 - 3. When joint substrates are wet due to rain, frost, condensation, or other causes.
- B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Architect from manufacturer's available full range of standard and optional colors.
- C. Grade of Sealant: For each application, provide the grade of sealant (nonsag, self-leveling, no track, knife grade, etc.) as recommended by the manufacturer for the particular condition of installation (location, joint shape, ambient temperature, and similar conditions) to achieve the best possible overall performance. Grades specified herein are for normal condition of installation.

2.2 MISCELLANEOUS MATERIALS

- A. Joint Primer/Sealer: Provide the type of joint primer/sealer recommended by the sealant manufacturer of the joint surfaces to be primed or sealed.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

- C. Sealant Backer Rod: Provide materials which are in compliance with ASTM D 1056; compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer.
1. Materials shall be capable of remaining resilient at temperatures down to minus 26°F.
- D. Joint Fillers:
1. Joint Fillers for Concrete Sidewalks: Provide Isomeric polymer foam, W.R. Meadows Sealtight Ceramar; or approved equal.
 - a. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - b. Closed-cell isomeric foam, flexible.
 - c. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
 - 1) "Expansion Joint", as manufactured by Construction Foam Products,
 - 2) Or approved equal.

2.3 SEALANTS

- A. **Sealant Type 1:** For all control and expansion joints in concrete sidewalks and slabs on grade, two-part, self leveling polyurethane traffic grade sealant, complying with, and ASTM C 920 and ASTM D 1850.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "NR-200 Urexpan"; Pecora Corporation.
 - b. "THC 900/901"; Tremco, an RPM Co.
 - c. "Sikaflex-2c SL"; Sika Corporation.
 - d. Or approved equal.
 2. Color to be selected by the Architect.
- B. **Sealant Type 6: Hybrid Sealants (Silyl-Terminated Polyether (STPE) Joint Sealants**
1. **STPE, S, NS, 50, NT:** Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - a. Uses: Interior and exterior horizontal and vertical joints of door and window perimeters, expansion and control joints, coping and coping to facade joints, EIFS and architectural panels, fiber cement panels, etc.
 - b. Products: Subject to compliance with requirements, provide one of the following:
 - 1) "DynaTrol® I-XL Hybrid" as manufactured by Pecora Corporation. Available in ten (10) colors.
 - 2) "DynaTrol® I-XL Hybrid FTH" as manufactured by Pecora Corporation. Field tintable, available in fifty (50) colors.
 - 3) Equivalent by Tremco, an RPM Co.
 - 4) Equivalent by Sika.
 - 5) Or approved equal.

2.4 FIRE RATED JOINTS

- A. Construction fire rated joint assemblies shall meet indicated fire rating performance requirements. Provide assemblies where required and as indicated on the drawings with the following components:
 - 1. Joint Filler: Subject to compliance with indicated requirements, provide one of the following:
 - a. "Ultra Block", as manufactured by Backer Rod Manufacturing,
 - b. "Cerablanket"; Tremco,
 - c. ThermaFiber
 - d. Or approved equal.
 - e. Provide fire rated joint filler in thickness and shape as required to fill joints.
 - 2. Joint Sealant: Subject to compliance with requirements, provide one of the following:
 - a. "Dynatrol II"; Pecora Corporation.
 - b. "Tremstop Acrylic"; Tremco, Inc, or "Trimstop IA, Intumescent Acrylic, Tremco, Inc.
 - c. "Sikaflex-2c NS"; Sika Corporation.
 - d. Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealers, with Installer present, compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer-performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
- B. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt; and frost.
- C. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
- D. Remove laitance and form release agents from concrete.
- E. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile; and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

- F. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.
- G. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- H. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint fillers.
 - 2. Do not stretch, twist, puncture, or tear joint fillers.
 - 3. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
- I. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.
- J. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.
- K. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

3.3 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

END OF SECTION 07900

SECTION 08110 - HOLLOW METALWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of hollow metalwork for frame is indicated and scheduled on drawings.
- B. Related Sections:
 - 1. Section 04200 - Masonry Work.
 - 2. Section 07900 - Joint Sealer Assemblies.
 - 3. Section 08211 - Wood Doors.
 - 4. Section 08700 - Finish Hardware.
 - 5. Section 09900 - Painting.

1.3 QUALITY ASSURANCE

- A. Provide frame complying with the following:
 - 1. Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
 - 2. American National Standard Institute:
 - a. ANSI Standards A156 Series for Hardware.
 - b. ANSI A115 Steel Door Preparation Standards.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated frame assembly that has been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction, (i.e., UL, Warnock Hersey).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel frame. Include details of frame type, conditions at opening, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of frame using same reference numbers for details and openings as those on contract drawings.

- C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square min., of each color and texture as selected for factory-finished frame.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Before shipping, label each frame with metal or plastic tags to show its location, size, door swing, and other pertinent information. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store frame at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering steel frame which may be incorporated in the work include; but are not limited to, the following:
 - 1. Steelcraft, a Division of Allegion.
 - 2. Republic Doors and Frames, a Division of Allegion.
 - 3. Ceco Door Products, a Division of Assa Abloy.
 - 4. Curries Company, a Division of Assa Abloy.
 - 5. Or approved equal.
- B. **Substitutions: Substitution of products will only be considered when the Contractor / Door Supplier have submitted, to the Architect, all appropriate documents and in the time frame as outlined in the requirements indicated in AIA A201 and Section 00800.**

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008 and ASTM A 568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

F. Shop Applied Paint:

1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, capable of passing a 100 hours salt spray and 250 hours humidity test in accordance with ASTM test methods B 117 and D 3322 and shall be suitable as a base for specified finish paints indicated in specification section 09900.

2.3 ACCESSORIES

- A. Inserts: For required anchorage into concrete work, furnish inserts of cast iron, malleable iron or 12 gauge steel hot-dip galvanized after fabrication.
- B. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled in, expansion bolt anchors.

2.4 FABRICATION, GENERAL

- A. Fabricate frame unit to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- B. Fabricate frame, concealed stiffeners, reinforcement, edge channels from either cold-rolled or hot-rolled steel (at fabricator's option).
- C. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- D. Finish Hardware Preparation: Prepare frame to receive finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.
- E. Reinforce frame to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- F. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.5 STANDARD STEEL FRAME

- A. Provide metal frame for wood door of type and style, as shown on drawings and schedule. Conceal fastenings, unless otherwise indicated.
 1. Fabricate frames of minimum 16-gauge cold-rolled furniture steel at interior locations and 14 gauge galvanized cold-rolled furniture steel at exterior locations.
 2. Fabricate frames with mitered and (face welded / full profile welded).

- B. Hardware reinforcing shall be as follows:
1. Frame is to be mortised reinforced, drilled and tapped in factory for all template mortise hardware, in accordance with "Approved" Finish Hardware Schedule and templates as provided by the Hardware Supplier. Where surface mounted hardware is to be applied, all frames shall have reinforcing plates.
 2. Reinforcement plates shall be as follows:
 - a. Hinge Preps:
 - 1) Masonry: For "F" Series: 7 gauge, minimum.
 - b. Strike Preps:
 - 1) Masonry: For "F" Series: 12 gauge, minimum.
 - c. Closure Reinforcement: All Series - 12 gauge, minimum.
 - d. Surface mounted hardware: All Series - 12 gauge, minimum.
 3. Base anchors for frame to be installed in masonry wall and partition assemblies, shall be adjustable type, shipped loose and to be 14 gauge, minimum.
 4. Jamb Anchors:
 - a. For "F" Series frame in masonry wall provide adjustable wire type anchors (0.156" dia.), or strap type anchors (16 gauge), provide quantities as follows:
 - 1) Frames up to 7'-6" in height: 3 per jamb.
 - 2) and one (1) adjustable base anchor per jamb.
 5. Reinforce heads and jambs where indicated on drawings with 10 gauge channel, continuously welded to frame.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install standard steel frame, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frame: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
- C. **Place frame prior to construction of enclosing walls and ceilings. Set frame accurately in position so that the head and jambs of the frame are square, plumb, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.**
- D. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
- E. Install fire-rated frame in accordance with NFPA Std. No. 80.

3.2 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

- B. Check and re-adjust operating Finish Hardware items, without causing any damage to frames. Provide complete work for frame, leave clean and in proper operating conditions.

END OF SECTION 08110

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SECTION 08211 - WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 01800 - Time of Completion and Liquidated Damages
 - 2. Section 04200 - Unit Masonry
 - 3. Section 08110 - Hollow Metalwork
 - 4. Section 08700 - Finish Hardware

1.2 SUMMARY

- A. Extent and location of type of flush wood door is indicated on drawings and in the door schedule.
- B. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive plained before veneering. Assembly of face veneer and crossband to core in accordance with WDMA.
 - 1. Solid core 20 min. labeled flush wood doors with solid hardwood edging.
- C. Shop-priming of wood doors is included in this Section.
- D. Factory-finishing of wood doors is included in this Section.
- E. Factory-prefitting to frames and factory-premachining for hardware for wood doors is included in this Section.

1.3 QUALITY ASSURANCE

- A. Construction per WDMA I.S. 1A - 11.
- B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM 2074-00 Fire Test (Category A Positive Pressure). For mineral core doors, provide composite blocking with improved screw holding capability as needed to eliminate through-bolting of hardware. They are to be labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction. Fire labels shall be affixed at the factory of the door manufacturer, and shall be from the Underwriter's or Warnock Hersey Testing Laboratories. Each label shall show the testing time of the label, and no approval will be given to "Construction Type" labels.
 - 1. All "Category A" doors shall have concealed intumescent seals.

- C. Door Construction Field Examination: Upon direction of the Architect, the Contractor may be instructed to destroy a randomly selected wood door or panel by sawing it in half, vertically and horizontally, to verify conformance of the contract requirements. If the door(s) do not meet the specifications, all of the doors delivered for the project will be rejected, and the doors shall be replaced at the Contractor's expense. Further door inspection, to insure conformity to specifications, shall also be at the expense of the Contractor.
1. All such delays as a result of the fabrication and delivery of non-compliant doors which vary from the processed shop drawing submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).

1.4 REFERENCE STANDARDS

- A. Comply with the applicable requirements of the following standards unless otherwise indicated.
1. Window & Door Manufacturers Association (WDMA)
 - a. I.S. 1A - 11 Architectural Wood Flush Doors (WDMA).
 - b. Standard Procedures and Recommendations for Factory Machining Flush Wood Doors for Hardware.
 2. American National Standards Institute
 - a. ANSI A115. W Series, Wood Door Hardware Standards.
 3. Underwriter's Laboratories, Inc. (UL)
 - a. UL 10C Fire Test
 4. American Society for Testing and Materials:
 - a. ASTM 2074-00 (Category A Positive Pressure) Fire Tests of Door Assemblies.

1.5 SUBMITTALS

- A. **The shop drawing submittal will not be reviewed by the Architect unless a complete shop drawing submittal (technical data, details of core and edge construction, location and extent of hardware blocking, fire ratings, factory finish samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly) are made as one complete submittal, by the Contractor, and will be returned to the Contractor if incomplete.**
1. **Subsequent delays as a result of an incomplete submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).**
- B. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
1. Include certifications as may be required to show compliance with specifications.
 2. **The door manufacturer's shop drawing literature which may include language for the substitution of door construction at the option of the manufacturer is not permitted. Doors which are switched will be rejected and all costs associated with the manufacturing of the door type(s) specified will be by the Contractor/Manufacturer.**

- C. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire rating, requirements for factory finishing and other pertinent data.
 - 1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets.
- D. Samples: Submit samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly, for the following:
 - 1. Doors for Transparent Finish: Flat samples illustrating finish and color of wood grain for each species of veneer and solid hardwood lumber required.
 - 2. Factory-Finished Doors: Type of factory finish required.
- E. Warranties and Certification Markings: Furnish with shop drawings:
 - 1. Door supplier must attest, in writing addressed to Architect, that the order has been placed in conformance with specification requirements in all respects.
 - 2. All doors shall carry a "Lifetime" guarantee, including rehang and finish for all door(s) which do not comply with the manufacturer's warranty.
 - 3. Copy of Warranty shall be given to the Architect and Owner prior to the completion of the project.
 - 4. All doors shall be factory marked, on the top of the door, showing the order number, item number on the order, size of finished door, material, and core construction, for future information should replacement of the door be necessary.
- F. The Wood Door Supplier shall provide a letter indicating all of the following:
 - 1. The wood door supplier has completely reviewed the contract documents (drawings, specifications and addenda) and has worked with the distributor in the preparation and submission of a complete shop drawing submittal to the Architect.
 - 2. The wood door supplier shall attest that the order has been placed in accordance with the contract document drawings, specifications and addenda,
 - 3. The wood doors ordered and delivered to the job site are in conformance with the requirements of the job and per the approved shop drawings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations in WDMA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.

- B. Protect all doors from damage and moisture under cover. Use wood blocking under horizontally stored doors. At no time will doors be allowed to come in contact with floor or water.
 - 1. The location where the doors are being stored on the job site shall be between 25 - 55% relative humidity. The Contractor shall forward independent certified testing that confirms compliance.
- C. All doors not finished at factory must be sealed on all surfaces within one (1) week after arrival at jobsite.
- D. Remove all damaged doors from jobsite prior to completion of project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Provide "Aspiro™ Series I Marshfield-Algoma™" wood doors as manufactured by Masonite Architectural; or approved equal.
 - 1. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
 - 2. Comparable products from other manufacturers will be considered if it can be clearly shown that their products are tested, equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect.
 - a. Eggers Industries; Architectural Flush Doors Division, a VT Industries company,
 - b. VT Industries, Architectural Wood Doors,
 - c. Or approved equal.
 - 3. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
 - 4. **Substitutions: Substitution of products will only be considered when the Contractor/ Door Supplier have submitted, to the Architect, all appropriate documents and in the time frame as outlined in the requirements indicated in AIA A201 and Section 00800.**

2.2 MATERIALS AND COMPONENTS

- A. General: Provide wood doors complying with applicable requirements of referenced standards for kinds and types of doors indicated and as specified.
- B. Solid Core Doors for Transparent Finish: Comply with the following requirements:

1. **At existing buildings, provide veneer faces to match the species of the existing veneer or as directed by the Architect.**
 2. Aesthetic Grade: Custom, with Grade A faces
 3. Species: Match existing.
 4. Cut: Match existing
 - a. Plain sliced red oak for transparent finish; CS-171, Type II.
 5. Match between Veneer Leaves: Match Existing.
 6. Assembly of Veneer Leaves on Door Faces: Match existing.
 7. Construction: Premium Construction Grade, SCLC-5 Bonded (5-ply, with no added urea-formaldehyde glues).
- C. Edges
1. Vertical stiles of same species to the face veneer, with a minimum of 1/4 inch solid hardwood after trimming.
 - a. Manufacturers standard construction with hardwood outer.
- D. Core: Structural Composite Lumber Core consisting of an engineered wood product that is made by fusing a network of wood strands together with a water-resistant adhesive to produce a strong, solid and stable product that has true structural properties with excellent screw holding properties and very high split resistance.
1. Core Edge Interface: Vertical and horizontal edges of solid core doors must be securely bonded to the core with waterproof glue containing no added urea formaldehyde resin.
- E. Fire-Rated Solid Core Doors
1. Faces and WDMA Grade: Provide species and grade to match doors in same area of building, unless otherwise indicated.
 2. Core Construction
 - a. 20 Min. Doors: Double Leaf - Structural Composite Lumber Core which utilizes an engineered hardwood strand board that is oriented and resin bonded to provide physical properties that equal or exceed solid lumber.
 3. Edge Construction
 - a. 20 Min. Doors: Double Leaf - Stiles to match face veneer, with minimum of 1/4 inch solid hardwood (after factory trimming).
 - 1) Manufacturers standard core construction with hardwood outer.
 - b. All "Category A" doors shall have concealed intumescent seals.

2.3 GENERAL FABRICATION REQUIREMENTS

- A. Fabricate wood doors to produce doors complying with following requirements.

- B. In sizes indicated for job-site fitting.
- C. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:
 - 1. Comply with tolerance requirements of WDMA for prefitting. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
 - 2. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory premachining.
 - 3. Pre-fit and pre-machine wood doors at factory. Machining shall be in accordance with necessary templates supplied by the Builders Hardware supplier, in accordance with the approved Finish Hardware Schedule for this project. Each door shall be machined for all necessary mortise hardware (ie, locks, hinges, closers, etc.) but face or thru bolt holes shall be done in the field, if such machining is not called for on templates, or is not normally machined at factory. No field preparation will be allowed.
 - 4. Sizing of single doors to be undersized for nominal 1/4 inch, with edges beveled on two edges, as required by the frame manufacturer. Pairs of doors will be undersized 3/16 inch to permit no more than 1/8 inch gap between door leaves. Beveling same as single doors. Door edges beveled 1/8 inch in 2 inch thickness of door.
 - 5. Door clearances are to be 1/8 inch at top and the bottom shall be a maximum of 1/2 inch, or as required by job condition or labeling requirements.
- D. Metal Astragal: Metal astragal as indicated on the drawings. Pairs of doors shall be equipped with formed steel edges where required for pairs of fire-rated doors.
- E. Factory Finish and Uniform Range of Veneers
 - 1. Prefinish wood doors at factory only. Match existing stain color.
 - 2. All face veneer shall have uniform range of colors, as specified by Architect, in selection of the range of color of the veneer.
 - 3. Pairs of doors are to have matching grain pattern and color.
 - 4. Comply with recommendations of WDMA for factory finishing of doors, including final sanding, immediately before application of finishing materials.
 - 5. Provide finish WDMA, #TR-6, transparent water-based stain and ultraviolet (UV) cured water based polyurethane sealer and topcoat material, color as selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors using finish hardware in accordance with approved hardware schedule. Protect doors from damage until completion of Project. Except where through bolting is required to meet Code for "A" or "B" label doors, install surface applied hardware on metal or wood doors using all thread screws inserted in pilot drilled holes filled with white acrylic glue.

- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's printed instructions and of referenced WDMA standard and indicated in the printed instructions provided by the manufacturer.
- C. Install fire-rated doors in corresponding fire-rated frame in accordance with requirements of NFPA No. 80.
- D. Job-Fit Doors: Align and fit doors in frame with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors.
 - 1. Machine doors for hardware. Seal cut surfaces after fitting and machining.
- E. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
 - 1. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.
 - 2. Prefit Doors: Fit to frame for uniform clearance at each edge.
- F. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.

3.2 ADJUSTING AND PROTECTION

- A. Operation: Rehang or replace doors which do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
 - 1. Protect doors, as recommended by door manufacturer, to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 08211

SECTION 08410 - ALUMINUM / FRP DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. The contractor shall furnish all labor, tools, equipment, and services required to install new doors, hardware, glazing, etc. In general, the work under this section includes the following:
 - 1. The furnishing and installation of doors, hardware, glazing and caulking, as required, for a complete installation including all necessary cleaning and adjustments.
- B. The following types of doors, panels and accessories are required:
 - 1. Fiberglass Reinforced Polyester (FRP) Doors.
 - 2. Fiberglass Reinforced Polyester (FRP) Panels.
 - 3. Glazing.
 - 4. Security Window Film.
 - 5. Hardware.
- C. Related Sections
 - 1. Section 08700 - Finish Hardware.
 - 2. Section 08800 - Glass and Glazing.
 - 3. Section 08870 - Security Window Film.
 - 4. Section 08900 - Curtain Wall System.

1.3 REFERENCES

- A. Fiberglass Reinforced Polyester (FRP) Flush Doors.
 - 1. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 2. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
 - 3. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 - 4. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 5. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 6. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
 - 7. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
 - 8. ASTM D 570 - Water Absorption of Plastics.
 - 9. ASTM D 638 - Tensile Properties of Plastics.
 - 10. ASTM D 790 - Flexural Properties of Non-reinforced and Reinforced Plastics and Electrical Insulating Materials.

11. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
12. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
13. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
14. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
15. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
16. ASTM D 5420 - Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
17. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
18. ASTM E 84 - Surface Burning Characteristics of Building Materials.
19. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
20. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
21. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
22. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
23. ASTM F 476 - Security of Swinging Door Assemblies.
24. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air blast loading.
25. NWWDA T.M. 7-90 - Cycle Slam Test Method
26. SFBC PA 201 - Impact Test Procedures.
27. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
28. SFBC 3603.2 (b) (5) - Forced Entry Resistance Test.

1.4 REFERENCES

- A. Heavy Wall Tube Aluminum-Framed Storefront Doors
 1. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 2. ASTM D 1667 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Form).
 3. ASTM D 2000 - Classification System for Rubber Products in Automotive Applications.
 4. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.

1.5 PERFORMANCE REQUIREMENTS

A. Fiberglass Reinforced Polyester (FRP) Flush Doors

1. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
2. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
3. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
4. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
5. Swinging Door Cycle Test, Doors, ANSI A250.4: Minimum of 25,000,000 cycles.
8. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
9. Swinging Security Door Assembly, Doors, ASTM F 476: Grade 40.
10. Salt Spray, Exterior Doors, ASTM B 117: Minimum of 500 hours.
11. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
12. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Maximum of R-Value 3.4 Minimum of 55 CRF value.
13. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
 - a. Flame Spread: Maximum of 200. (Class C).
 - b. Smoke Developed: Maximum of 450. (Class C).
14. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
 - a. Flame Spread: Maximum of 25.
 - b. Smoke Developed: Maximum of 450.
15. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-lbs per inch of notch.
16. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
17. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
18. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
19. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
20. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.
21. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

22. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
23. Chemical Resistance, ASTM D 543. Excellent rating.
 - a. Acetic acid, Concentrated.
 - b. Ammonium Hydroxide, Concentrated.
 - c. Citric Acid, 10%.
 - d. Formaldehyde.
 - e. Hydrochloric Acid, 10%
 - f. Sodium hypochlorite, 4 to 6 percent solution.
24. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
25. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
26. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
27. Thermal and Humid Aging, Foam Core, Nominal Value, 158°F and 100 % Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.
28. Compliance with the International Building Code® (IBC), latest NJ Edition.

1.6 SUBMITTALS

- A. Comply with AIA A201 and Section 00800 - Submittal Procedures.
- B. Product Data: Submit door manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Submit six sets of factory shop drawings for the fabrication and installation of the Fiberglass Reinforced Polyester (FRP) Doors, Panels, and associated components of the work. Include wall elevations at 1/2" scale, and half-sized detail sections of every typical composite member. Show anchors, joint system, expansion provisions, and other components not included in the manufacturer's standard data. Include field-verified dimensions and glazing details, and include Catalog cuts for all Finish Hardware.
- D. Samples:
 1. FRP Door: Submit corner samples of manufacturer's door showing face sheets, core, internal framing, finish, glazing, hardware, options, and accessories.
 - a. The Architect reserves the right to require samples of typical fabricated sections, showing joints, exposing fastenings, (if any) quality of workmanship, hardware and accessory items, before fabrication of the work proceeds.
 2. Color: Submit manufacturer's color chip samples of Standard of Classic and or Painted FRP Door and Panel Skins and either Standard or Optional Anodized or Painted finished at the Door Stiles and Rails, and Door Perimeter.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- H. Warranty: Submit manufacturer's standard warranty.

1.7 QUALITY ASSURANCE

- A. Standards: Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA and AA, including the terminology definitions and specifically including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated.
- B. Code Compliance and Regulations: All materials supplied shall be in accordance with the International Building Code, State of New Jersey "Barrier-Free" Subcode, and all applicable State or Local Codes.
- C. Manufacturer shall have produced Fiberglass Reinforced Polyester (FRP) Doors, and Panels for a recommended ten (10) years, and shall have completed projects similar to this building in type and size.
 - 1. Door components from same manufacturer.
- D. Bidders are expected to visit the jobsite to make a complete survey of project requirements prior to bid. All dimensions, quantities and conditions relating to the installation shall be fully understood. Failure to visit the site will not relieve the successful bidder from the responsibility of furnishing all materials and services required to comply with the true intent and meaning of the specifications without any additional costs to the Owner.
- E. Instructions: The manufacturer or representatives will be available for consultation to all parties engaged in the project, including instruction to installation personnel.
- F. An examination of product will include cutting and/or disassembly of the entrance to reveal the construction of the particular component. If the door, or component fails, replacement of the project's material will be required. This process will assure the owner of proper adherence to the bid documents.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All materials supplied shall be delivered to the jobsite in their original, unopened packages, with labels intact. Materials shall be inspected for damage, and the manufacturer shall be advised immediately of any discrepancies. Unsatisfactory materials are not to be used.
- B. All materials supplied shall be packaged in individual corrugated cartons. Doors and panels shall be "floated" within cartons, with no portion of the door having contact with the outer shell of the container.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.9 SPECIAL PROJECT WARRANTY

- A. Provide a written warranty, signed by Manufacturer, Installer and Contractor, agreeing to replace, at no cost to the Owner, any doors or panels that fail in materials or workmanship, within the time period of acceptance, as indicated below.
 - 1. Failure of materials or workmanship includes excessive deflection, faulty operation of entrances, deterioration of finish, or construction, in excess of normal weathering and defects in hardware, weather-stripping and other components of the work.
- B. Warranty Period: **Ten (10) years** from approved date of Substantial Completion as determined by the Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **FRP Doors:** Basis-of-Design: Special-Lite Inc.; or approved equal.
1. Subject to compliance with requirements, provide either the named product or product by one of the following manufacturers:
 - a. FRP Architectural Doors Inc.
 - b. Vale Company.
 - c. Or approved equal.

2.2 FIBERGLASS REINFORCED POLYESTER (FRP) FLUSH DOORS

- A. Model: **SL-17** Flush Doors with SpecLite3; or approved equal, fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size: As indicated on the drawings.
- C. Door Construction:
1. Doors are to be 1-3/4" thick Special-Lite, Series SL-17. (FRP); or approved equal.
 2. Stiles and Rails: Constructed of aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, minimum/maximum 2-5/16-inch depth, joined with steel tie rods.
 3. Stiles to be tubular shape to accept hardware as specified.
 4. Top and bottom rails to be extruded with legs for interlocking "rigidity weather bar."
 5. Corners: Mitered or butted mortise and tenon joints.
 6. Joinery to be 3/8" tie rods, top and bottom, bolted through an extruded spline, in both top and bottom rails with 3/16" mechanically fastened (screwed) reinforcing angles, and secured with hex type nuts. Welds, glue, or other methods are not acceptable.
 7. All doors shall be pre-machined in accordance with templates from the hardware manufacturer. For surface applied hardware, doors shall have necessary reinforcement, including the attachment of RIVNUT blind bolt fasteners. With the exception of door closers and holders, which require field applications, doors are to be shipped with hardware attached.
 8. Vision Lites: Provide glazed openings in doors as indicated, with manufacturer's standard aluminum moldings and stops, with removable stops on inside only. Glass to be "factory installed" for warranty purposes. Refer to Section 08800 - Glass and Glazing for type.
 9. Face sheets to be locked in with extruded interlocking edges, which are the integral reglets of the Vertical and Horizontal rails permitting a flush appearance.
 10. Core is to be of **foamed in place Urethane foam** minimum of 5 lbs. per cubic foot density. **Minimum R Value of 9.**
 - a. All doors are to be properly reinforced for hardware prior to urethane core foaming in door.
 11. Face sheets for Fiberglass Reinforced Polyester (FRP) Doors are to be Kemlite SpecLite3®; or approved equal; 120" thick (pebble like texture) with color throughout. Color: Standard and or Classic as approved by the Architect.

12. Concealed adjustable meeting stile astragal on pairs. Install door manufacturer's adjustable astragal with double pile and weather seal weatherstripping.

2.3 MATERIALS AND ACCESSORIES - Fiberglass Reinforced Polyester (FRP) Flush Doors

- A. Aluminum Members: Provide alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate, with a minimum wall thickness of 0.125"
- B. All materials shall be of the same manufacturer. No splitting of Door or components will be permitted.
- C. Fasteners: Provide aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, stops, panels, hardware, anchors, and other items being fastened. For exposed fastener (if any), provide Vandal-proof flat head screws with finish matching the item to be fastened.
 1. Do not use exposed fasteners, except where unavoidable for the assembly of units, or unavoidable for the fastening of hardware. Provide only concealed screws in glazing stops.
- D. Reinforcement and Brackets: Manufacturer's standard formed or fabricated steel units, of shapes, plates, or bars, with 2.0 ounce hot-dip zinc coating, complying with ASTM A 123, applied after fabrication.
- E. Expansion Anchor Devices: Lead shield or toothed steel, drill-in, expansion bolt anchors.
- F. Bituminous Coating: Cold applied asphalt mastic complying with SPC-PS 12, compounded for 30-mil thickness per coat.
- G. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof.
- H. Glazing Gaskets: For glazing factory-installed glass, and for gaskets, which are factory-installed in "captive" assembly of glazing stops, provide manufacturer's standard stripping of molded neoprene, complying with ASTM D 2000 (Designation 2BC415 to 3 BC620), or molded PVC complying with ASTM C 509, Grade 4.

2.4 FABRICATION

- A. Sizes and Profiles: The required size for doors and profiles requirements are to be "field verified".
- B. Coordination of Fabrication: Check the actual Curtain Wall frame door opening in the construction work by accurate field measurements before fabrication, and show recorded measurements on final shop drawings.
- C. Assembly:
 1. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to the cleaning, finishing, treatment and application for coatings.
 2. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- D. Welding: No Welding of any Door joints will be accepted.
- E. Fasteners: Conceal fasteners, wherever possible, except as otherwise noted.

- F. Fit:
 - 1. Maintain continuity of line and accurate relation of planes and angles.
 - 2. Provide secure attachments and support at mechanical joints, with hairline fit at contacting members.
- G. Reinforce the work as necessary for performance requirements and as required for support to the structure. Separate dissimilar metals and bituminous paint or performed separators, which will prevent corrosion. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.

2.5 ARCHITECTURAL FIBERGLASS REINFORCED POLYESTER (FRP) PANELS

- A. FRP PANELS:
 - 1. Model: SL-37 Insulated Architectural Panels with SpecLite3® FRP face sheets; or approved equal.
 - 2. Thickness: 1 inch.
- B. Face Sheets:
 - 1. Material: SpecLite3 FRP; or approved equal, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.
 - 2. Texture: Pebble.
 - 3. Color: As selected by Architect from Standard and Classic colors.
- C. Insulated SpecLite3 FRP Panels; or approved equal:
 - 1. Insulated Panels: Two 0.120-inch minimum thickness sheets.
 - 2. Core: Foam polyurethane core of a minimum of 5 pounds per cubic foot density.
 - 3. Form components to function as single unit.
 - 4. R-Value: Maximum of 4.3 for 1" inch panels.
 - 5. U-Value: Maximum of 0.23 for 1" inch panels.
 - 6. CRF: Minimum of 81 for 1" inch panels.
- D. Class A Flame Spread and Smoke Developed Rating:
 - 1. Class A flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panels.
 - 2. Flame Spread, ASTM E 84: Maximum of 25.
 - 3. Smoke Developed, ASTM E 84: Maximum of 450.

2.6 HARDWARE

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Factory install hardware.

- C. Hardware Schedule: As indicated on the drawings and as specified in Section 08700.

2.7 GLAZING AND VISION LITES

- A. Provide glazing system for doors to receive lites. Design system for replacement of glass, but for non-removal of glass from the exterior.
 - 1. Provide anchorage and alignment brackets for concealed support of assembly from the building structure. Allow for thermal expansion on exterior units.
 - 2. All glass in doors is to be factory installed.
 - 4. Glass for exterior doors to be: As detailed on the drawings. Refer to Section 08800.
- B. Factory Glazing: 1-inch glass insulating units.
- C. Lites in Exterior Doors: Allow for thermal expansion
- D. Rectangular Lites:
 - 1. Size: As indicated on drawings.
 - 2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door stile and rails.

2.12 ALUMINUM FINISH (MATCH EXISTING)

- A. Anodized Finish: Match Existing.
OR/
- B. Painted Finish:
 - 1. High-Performance Organic Coating: AAC12C42R1X (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Chemical conversion coating, acid chromate-fluoride-phosphate pre-treatment; Organic Coating: as specified below). Prepare, pre-treat and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions. (Trade name for this process: KYNAR).
 - a. Color: Match Existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION (Fiberglass Reinforced Polyester (FRP))

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Set thresholds in bed of mastic and backseal.
- D. Install exterior doors to be weathertight in closed position.
- E. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.3 INSTALLATION - FRAMES

- A. Install framing systems in accordance with manufacturer's instructions.
- B. Install framing systems plumb, level, square, true to line, and weathertight, without warp or rack.
- C. Anchor framing securely in place.
- D. Set sills, door thresholds, and other members in bed of sealant or with joint fillers or gaskets to provide weathertight construction. Comply with Section 07900.
- E. Install sill flashing to make frame watertight at sill.
- F. Glass: Install glass indicated to be glazed into framing, and not preglazed, as specified in Section 08800.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.5 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.6 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish or glazing.

3.7 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 08410

SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
- C. Related Sections:
 - 1. Division 06 Section "Rough Carpentry".
 - 2. Division 08 Section "Hollow Metal Doors and Frames".
 - 3. Division 08 Section "Flush Wood Doors".
 - 4. Division 08 Section "Fiberglass Doors",
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 - Access Control System Units.
 - 4. UL 305 - Panic Hardware.
 - 5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
 2. Faulty operation of the hardware.
 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be **one (1) year** from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.

- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. McKinney (MK) - TA/T4A Series, 5 knuckle.
 - b. Or Approved Equal
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:
 - a. Pemko (PE).
 - b. Or Approved Equal

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:
 - a. Rockwood (RO).
 - b. Or Approved Equal

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have a recommended minimum of ten (10) years' experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Facility Standard.
- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Three (3).
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
 4. Construction Control Keys (where required): Two (2).
 5. Permanent Control Keys (where required): Two (2).
- F. Construction Keying: Provide temporary keyed construction cores.
- G. Key Registration List (Bitting List):
 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 - 1. Heavy duty mortise locks shall have a **ten (10) year** warranty.
 - 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ML2000 Series.
 - b. Sargent Manufacturing (SA) - 8200 Series.
 - c. Or Approved Equal

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. Exit devices shall have a **five (5) year** warranty.
 - 2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with

the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Or Approved Equal

2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..
1. Manufacturers:
 - a. Norton Rixson (NO) - 7500 Series.
 - b. Or Approved Equal

2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
1. Manufacturers:
 - a. Rockwood (RO).
 - b. Or approved equal

- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

- 1. Manufacturers:
 - a. Norton Rixson (RF).
 - b. Or approved equal

2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko (PE).
 - 2. Or approved equal

2.11 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.12 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.

- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

- B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. OT - Other
6. RF - Rixson
7. NO - Norton

Hardware Sets

Set: 1.0

Doors: A101, A103

2 Continuous Hinge	FM__SLF-HD1	C	PE
1 Mullion	L980	PC	SA
1 Rim Exit Device, Dummy	16 72 8810 863	US32D	SA
1 Rim Exit Device, Storeroom	16 72 8804 863	US32D	SA

1 Cylinder	72 980C1	US26D	SA	
4 Permanent Core	Compatible with Facility's Existing System		626	OT
2 Door Closer	UNI7500	689	NO	
1 Threshold	253x3AFG MSES10SS-2		PE	
2 Sweep	18061CNB		PE	

Set: 2.0

Doors: A102

6 Hinge (heavy weight)	T4A3786	US26D	MK	
1 Dust Proof Strike	570	US26D	RO	
2 Flush Bolt	555 / 557 As Required	US26D	RO	
1 Classroom Lock	72 8237 LNMD	US26D	SA	
1 Permanent Core	Compatible with Facility's Existing System		626	OT
2 Conc Overhead Stop	1-X36	630	RF	
2 Silencer	608		RO	

END OF SECTION 08700

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 08410 - Aluminum/FRP Doors.
 - 2. Section 08870 - Security Window Film.
 - 3. Section 08900 - Glazed Curtain Wall.

1.2 SUMMARY

- A. Extent of glass and glazing work is indicated on drawings and schedules.
- B. Extent of application of privacy window film is indicated on drawings and schedule.
- C. Types of work or locations requiring glass and glazing include, but are not limited to, glass types scheduled herein and on the drawings.
 - 1. FRP Doors.
 - 2. Curtain Walls.

1.3 QUALITY ASSURANCE

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glass: Categories I and II materials complying with testing requirements in CPSC 16CFR1201 and permanently marked with label of:
 - 1. Safety Glazing Certification Council (SGCC).
- C. Insulating Glass Seal Standard: Comply with ASTM E 774, Class C.
 - 1. Comply with International Building Code for insulated tempered glass.
 - 2. Label each unit permanently on spacer or on one pane.
 - 3. Certification agency:
 - a. Insulating Glass Certification Council (IGCC).
 - b. Associated Laboratories, Inc. (ALI).
- D. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator with a

recommended 5 years of successful experience in the production of each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

- E. Installer (Glazier): A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program
 - 1. Firm with a recommended 5 years of successful experience in glazing work similar to required work.
- F. All glass shall bear the Label of the manufacturer.
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with an appropriate certification label of IGCC.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including documentation of compliance with requirements and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing material, and installation and maintenance instructions.
- B. Before any glass is delivered to the job site, submit sections and details of glass installation at framing members.
- C. Samples: Submit for verification purposes, 12" square samples of each type of glass indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.
 - 1. Submit insulating glass samples with completed edge-seal construction, but hermetic seal need not be maintained.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.
- B. Protect privacy window film, glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.6 PROJECT CONDITIONS

- A. Examine framing and substrate work to receive glass and glazing materials, and condition under which glass is to be installed. Do not proceed with glazing until unsatisfactory conditions have been corrected.

- B. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.
 - 1. Install liquid sealants at ambient and substrate temperatures above 40°F.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- C. Manufacturer's warranty of glazing film to replace defected material for a period of **fifteen (15) years** for film installed at interior vision panels and glazing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
 - 1. Insulating Glass Products:
 - a. Pilkington, Libbey-Owens-Ford, (LOF)
 - b. Vitro Architectural Glass (formally PPG Glass)
 - c. Guardian Industries Corp.
 - d. Or approved equal.
 - 2. Subject to compliance with requirements, manufacturers offering privacy window film product which may be incorporated in the work include the following:
 - a. 3M
 - b. Avery
 - c. Solyx
 - d. Or approved equal

2.2 PRIMARY GLASS PRODUCTS

- A. Heat Treated Float Glass (Tempered Plate Glass): ASTM C 1048; Type I; Quality-Q3; Class I (clear)

1. Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength.
- B. Uncoated Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality-Q3 (glazing select), and as follows:
 1. Manufacturer's standard **bronze** tint (to Match Existing), with visible light transmittance of 38% and shading coefficient of 0.31 for 1/4" thick glass.
- C. Energy Advantage Low-E Glass: Manufacturer's standard clear color Low-E glass, coated on third surface with light transmittance:
 1. Bronze Tint: 38% and shading coefficient of .33 for 1/4" thick glass.

2.3 INSULATING GLAZING

- A. Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
- B. Provide insulating glass for applications in exterior doors, side lites, storefront units, curtain wall systems, aluminum windows and as follows:
 1. Exterior pane shall 1/4-inch thick tinted glass to meet indicated requirements.
 2. Interior pane shall be 1/4-inch thick "Low-E" coating on the third surface.
 3. Units shall be tempered where within 6 feet of a door or where "tempered" or "safety" glass is required by Code.
 4. Double Glass Performance Data:
 - a. Clear:
 - 1) Visible light transmittance of 70%,
 - 2) Solar Energy Transmittance of 33%,
 - 3) U-Factor: Summer (Air) of 0.27,
 - 4) U-Factor: Winter (Air) of 0.29,
 - 5) Solar Heat Gain Coefficient of 0.38,
 - 6) Shading coefficient of 0.44.
 - b. Bronze Tint (3rd surface):
 - 1) Visible light transmittance of 38%,
 - 2) Solar Energy Transmittance of 14%,
 - 3) U-Factor: Summer (Air) of 0.27,
 - 4) U-Factor: Winter (Air) of 0.28,
 - 5) Solar Heat Gain Coefficient of 0.27,
 - 6) Shading coefficient of 0.31.

2.4 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for category II materials, for kinds of laminated glass indicated and other requirements specified as following:

1. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - a. Interlayer Material: Polyvinyl butyral sheets.
2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
 - a. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.
3. Inner Lite: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select).
 - a. Class 2 (tinted).
 - b. Thickness: 1/4"
4. Outer Lite: Tempered glass type.
 - a. Thickness: 1/4".
5. Plastic Interlayer: 0.060 inch thick.

2.5 WINDOW FILM

- A. Subject to compliance with requirements, manufacturers offering products (final selection by the Architect) that may be incorporated into the Work include the following:
 1. Model: "Scotchcal™ Frosted Crystal 7725-324", as manufactured by 3M™.
 2. Model "SC 900-862" Frosted Sparkle, as manufactured by Avery
 3. Model "SX-324", as manufactured by Solyx.
 4. Or approved equal.

2.6 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES

- A. General: Provide color of exposed glazing sealant compound as selected by Architect from manufacturer's standard colors, or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.
- B. 1 Part Silicone Rubber Glazing Sealant: Elastomeric silicone sealant complying with FS TT-D-001543, Class A, non-sag. Provide acid type recommended by manufacturer where only non-porous bond surfaces are contacted; provide non-acid type recommended by manufacturer where one or more porous bond surfaces are contacted.
- C. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.

1. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
 - a. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- C. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- D. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- E. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.2 STANDARDS AND PERFORMANCE

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Inspect each piece of glass immediately before installation, and discard pieces which have significant edge damage or face imperfections.
- F. Unify appearance of each series of lites by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other piece.
- G. Install insulating glass units to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

3.3 PREPARATION FOR GLAZING

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealer to joint surfaces where recommended by sealant manufacturer.

3.4 GLAZING

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- I. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.5 WINDOW FILM

- A. Contractor shall coordinate the acquisition of window film material.
- B. Contractor shall protect window film from damage after installation until Substantial Completion of the work performed in project Milestone.

3.6 PROTECTION AND CLEANING

- A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- D. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to deterioration of glazing materials and other work. Comply with manufacturer's instructions.
- E. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass manufacturer's recommendations for final cleaning.

END OF SECTION 08800

SECTION 08870 - SECURITY WINDOW FILM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Field applied security film and rigid pvc cap system applied to glazed surfaces and glazing framing systems.

1.3 RELATED SECTIONS

- A. Section 08410 - Aluminum / FRP Doors and Aluminum Frames
- B. Section 08800 - Glass and Glazing

1.4 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
- B. ASTM International (ASTM):
 1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 2. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
 3. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
 4. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 5. ASTM D 4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
 6. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
 7. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
 8. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.

9. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 10. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- C. Window 5.2 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.
 - D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
 - E. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.
 - F. GSA Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.
 - G. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.
 - H. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.

1.5 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:
 1. Flame Spread: 25, maximum.
 2. Smoke Developed: 450, maximum.
- B. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light haze will result in accordance with ASTM D 1044 using 50 cycles, 500 grams weight, and the CS10F Calbrase Wheel.

1.6 SUBMITTALS

- A. Submit under provisions of AIA A201 and Section 00800.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Selection Samples: For each film specified, submit film samples representing manufacturer's film type for the project.

- D. Verification Samples: For each film specified, two samples representing film color and pattern.
- E. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.
- F. **Letter from the manufacturer of the security film that the contractor is a certified installer.**
- G. **Shop drawings from the installer / manufacturer of the security window film illustrating all conditions of the Impact Protection Adhesive (IPA) overlap distance onto the adjacent glazing framing system.**

Note: Installation of the security window film shall not proceed until the submittals of all conditions are submitted.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
 - 1. **Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.**
 - 2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film.
 - e. Amount of film installed.
 - f. Date of completion.
 - 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
 - 4. Provide an application analysis to determine available energy cost reduction and savings.
- C. **Window Security Film Pre-Installation Meeting:** Prior to installation of the Security Window Film, there shall be a Pre-Installation Meeting with the General Contractor, Window Security Film Subcontractor, Construction Manager and the Architect. At this meeting, products and installation requirements and shall be reviewed.
- D. Mock-Up: Provide a mock-up for evaluation and approval by the Architect of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
- B. Manufacturer warrants the film for a period of **fourteen (14) years** when installed with 3M Impact Protection Attachment Sealant) from the date of installation against cracking, crazing, delaminating, peeling, or discoloration. If the product is found to be defective under warranty, Manufacturer will replace such quantity of the film proved to be defective and will additionally provide the removal and reapplication labor free of charge at current industry labor rates.
 1. Manufacturer also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value \$500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the date of application. Any glass failure must be reviewed and approved by Manufacturer Representative prior to replacement and payment.
 2. Additional warranty and limited remedy terms are contained in the Warranty, Limited Remedy, and Disclaimer and the Limitation of Liability.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: "3M Scotchshield Ultra S800 Safety and Security Window Film", as manufactured by 3M Commercial Solutions; or approved equal. Optically clear microlayered polyester film, nominally 8 mils (0.008 inch) thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and

forms a physical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.

1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
 - a. Solar Gard Armorcoat 8-Mil Clear Safety and Security film, as manufactured by Saint-Gobain Solar Gard,
 - b. Or approved equal.

Note: Requests for substitutions will be considered in accordance with provisions of AIA A201 and Section 00800.

2. Physical / Mechanical Performance Properties (nominal):
 - a. Film Color: Clear.
 - b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
 - c. Tensile Strength (ASTM D882):
 - 1) Base Film: 32,000 psi (MD) / 32,000 psi (TD).
 - 2) Coated Film: 32,000 psi (MD) / 32,000 psi (TD).
 - d. Break Strength (ASTM D882):
 - 1) Base Film: 250 lb/in (MD) / 250 lb/in (TD).
 - 2) Coated Film: 245 lb/in (MD) / 265 lb/in (TD).
 - e. Percent Elongation at Break (ASTM D882):
 - 1) Base Film: 115 % (MD) / 115 % (TD).
 - 2) Coated Film: 132 % (MD) / 130 % (TD).
 - f. Yield Strength:
 - 1) Base Film: 12,000 psi (MD).
 - 2) Coated Film: 15,000 psi (MD).
 - g. Percent Elongation at Yield (ASTM D882):
 - 1) Base Film: 7% (MD).
 - 2) Coated Film: 9% (MD).
 - h. Graves Tear Resistance (ASTM D1004):
 - 1) Maximum Force (lbs):
 - a) Base Film: 40 (MD) / 40 (TD).
 - b) Coated Film: 40 (MD) / 40 (TD).
 - 2) Maximum Extension (in):
 - a) Base Film: 0.45 (MD) / 0.65 (TD).
 - b) Coated Film: 0.50 (MD) / 0.57 (TD).
 - 3) Graves Area Tear Resistance (lbs%):
 - a) Base Film: 1,100 (MD) / 1,300 (TD).
 - b) Coated Film: 1,100 (MD) / 1,300 (TD).
 - i. Puncture Propagation Tear Resistance (ASTM D2582):
 - 1) Coated Film: 9 lbf (MD) / 10 lbf (TD).
 - j. Puncture Strength (ASTM D4830):
 - 1) Material Properties (as supplied).
 - 2) Coated Film: 185 lbf.
2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.

4. Identification: Labeled as to Manufacturer as listed in this Section.
5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.79.
6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
7. Impact Resistance and Pressure Cycling: Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTM's E1996 and E1886) at +/- 75 psf Design Pressure with use of 3M Impact Protection Adhesive. Film applied to 1/4- inch tempered glass.
8. Blast Hazard Mitigation:
 - a. GSA Rating of "2"/ ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 43 psi*msec blast impulse, on 1/4 inch (6 mm) tempered single pane glass and 3M Impact Protection Profile attachment system.
9. Forced Entry Resistance: Product shall have been evaluated for time to resist complete body passage by a qualified 3rd Party test lab.

2.2 IMPACT PROTECTION FILM ATTACHMENT SYSTEMS

- A. Impact Protection Adhesive (IPA): Weatherable, UV-resistant, moisture curable structural sealant wet glaze.
 1. Color(s) available from the following to be selected by the Architect:
 - a. Black.
 - b. White.
 2. Material Properties (as supplied):
 - a. Typical Cure Time: 3 - 7 days (25 degrees C, 50% RH)
 - b. Full Adhesion: 7 - 14 days
 - c. Tack-Free Time (ASTM D 5895): 21 minutes (25 degrees C, 50% RH)
 - d. Flow, Sag or Slump (ASTM D 2202): 0 inches
 - e. Specific Gravity: 1.4
 - f. Working Time: 10 - 20 minutes (25 degrees C, 50% RH)
 - g. VOC Content: 16 g/L
 3. Material Properties (as cured - 21 days at 25 degrees C, 50% RH):
 - a. Ultimate Tensile Strength (ASTM D412): 380 psi (2.62 MPa)
 - b. Ultimate Elongation (ASTM D412): 640 psi
 - c. Durometer Hardness, Shore A (ASTM D2240): 38-39 points
 - d. Tear Strength, Die B (ASTM D624): 72 ppi
 4. Uniformity: Product shall have uniform consistency and appearance, with no clumping.

5. Impact Resistance and Pressure Cycling:
 - a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Medium Large Missile C and Small Missile A impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 75 psf design pressure.
 - b. As part of a filmed glass system, film attachment shall demonstrate ability withstand structural load requirements of ASTM E330 when tested at +/- 100 psf design pressure.
6. Blast Hazard Mitigation:
 - a. GSA level "2" rating (minimal hazard) of "2" with minimum blast load of 11 psi overpressure and 55 psi*msec blast impulse.

2.3 RIGID PVC ATTACHMENT SYSTEM

- A. Basis of Design: "BondKap", as manufactured by FilmFastener LLC; or approved equal, attachment system. Weatherable Rigid PVC secured using approved structural silicones such as Dow Corning 995; GE SCS2000 "Wet Glaze" type attachment; or approved equal. The rigid PVC aids in the integrity of the silicone to maintain proper alignment and increases the tensile/tear strength of the silicone, while provided and aesthetic cover to an unsightly large bead of silicone.
 1. Select from the available Rigid PVC Profiles to suit the condition:
 - a. BK 2001; or approved equal.
 - 1) Width: 1.516 inches.
 - 2) Typically used for commercial storefront applications where added protection is necessary such as high profile faculities.
 - b. BK 2004; or approved equal.
 - 1) Width: 1.30 inches.
 - 2) Typically used for commercial storefront applications.
 - c. BK2005; or approved equal.
 - 1) Width: 2.588 inches.
 - 2) Typically used for commercial storefront doors.
 - d. BK 2006; or approved equal.
 - 1) Width: 1.78 inches.
 - 2) Typically used for commercial storefront doors.
 2. Material properties.
 - a. Full cure of silicone 30 to 60 days depending on BondKap; or approved equal profile.
 - b. Strength and elongation dependent upon silicone used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 1. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance:

- B. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
- C. At the request of the specifying authority, an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long bead, approximately 0.5 - 1 inch in width, masking one side of the frame surface underneath the strip with tape. Allow the Impact Protection Adhesive to cure for 7 days and test adhesion by pulling up on the masked end and a 90 degree angle. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is not recommended.
- D. Impact Protection Adhesive (IPA) Examination:
 - 1. If application of window film is/was the responsibility of another installer, notification in writing shall be made of deviations from manufacturer's recommended installation tolerances and conditions.
 - 2. Filmed glass surfaces receiving new attachment should first be examined to verify that they are free from defects and imperfections, and that the film edges extend sufficiently to the frame edges.
 - 3. Do not proceed with installation until film and frame surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
 - 4. Conduct an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long bead, approximately 0.5 - 1 inch in width, masking one side of the frame surface underneath the strip with tape. Allow the Impact Protection Adhesive to cure for 7 days and test adhesion by pulling up on the masked end and a 90 degree angle. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is not recommended.
- E. Rigid PVC Profile Examination.
 - 1. Assure the Rigid PVC Profile is the correct length, color and profile for the installation.
 - 2. Assure the Rigid PVC Profile has not been subject to direct sunlight and has warped. If damage has occurred replace as necessary. Rigid PVC Profile will not warp once properly installed and has full adhesion with the structural silicone.
- F. Commencement of installation constitutes acceptance of conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions (See attached Impact Protection Adhesive Attachment System document).
 - 1. Install film on surface 2 (single pane glass).
- B. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.
- C. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
- D. Apply film to glass and lightly spray film with slip solution.
- E. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
- F. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
- G. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
- H. Recommended minimum bead overlap for blast mitigation is 0.5 inch on both film and frame surfaces (excluding the glazing stops or compression gaskets).
- I. To ensure a straight and consistent bead width is achieved, masking tape may be applied to film and frame surfaces before application of Impact Protection Adhesive.
- J. Dispense Impact Protection Adhesive with a caulk gun and nozzle having an opening cut to approximate size of desired bead width.
 - a. Install as specified by silicone manufacturer and rigid pvc manufacturer.
 - b. Cut the tip of the silicone the appropriate size for the rigid pvc in use.
 - c. Apply the silicone to the frame and glass or on the rigid pvc profile depending on which profile is in use.
 - d. Place the rigid pvc on the silicone at the specified angle to achieve maximum contact with silicone frame and glass.
 - 1) If alternative rigid pvc selection is used and silicone has been applied to the rigid pvc, press the silicone rigid pvc combination to the desired position on the glass and frame.
 - e. Apply sufficient pressure to assure silicone is mated to rigid pvc glass and frame. You should be able to perceive the silicone under the rigid pvc. If not lift the rigid pvc and apply more silicone. If an excess of silicone is protruding past the rigid pvc, see cleaning and protection.

3.4 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.

- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.
- D. Common window cleaning solutions may be used 30 days after installation.

END OF SECTION 08870

Product Features and Benefits

3M™ Safety & Security Impact Protection Attachment (IPA) Sealant is a liquid caulk edge retention system designed to hold the 3M Safety and Security Window film in place to help provide additional impact protection from a variety of sources including bomb blasts, extreme weather and forced entry events. The 3M Impact Protection System (film + IPA) helps protect against personal injury from flying glass.

- Excellent tear, elongation and tensile strength
- Anchors the filmed glass to the window frame
- Available in Black, White and Gray



Film Installation

- Follow 3M Window Film Flat Glass Installation instructions (found on 3M Dealer Advantage site).

Project Site Considerations

- Ensure the work area is clean, dry and free of obstacles. Window film should be allowed to dry for at least 14 days before installing IPA. If residual moisture from film installation is visible near edges of film, wipe dry, wait an additional 7 days and check again.
- To ensure good adhesion, apply a 1/2" bead of IPA on the frame and onto a piece of tape. After 14 days, grab the IPA on the tape and pull the IPA from the frame until either the IPA removes cleanly from the frame (poor adhesion) or the IPA splits and leaves IPA on the surface (good adhesion). Contact your 3M sales representative or 3M Application Engineer with questions.

Materials

- 3M™ Impact Protection Attachment Sealant (Black, Gray or White)
- Caulk gun (electric or manual) and nozzle
- Small squeegee or putty knife, trimmed to size with scissors or utility knife
- Masking tape (3M™ ScotchBlue™ Painter's Tape #2090 works well)
- Cutting tool(s) such as retractable utility knife and scissors
- 3M™ Super Fine Synthetic Steel Wool Pad (optional)
- Rubbing Alcohol (or 2 parts Isopropyl Alcohol to 1 part water)
- Lint-free toweling
- Rubber nitrile gloves
- Thin tip permanent marker (optional)

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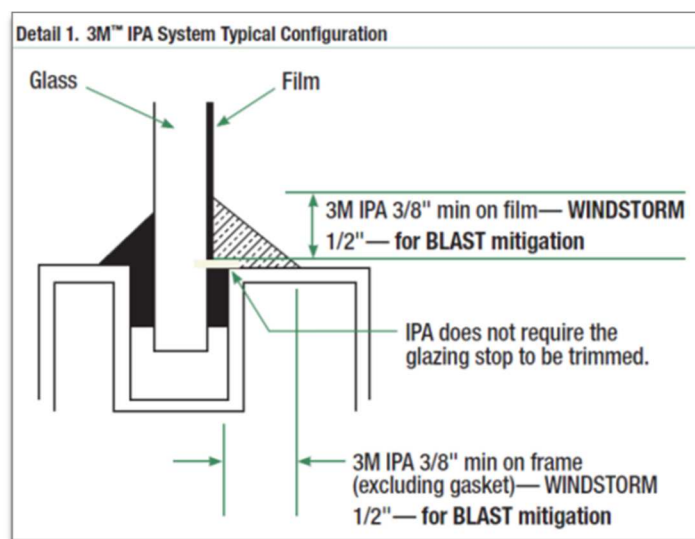
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Window Prep

- Ensure window frame and film surfaces are dry and free of dirt, debris, dust and grease. Remove any contaminants on frame surface with rubbing alcohol.
 - (Spot cleaning may be required with other more aggressive cleaners or tools, such as a synthetic steel wool pad, as required prior to cleaning with the rubbing alcohol.)
 - Apply rubbing alcohol generously to lint-free toweling and wipe the frame and several inches onto the film.
 - Immediately wipe dry with a clean lint-free towel.
- IPA requires a clean, dry and smooth frame surface to bond properly.
- Do NOT spray soapy water or common glass cleaners to clean the frame as their residue could reduce IPA bond strength.
- As needed, consult with building owner or project manager prior:
 - 3M does not assume liability for any damage that may be incurred during cleaning.
 - Trimming of the gasket is optional but in some cases could impact stability of the glass.
 - Consult local air quality rules before use.
 - Have a plan for proper disposal of extra IPA, masking tape and toweling waste.
- Do NOT use any abrasive cleaners or tools on the film/glass surface.
- Ensure that there is adequate space on the frame to allow for the proper amount of IPA contact with the frame. This minimum “distance” of IPA varies depending on the intended use or purpose of the IPA (e.g. 1/2 inch for blast mitigation in Detail 1, below).



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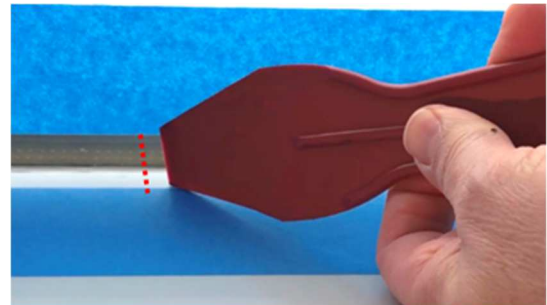
3M™ Impact Protection Attachment (IPA) Sealant Installation

1. Apply a 2 in. (48 mm) strip of 3M™ Masking Tape to the film surface ensuring that the tape is the required “distance” from the edge of the film along all four sides.
Note: This “distance” will depend on the intended use (e.g. 1/2 inch for blast mitigation in **Detail 1**, above). You can measure as you apply the tape, or prior you can lightly mark the distance on the film with a marker the same color as the IPA (to hide the mark).



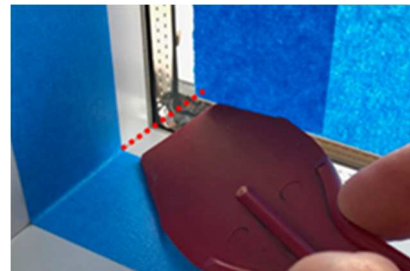
2. Apply a 2 in. (48 mm) strip of 3M Masking Tape to the window frame ensuring that the tape is the required “distance” from the edge of the gasket. Trimming the gasket is optional, but tape should be applied at the “distance” from the gasket edge. **Note:** This “distance” will depend on the intended use (e.g. 1/2 inch for blast mitigation). You can measure as you apply the tape, or prior you can lightly mark the distance on the frame with a marker.

1&2



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Note: The space between the parallel pieces of tape will allow a uniform sealant bead to be applied to the glass/frame interface, resulting in the proper amount of IPA on the frame and on the film (“distance” required).



3. Prepare squeegee tools to smooth the IPA. A good option is a plastic putty knife cut to the dimension between the masking tape so that the spatula edges make contact with the edges of the masking tape. Cut a slightly wider tool that fits the corners. (see red dotted lines in images)

4. Prepare the caulk gun nozzle with a flat opening (no angle) so that the nozzle edges make contact with the edges of the masking tape.



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5. Clean the surface where the IPA will be applied to remove any finger oils or debris. Apply rubbing alcohol to a lint-free towel and wipe the window frame and film. Immediately wipe dry with a clean lint-free towel.
6. Load the IPA tube into the caulk gun and pierce the tube about 4 times with a blade. Do not cut the end off the tube, as this will allow the IPA to run freely and potentially make a mess.
7. Apply a triangular bead of IPA sealant around the entire frame in the area between the tape. Apply ample IPA in the corners as it is easier to squeegee outward. On the straight areas, keeping the caulk gun held at a 90-degree angle to the IPA bead will provide a smoother bead. Avoid making any air bubbles or gaps.
8. Smooth the sealant bead with an appropriate tool to give a finished look. It is best to start in one side of a corner and pull outward 5-10 inches, clean off the spatula, then start in the same corner and wipe the other direction. The flat sides can be smoothed by starting near the corners and wiping the full length of the side. For best appearance and performance, wipe all sides with a clean spatula within the tack time before a skin forms (approx. 10 mins). The IPA surface should be flat, not concave.
9. Carefully remove the masking tape strips from the glass/frame immediately after tooling. Do not allow the excess sealant to contact the film, frame or flooring surfaces. A drop cloth should be used to protect the work area. Be careful not to step on sealant and transfer it to surrounding surfaces.



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Note: Should you get some of the sealant on the surrounding surfaces (frame, window, etc.), first try wiping up the bulk of the IPA with paper toweling. For smaller areas, you can use toweling with some rubbing alcohol.

Note: Curing time for the IPA Sealant will vary depending on temperature and relative humidity. It is not recommended to clean the film/IPA system for at least 36 hours following the installation. Full curing/ adhesion can take 21 days or more, depending on conditions.

Note: Read and follow all product labels, inserts and installation instructions before use. When using any equipment, always follow the manufacturers' instructions for safe operation.

Health and Safety

When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety and environmental information. To obtain SDS sheets for 3M products go to [3M.com/SDS](https://www.3m.com/SDS), or by mail or in case of an emergency, call 1-888-364-3577 or 1-651-737-6501.

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SECTION 09250 - GYPSUM DRYWALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Extent of each type of gypsum drywall construction required is indicated on the drawings.
- B. This Section includes the following types of gypsum board construction:
 - 1. Gypsum drywall including screw-type metal support system
 - 2. Drywall finishing (joint tape and compound treatment)
 - 3. Vinyl trim and accessories.
- C. Related Section(s):
 - 1. Section 09900 - Painting

1.3 QUALITY ASSURANCE

- A. Manufacturer: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.
- B. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- C. Fireblocking and Draftstopping: Comply with the International Building Code requirements for installation of fireblocking and / or draftstopping, to prevent the fire passage of flame and product of combustion through concealed spaces or openings in gypsum board systems, in the event of fire.
- D. Provide self extinguishing vinyl trim accessories which do not support combustion once flame source is removed.

1.4 REFERENCES

- A. ANSI/ASTM C 840 Gypsum Board Standard - Comply with applicable requirements for application and finishing of gypsum board, unless otherwise indicated.
- B. ASTM C754 Steel Framing Standard - Comply with applicable requirements for installation of steel framing for gypsum board)
- C. ASTM C11 Gypsum and Related Building Materials and Systems

- D. ASTM C1396/C1396M Impact Resistance Gypsum Wallboard and tested in accordance with ASTM C1629/C1629M
- E. ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds
- F. ASTM C475/C475M Joint Treatment Materials
- G. ASTM D3678 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions
- H. ASTM C1047 Interior Trim
- I. Application and Finishing of Gypsum Panel Products: GA-216

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these specifications.
 - 1. Provide product data for impact resistance gypsum wallboard system.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
 - 1. Minimum Room Temperatures: When ambient outdoor temperatures are below 55°F maintain continuous, comfortable building working temperature of not less than 55°F for 48 hours prior to application and continuously thereafter until drying is complete.

2. Ventilate building spaces as required to remove water in excess of that required for drying joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.
3. The gypsum drywall shall be installed only when the exterior walls have been erected, windows installed and the permanent roof is installed and in watertight condition to prevent the growth of mold. The contractor shall not install gypsum drywall panels that are wet, have the indication of mold, including but not limited to: fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
- B. Metal Support Systems:
 1. Allied Structural Industries
 2. Clark-Dietrich Building Systems
 3. National Gypsum Company
 4. Marino\WARE; a Div. of WARE Industries, Inc.
 5. United States Gypsum Co. (USG)
 6. Or approved equal.
- C. Gypsum Board Related Products:
 1. CertainTeed Gypsum.
 2. Georgia-Pacific Corp.
 3. Gold Bond Building Products Div., National Gypsum Co.
 4. United States Gypsum Co.
 5. Continental Building Products
 6. Or approved equal.
- D. Impact Resistance Gypsum Wallboard:
 1. United States Gypsum Co. (USG)
 2. National Gypsum Co.
 3. Georgia-Pacific Gypsum, LLC
 4. Continental Building Products
 5. CertainTeed Gypsum.
 6. Or approved equal.
- E. Vinyl Trim
 1. Trim-Tex,
 2. Or approved equal.

2.2 METAL SUPPORT MATERIALS

- A. General: Provide components which comply with ASTM C754 for materials and sizes, unless otherwise indicated.
- B. Wall/Partition Support Materials
 - 1. Studs ASTM C645, 25 gauge unless otherwise indicated. 20 gauge minimum at door jambs and wherever structural or other gauge studs are called for, for use with impact resistant type gypsum wallboard, and to comply with applicable published instructions and recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.
 - a. Depth of Section: 6 inch, unless indicated otherwise.
 - b. Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.
 - c. Provide structural heavy gauge studs and bracing to support loads of wall mounted items, equipment, cabinets, etc. coordinate with other trades for weight requirements and mounting locations.
 - 2. Fasteners for Stud Members: Provide fasteners of type, material, size, recommended by manufacturer for the substrate and application indicated.

2.3 GYPSUM BOARD

- A. Impact Resistance, Gypsum Board: ASTM C1629, as follows: (Paintable)
 - 1. Thickness: 5/8 inch, unless otherwise indicated.
 - 2. Complies with ASTM E84, Flame Spread 5, Smoke Developed 0 and Fire Resistance ASTM E119.
 - 3. Mold resistant per ASTM D3273-00 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environment Chamber".
 - 4. Edges: Manufacturer's standard.
 - 5. Basis of Design: "Fiberock Abuse Resistant Interior Panels"; United States Gypsum Co.; or approved equal.

2.4 TRIM ACCESSORIES

- A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim beads, J-type edge trim beads, special L-kerf type edge trim beads, and one-piece control joint beads.
- B. Semi-Finishing Type: Manufacturer's standard trim units which are not to be finished with joint compound (non-beaded), where indicated.

2.5 JOINT TREATMENT MATERIALS (GYPSUM BOARD APPLICATION)

- A. General: Provide materials complying with ASTM C475, ASTM C840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Manufacturer's recommended types for indicated applications. Use types compatible with joint compounds.
- C. Joint Compounds: Provide manufacturer's recommended types for indicated applications.
 - 1. For interior repair and patching work, provide chemical-hardening-type for bedding and filling, ready-mixed vinyl type or vinyl type powder type for topping.

2.6 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Gypsum Board Screws: ASTM C954 or ASTM C1002.
- C. Acoustical Sealant: Water base type, non-drying, non-bleeding, non-staining type; permanently elastic, as recommended by gypsum board manufacturer.
 - 1. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, [with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
 - 2. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF METAL SUPPORT SYSTEMS

- A. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

- B. Provide furring and shims as required to install new work over existing substrates so that new work will be installed plumb, level and true.
- C. Wall-Partition Support Systems:
 - 1. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.
 - 2. Isolate non-load bearing steel stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
 - a. Install single deep-leg deflection tracks and anchor to building structure.
 - b. Connect drift clips to cold-formed metal framing and anchor to building structure.
 - 3. Install runner tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Ramset to precast plank.
 - 4. Extend partition stud system through acoustical ceilings and elsewhere as indicated to the structural support and substrate above the ceiling.
 - 5. Space studs 16 inches o.c. except as otherwise indicated.
 - 6. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
 - 7. Provide runner tracks of same gauge as jamb studs. Space jack studs same as partition studs.
 - 8. Cut studs 1/2" short of full height to provide perimeter relief.
 - 9. Do not fasten studs to top track to allow independent movement of studs and track.

3.3 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL

- A. Pre-Installation Conference: Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed.
- B. Locate exposed end-butt joints as far from center of walls as possible, and stagger not less than 24 inches in alternate courses of board.
- C. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.
- D. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.

- E. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- F. Attach gypsum board to framing and blocking provided for additional support at openings and cutouts.
- G. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- H. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board over wood framing, with "floating" internal corner construction.
- I. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.4 METHODS OF GYPSUM BOARD APPLICATION

- A. Single-Layer Application: Install gypsum wallboard as follows:
 - 1. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound. Install "L" type trim where drywall construction is tightly abutted to other construction and install special kerfed type where other work is kerfed to receive long leg of "L" type trim. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
 - 1. Install J-type semi-finishing trim where indicated, and where exterior gypsum board edges are not covered by applied moldings.

3.6 FINISHING OF DRYWALL

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Apply joint compounds in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C11, ASTM C 840 and GA-216:
 - 1. **Level 1:** All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. In plenum areas above the ceiling, attics, areas concealed in the building (does not typically meet fire-resistant assembly requirements).
 - 2. **Level 5:** All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, applied to the entire surface. The surface shall be free of tool marks and ridges. Finish for areas that are to receive gloss, semi-gloss, enamel or non-textured flat paints.

3.7 IMPACT RESISTANCE GYPSUM WALLBOARD INSTALLATION

- A. General: Install fiber reinforced gypsum wallboard according to manufacturer's instructions and GA-216 "Application and Finishing of Gypsum Board."
 - 1. Nails and Screws: Corrosion resistant; ASTM C 840.
 - 2. Adhesives: Manufacturer's approved adhesive types.
 - 3. Accessories: Similar to indicated gypsum wallboard application.
 - 4. Joint Tape, Taping Compound and Finishing Compound: Comply with ASTM C 475.

3.8 CLEANING AND PROTECTION

- A. Remove temporary coverings used to protect other work.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

END OF SECTION 09250

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SECTION 09650 - RESILIENT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of resilient accessories is shown on drawings and in the Room Finish Schedule.
 - 1. Rubber resilient wall base.

1.3 RELATED SECTIONS

- A. Section 04200 - Unit Masonry.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ASTM F 1861 Type TS, Group 1 Performance Requirements for Resilient Rubber Wall Base.
 - 2. ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocol for Resilient Rubber Wall Base.
 - 3. ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols for Resilient Rubber Wall Base.
 - 4. ASTM D 2240 Not less than 85 Shore A.
 - 5. ASTM D 3389 Abrasion Resistance: less than 1 gram weight loss.
 - 6. ASTM E 648 Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
- B. Manufacturer: Provide each type of resilient accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
 - 1. Wherever possible, provide each type of required resilient accessories produced by a single manufacturer.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of resilient accessory.

- B. Samples for Verification Purposes: Submit the following samples in triplicate of each type, color, and pattern of resilient accessory required, showing full-range of color and pattern variations.
 - 1. For initial selection of colors submit, prior to above, samples in form of actual sections of resilient accessories, showing full range of colors available.
- C. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.
- D. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient accessory required.
- E. Replacement Material: After completion of work, deliver 5% to project site replacement materials from same manufactured lot as materials installed.

1.6 PROJECT CONDITIONS

- A. Maintain minimum temperature of 65°F (18°C) or more than 85°F (29°C) in spaces to receive resilient accessories for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation.
 - 1. Store resilient materials in spaces where they will be installed for at least 48 hours before beginning installation.
- B. Maintain the ambient relative humidity between 40% and 60% during installation.
- C. Install resilient accessories after other finishing operations, including painting, have been completed.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55°F (13°C) or more than 85°F (29°C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but not limited to the following:
 - 1. Rubber Resilient Wall Base and Accessories:
 - a. "Pinnacle", as manufactured by Roppe Corporation,
 - b. "BaseWorks Thermoset Rubber Wall Base", as manufactured by Johnsonite,
 - c. "RubberMyte" as manufactured by Burke Mercer Flooring Product,
 - d. Equivalent by Mohawk,
 - e. Or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of other manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner.

2.2 ACCESSORIES

- A. Wall Base: Provide rubber base complying with ASTM F-1861, Type TS, Group 1. Vulcanized SBR rubber with matching preformed corner units, and as follows:
1. Height: 4-inches, unless otherwise indicated on the drawings.
 2. Thickness: 1/8 inch gauge.
 3. Style: Standard top-set cove.
 4. Finish / Colors: Matte finishes in colors as selected by Architect from manufacturer's available full range of colors. Allow for more than one color in any given area.
 5. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
 6. Phthalate, chlorine and halogen free.
- B. Adhesives (Cements): Water resistant, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.
1. Adhesives to be used for resilient accessory applications shall not generate any odor or unpleasant smell.

2.3 COLORS

- A. Colors shall be as selected and directed by the Architect.
1. All selections shall be made from manufacturer's full product lines, for all products and accessories, (including premium colors).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Inspect substrates and conditions of installation to verify that work may properly

commence. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Broom clean or vacuum surfaces to be covered, and inspect substrate.
 - 1. Remove paint, and other materials that could interfere with adhesion of resilient products.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published recommendations for installation.

3.4 INSTALLATION OF ACCESSORIES

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
 - 1. Job-formed Corners:
 - a. Outside Corners: Form by bending without producing discoloration (whitening) at bends.
 - b. Inside Corners: Butt one piece to corner, then scribe next piece to fit.
- B. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

3.5 CLEANING AND PROTECTION

- A. Perform following operations immediately upon completion of installation:
 - 1. Sweep or vacuum thoroughly.
 - 2. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient accessory manufacturers.

3.6 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Accessories: Furnish not less than 5% of each type, size and color selected and installed.

END OF SECTION 09650

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Section(s):
 - 1. Section 03300 - Concrete Work.
 - 2. Section 04200 - Unit Masonry.
 - 3. Section 08110 - Hollow Metalwork.
 - 4. Division 22, 23 - Mechanical Work.
 - 5. Division 26 - Electrical Work.

1.2 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
 - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- C. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- D. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.
- E. Following categories of work are not included as part of field-applied finish work.
 - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, steel windows, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop fabricated or factory built mechanical and electrical equipment or accessories. This is in addition to the prime coat specified herein.
 - 2. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, and shop fabricated or factory built mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

3. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
 4. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
 5. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
 6. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment, identification, performance rating, name, or nomenclature plates.
- F. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified herein.
1. Painting of mechanical and electrical work is limited to those items exposed to view.
 2. Mechanical items to be painted include, but are not limited to, the following:
 - a. Piping, pipe hangers and supports.
 - b. Ductwork, insulation.
 - c. Access doors and service panels.
 3. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings.
 - b. Backboxes.
 - c. Junction boxes.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.
- C. Coefficient of Friction: The Federal and industry standard for testing coefficient of friction or the slip resistance of a surface is tested to the requirements, as outlined, in ASTM D-2047, which utilizes a friction measurement machine, commonly referred to as the James Machine.
- D. Industry Standards: Comply with industry standard established by the Painting and Decorating Contractors of America PDCA for applications, methods and recommendations and use of tools and equipment for paint and stain coatings, primers and block fillers.

- E. Lead and Chromate Contents:
 - 1. All paint products must be free of any lead or chromate contents.
- F. Volatile Organic Compound Compliant (VOC.):
 - 1. All paint products must meet the State VOC environmental regulations (OTC Regulation compliant) and the following:
 - a. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
 - (1) Primer, Sealer and Undercoater: VOC content of not more than 200 g/L.
 - (2) Specialty Primer, Sealer and Undercoater: VOC content of not more than 350 g/L.
 - (3) Rust Preventative Coating: VOC content of not more than 400 g/L.
 - (4) Flat Paints and Coatings: VOC content of not more than 100 g/L.
 - (5) Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
 - (6) Nonflat High Gloss Coatings: VOC content of not more than 250 g/L.
 - (7) Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- G. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.
 - 1. At galvanized surfaces, primer shall be a zinc dust-zinc oxide coating.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
- B. Samples: Prior to beginning work, Contractor shall furnish color chips (2 fan decks) for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
 - 1. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.
- C. Acknowledgment of Contract Documents: Contractor/ Installer shall submit to the Architect certifications signed by each of the Contractor and Installer attesting acknowledgment of requirements of the Contract Documents for specific project requirements indicated in this specifications.

1. Installer shall submit proof of evidence, (this project specification section) with his/her letter of certificate.
 2. Contractor / Installer shall not proceed with painting work of this section until submittal of required certifications are completed.
 3. Any work performed prior to completion of this submittal shall be subject to total rejection by the Architect. All rejected work shall be rectified without any additional cost to the Owner.
- D. Coating Maintenance Manual: Upon conclusion of the project, the contractor in conjunction with the coating manufacturer shall furnish a coating maintenance manual such as the Sherwin-Williams " Custodian Project Color and Product Information" report or equal. Manual shall include an area summary with finish schedule, area detail designating where each product/color/finish was used, product data pages, SDS pages, care and cleaning instructions, touch up procedures and color samples of each color and finish used.

1.5 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
1. Name or title of material.
 2. Fed. Spec. number, if applicable.
 3. Manufacturer's stock number and date of manufacturer.
 4. Manufacturer's name.
 5. Contents by volume, for major pigment and vehicle constituents.
 6. Thinning instructions.
 7. Application instructions.
 8. Color name and number.

1.6 JOB CONDITIONS

- A. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- B. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- D. Provide sufficient temporary illumination producing overall space/room minimum illumination level of 50 ft. candles while preparing or painting of surfaces and to assure the production of quality finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - 1. M A B
 - 2. Benjamin Moore
 - 3. PPG Architectural Coatings
 - 4. The Sherwin-Williams Company
 - 5. Linetec Inc.
 - 6. Or approved equal

2.2 COLORS AND FINISHES

- A. Prior to beginning work, Contractor shall furnish color chips for surfaces to be painted from manufacturers full line of products. This shall include custom colors.
 - 1. Contractor shall allow for split frames at all new and existing hollow metal door frames to be painted.
 - 2. Final acceptance of colors will be from samples supplied on the job.
- B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

2.3 MATERIALS

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide undercoat paint recommended and produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.4 EXTERIOR PAINT SCHEDULE

- A. Basis of Design: Provide the following paint systems for the various substrates, or approved equal manufacturer / system:
- B. Semi-Gloss Enamel (Waterbased Alkyd Urethane Enamel Finish)
 - 1. 1st Coat: Sherwin-Williams, Extreme Bond Exterior Primer.
 - 2. 2nd Coat: Sherwin-Williams, Pro Industrial Waterbased Alkyd Urethane.
 - 3. 3rd Coat: Sherwin-Williams, Pro Industrial Waterbased Alkyd Urethane.
 - 4. Apply to the following exterior surfaces: Lintels, ferrous metal, and other exterior assemblies to receive paint.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

2.5 INTERIOR PAINT SCHEDULE

A. Semi-Gloss (Satin) Enamel:

1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer.
2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic.
3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic.
4. Apply to following interior surfaces: Hollow metal work, miscellaneous steel and ferrous metal fabrications.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

B. Egg-Shell / Satin Enamel - Acrylic Latex:

1. Base Coats: Enamel Undercoat; Primer-Sealer to suit substrate or Loxon Block Surfacer for Concrete Masonry/CMU Block.
 - * Block Filler shall be Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance before application of finish coats.
2. 2nd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel.
3. 3rd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel.
4. Apply to the following interior surfaces: Concrete masonry units, gypsum drywall and other interior assemblies to receive paint.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

C. Water-Based Acrylic Epoxy:

1. Base Coats: Block fillers (Sherwin-Williams Loxon Block Surfacer and/or Primers recommended by manufacturer).
 - * Block Filler shall Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance and before finish coat applications.
2. 2nd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy.
3. 3rd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy.

4. Apply to following surfaces: CMU and other surfaces where indicated or required.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

2.6 EXTRA STOCK

- A. Contractor shall provide one gallon of extra stock for each color/type selected for use on the project. Provide unopened containers clearly marked with manufacturers color number and name.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions, included rotted or otherwise defective materials, have been observed by all concerned and corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General:
 1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 2. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
 3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
 4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
 5. Painting of materials shall commence only when the moisture content of the materials complies with manufacturer's recommendations as follows:
 - a. Concrete and masonry - 22% maximum.

b. Gypsum drywall - 12% maximum.

B. Cementitious Materials:

1. Prepare cementitious surfaces of concrete, concrete block, cement plaster and gypsum drywall board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
2. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

C. Ferrous Metals:

1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
2. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.
3. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
- D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.4 APPLICATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Where finish schedule calls for walls, or ceilings to be painted, paint all new and existing surfaces in same area. Paint from corner to corner on walls, or ceilings, or to a major change in direction of surface to be painted. Provide crisp, clean, sharp lines where new painted surfaces abut existing painted surfaces.

- C. **Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.**
- D. Sand lightly between each succeeding enamel coat.
- E. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- F. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- G. **Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer and an acceptable finished appearance in finish, color and appearance as determined by the Architect.**
- H. Primer Coat: Apply primer coat of material which is required to be painted or finished, and which has not been prime coated by others.
 - 1. **Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.**
- I. **Block Fillers: Apply block fillers using manufacturer's recommended application techniques with sufficient material and coats to achieve a pinhole-free, "Level 3 - Premium Fill Surface", and in accordance with PDCA 's industry standards.**
- J. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- K. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 CLEAN-UP AND PROTECTION

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
- B. Upon completion of painting work, clean all paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION 09900

SECTION 10440 - SPECIALTY SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of specialty signs is shown on the drawings.
- B. Forms of specialty signs required include the following:
 - 1. Panel signs (Room Identification Signs).
 - 2. Installation of all specialty signs.

1.3 QUALITY ASSURANCE

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.
- B. All signs shall conform to the International Building Code and ICC/ANSI A117.1. - 2017 requirements for accessible building elements.
 - 1. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
 - 1. Submit full-size sample units, if requested by the Architect. Acceptable units may be installed as part of the work.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Americraft Inc.
2. Architectural Graphics Inc.
3. ASI Sign Systems, Inc.
4. Bayuk Graphic Systems, Inc.
5. Brandon Signage Co.
6. Designer Sign Company.
7. Gemini
8. Howard Industries
9. Metro Signs.
9. Mohawk Sign Systems.
10. Or approved equal.

2.2 MATERIALS

- A. GENERAL: Provide manufacturer's standard plastic signage which comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2017 Barrier Free Standards. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).
1. Acrylic sheet material to be cut to the desired sizes with radius or square corners as indicated, or as per approved shop drawings.
 2. Manufacturer's standard extruded acrylic material, as indicated, for Barrier Free Accessible signage indicating International Symbol of Accessibility.
 3. "Helvetica Regular" letter style, Domed Grade II Braille and other pictograms as described herein.
 4. Colors: As selected by the Architect from manufacturer's standards after award of contract, or as specified herein.

2.3 FABRICATION

- A. Unframed Panel Signs: Fabricate unframed panel signs with edges mechanically and smoothly finished to conform with the following requirements:
1. Edge Condition: Square cut.
 2. Corner Condition: Provide radius corners for each sign type.

2.4 SIGNAGE

- A. GENERAL: ALL signage MUST comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2009. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).
- B. INTERIOR SIGNAGE:
1. Room Names and Numbers Signage:
 - a. Provide Room Name and Numbers plastic signs for all rooms with name and room number, as shown on drawings and schedules.
 - 1) Type "8" Signs - Media Center / Library, etc.:

- a) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
 - 2) Informational Signage:
 - a) Provide informational plastic signs at selected doors, as shown on drawings and schedules.
 - i) Signs - "THIS IS NOT AN EXIT", "EXIT", etc.:
 - (1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
 - 3) Sizes: As indicated or as directed by the Architect / Owner.
 - 4) All room signs shall have radius corners.
2. Signage Locations:
 - a. Along the door on the latch side and shall be mounted as follows:
 - 1) 48" minimum to the lowest tactile character on the sign measured from the finish floor.
 - 2) 60" maximum to baseline of highest tactile character on the sign measured from the finish floor.
 - b. For locations having double doors, mounting shall be to the right of the right hand door.
 - c. Where there is no wall space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.
3. Graphic Content and Style: Provide sign copy to comply with the requirements indicated for sizes, styles, spacing, content, positions, materials, finishes and colors of letters, numbers, symbols and other graphic devices.
 - a. Raised Copy Thickness: Not less than 1/32" from the sign face.
 - b. Raised characters shall be in different color and meets the Barrier Free requirements for a 70% contrast ratio of colors. Colors shall be selected from manufacturer's available full range of colors.
 - c. Raised characters and symbols for tactile signs shall be 5/8" high minimum and 2" high maximum. Sign size shall suit the required letters and numbers.
4. Braille Copy: Braille Copy shall be Grade II and shall conform to Specification 800, National Library Service, Library of Congress. Braille shall be raised integral .0625 diameter.
 - a. Braille shall be separated 1/2" minimum from the corresponding raised characters or symbols.
5. Mounting: As directed by the Architect using required fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Locate sign units and accessories where shown or scheduled, using mounting methods of the type described and in compliance with the applicable Codes and regulation.
- B. Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

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- C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
 - 1. Silicone Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous or vinyl-covered surfaces.
 - a. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
 - b. Fasteners and Anchors: Manufacturer recommended concealed types for indicated signage and substrate materials.

3.2 CLEANING AND PROTECTION

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10440

PART 4
PLUMBING WORK

SECTION 220010 - GENERAL REQUIREMENTS PLUMBING

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PART 1 - GENERAL REQUIREMENTS PLUMBING

1.1 GENERAL

- A. The conditions of Divisions 00 and 01 apply to each and every Trade Contractor or other person or persons supplying any material or labor entering this building and/or site, either directly or indirectly. In the event of a conflict between Section 220010 and Divisions 00 and 01, the terms of Divisions 00 and 01 shall govern.
- B. One Building Trade, the Plumbing Building Trade, will be covered by these General Requirements Plumbing.
- C. For simplicity, this Building Trade will be referred to further herein as the Plumbing Trade Contractor. The Plumbing Specifications and all Plumbing Drawings, together with all addenda make-up the Plumbing Contract Documents, and are a part of the "Project Contract Documents", as described throughout these specifications.
- D. The term "Electrical Trade" as used in the Contract Documents, means the Electrical Building Trade.
- E. The term "indicated" means all information included, detailed, shown and/or implied on the Contract Documents.
- F. The term "existing" is used generally in reference to renovation projects. On new construction projects, the term "existing" is intended to mean work already in place.

1.2 SCOPE AND OBJECTIVES OF THE PLUMBING WORK

- A. Scope of work includes, but is not limited to, the following:
 - 1. Submittals including product data, shop drawings and samples;
 - 2. Removal of selected plumbing piping and accessories;
 - 3. Piping, insulation and valves;
 - 4. Preparation of coordination drawings;
 - 5. Preparation of as-built drawings in AutoCad format;
 - 6. Periodic inspection of completed work to confirm compliance with Contract Documents;
 - 7. Refer to Division 01 Section "Summary" for additional information.

1.3 INTENT OF THE PLUMBING CONTRACT DOCUMENT

- A. The intent of the Plumbing Contract Documents is to include all items and labor necessary for the proper execution and completion of the Work of the Plumbing Trade Contractor. The Contract Documents of all Trades are complimentary to each other; what is required by one shall be as binding as if required by all. Performance of the Plumbing Trade

Contractor is required only to the extent consistent with the Project Contract Documents and reasonably inferable from them as being necessary to produce the desired results.

- B. It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Architect/Engineer may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work. In the event of such ambiguity or discrepancy, comply with the higher cost product (material plus labor), the more stringent requirement, and supply the better quality or greater quantity of work.

1.4 PROPOSAL PREPARATION

- A. Prior to submitting a pricing quotation/proposal, proceed as follows, and include the following:
 - 1. Visit the site, survey, record, confirm and include in the scope of work, all material and labor necessary to install the equipment and systems indicated. Use the Contract Documents as diagrammatic in nature, since they are not intended to show all details which may affect the plumbing bid proposal.
 - 2. Include the work, as applicable, to remove and dispose of plumbing piping, insulation and appurtenances, not required for new work, unless otherwise indicated to be abandoned in place.
 - 3. Include all disconnections, removals and temporary provisions required to permit rigging, installation, connection, testing and operation of the new equipment. Include all such provisions whether or not shown, detailed or specified within technical sections of the Contract Documents.
 - 4. Include in the work, providing the labor of Keymen, including, but not limited to the following:
 - a. One Project Manager;
 - b. One Project Foreman.
 - 5. Foreman must refine the detail, layout, coordination and fit of all of the plumbing piping. Plan all disconnections, removals, offsets, temporary provisions, as required, to fit the new piping into the space, and as required to accommodate maintenance accessibility and service access.
 - 6. Project Manager must maintain and submit for approval, a written project schedule, on a weekly basis.
 - 7. All Project Managers must organize, administrate, control and log the RFI process for their respective trade. Where applicable, submit all RFI(s) for master RFI log maintained by Lead/Prime Contractor.
- B. In preparing a Bid Price:
 - 1. Thoroughly review and confirm all existing conditions and Contract Document information. Make note in writing of any exceptions, misunderstandings, unclear areas, unclear directions, and any aspects which will prohibit completion of the work, in total. Failing to supply such notice, all bidders will be accountable for having accepted all conditions at the site which affect their work and their costs. By

submitting a bid price, all Trade Contractors certify that the Contract Documents have been thoroughly reviewed and are sufficient for construction, and that the bidding Trade Contractors have adequate information to establish and determine their responsibility for materials, methods, costs, and schedule for their work.

2. Incorporate all requirements of all sections of the Contract Documents.
3. Include the following with the Manufacturer's and Sub-Contractor's Lists:
 - a. The name and telephone number of all Sub-Contractors.
 - b. The manufacturer and model numbers of all equipment proposed by the bidder and as listed on all of the equipment schedules and specified in the Contract Documents.

1.5 HAZARDOUS MATERIALS

- A. The use of asbestos, PCB's or any material or product containing hazardous materials in the performance of this contract is not permitted. Certify, in writing, that no hazardous material or product containing a hazardous material, has been furnished or installed.

1.6 DRAWINGS AND SPECIFICATIONS

- A. It is the intent of the specifications and drawings to include under each item all materials, apparatus and labor necessary to properly install, equip, adjust and put into perfect operation the respective portions of the installations specified and to so interconnect the various items or sections of the work as to form a complete and properly operating whole.
- B. Any apparatus, machinery, small items not mentioned in detail which are necessary to complete or perfect any portion of the installation in a substantial manner and in compliance with the requirements stated, implied or intended must be furnished and/or installed without extra cost to the Project. This includes all materials, devices or methods peculiar to the machinery, apparatus or systems furnished and/or installed by the Plumbing Trade Contractor.
- C. In referring to drawings, figured dimensions take precedence over scale measurements. Verify all wall locations, ceiling heights, elevations, dimensions, etc. on the architectural drawings, where applicable. Discrepancies must be referred to the Engineer for decision. Certify and verify all dimensions, routings and layouts in the field and on the coordination drawings before ordering material or commencing work.
- D. Any work called for in the specifications, but not mentioned or shown on the drawings, or called for on the drawings, but not mentioned in the specifications, must be furnished and/or installed as though called for in both.
- E. When any device or part of equipment is herein referred to in the singular number, such as "the pump" such reference is deemed to apply to as many such devices as required to complete the installation.
- F. The term "Provide" means "Furnish and Install". Neither term will be used generally in these specifications, but will be assumed. The term "Furnish" means to obtain and deliver to the job site for installation by other trades.

1.7 LAWS, ORDINANCES, REGULATIONS AND PERMITS

- A. The entire plumbing system in all and/or in part must conform to all pertinent laws, ordinances and regulations of all bodies having jurisdiction, notwithstanding anything in these drawings or specifications to the contrary.
- B. Pay all fees and obtain and pay for all permits and inspections required by any authority having jurisdiction in connection with the work under this contract.
- C. Electrical work performed by the Plumbing Trade Contractor must comply with the requirements of the National Electrical Code, NFPA and other boards and departments having local jurisdiction.

1.8 TESTS

- A. The following requirements are supplementary to tests specified for individual equipment or systems in other specification sections. Give written notice of date of test in ample time to all concerned.
- B. Concealed or insulated work must remain uncovered until all required tests have been completed; but if construction schedule requires, arrange for partial tests on portions of systems as approved. If a Prime Contractor covers or directs a Sub-Contractor to cover plumbing work prior to completing the required tests, the Prime Contractor is responsible for any additional costs related to completing the required tests.
- C. As soon as conditions permit, conduct preliminary tests of equipment to ascertain compliance with specified requirements. Make needed changes, adjustments and/or replacements as preliminary tests may indicate, prior to acceptance tests.
- D. Conduct pressure, performance and operating tests as specified or required for each system or piece of equipment installed, modified or affected under this contract in presence of the Engineer or Owner as well as a representative of agencies having jurisdiction.
- E. Obtain Certificates of Approval and/or Acceptance as specified or required in compliance with regulations of agencies having jurisdiction. Work will not be deemed complete until such Certificates have been delivered to the Engineer.
- F. Prove conclusively, by testing, that Plumbing systems operate properly, efficiently and quietly in accordance with intent of drawings, specifications and most widely used construction practices.

1.9 CLEANING

- A. Be responsible for the following:
 - 1. Removal of all lumber, refuse, metal, piping and debris from site resulting from plumbing work.

2. Cleaning drippings created by the plumbing work, from finished work of other Trades.

1.10 GUARANTEE

- A. All material, equipment and workmanship must be in first class operating condition in every respect at time of acceptance by Owner. Acceptance by the Owner will be by letter written to the Plumbing Trade Contractor.
- B. Unconditionally guarantee in writing all materials, equipment and workmanship for a period of one (1) year from date of acceptance by Owner. During the guarantee period, repair or replace, at the Plumbing Trade Contractor's expense, any materials, equipment or workmanship in which defects may develop and provide free service for all equipment and systems involved in the contract during this guarantee period. Beneficial use of any system by the any of the Trade Contractors during construction does not constitute acceptance by the Owner. Time period of this beneficial use cannot be included in the guarantee period.
- C. Guarantee must also include restoration to its original condition of all adjacent work that is disturbed in fulfilling this guarantee.
- D. All such repairs and/or replacements must be made without delay and at the convenience of the Owner.
- E. Guarantees furnished by Trade Contractors and/or equipment manufacturers must be counter-signed by the related Trade Contractor for joint and/or individual responsibility for subject item.
- F. Manufacturers' equipment guarantees or warranties extending beyond the guarantee period described in item B above must be transferred to the Owner along with the Trade Contractor's guarantees.

1.11 ENTRANCE OF EQUIPMENT

- A. Determine the method of equipment entrance during initial site visit prior to bidding. Do not scale building openings, door widths, and equipment or component sizes off the drawings. Determine sizes from site measurements and the equipment manufacturer. Include cost of equipment manufacturer's knockdown, use of field assembled equipment, field assembly, all work required for access, removals, replacements, general construction, and the like, as required. During preparation of submittals, verify whether knocked-down or pre-disassembled equipment have been proposed all to the extent required to permit entry of equipment to final location. Verify that the use of field assembled (not pre-assembled) equipment complies with manufacturer's warranty, guarantee, listings and requirements.
- B. Perform all necessary rigging required for completion of plumbing work.

- C. Deliver products to the site properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Deliver products and equipment to the site properly weatherproofed.
- D. The Trade Contractor who furnishes or purchases the product or equipment is responsible to provide and maintain protection from the weather, dust, dirt, construction debris, etc. until the project is complete.
- E. For all products and equipment which, when installed, have an opening into the building must be provided with a plywood cover, or similar protection, to prevent debris, rain, etc. from entering the building. The Trade Contractor who installs the product or equipment is responsible for such protection beginning at the time of installation.

1.12 VISIT TO SITE

- A. Due to the nature of the work involved under these Contract Documents, all bidders are recommended to thoroughly examine the site. Coordinate and schedule all site visits with the Owner.
- B. Thoroughly review Contract Documents prior to visiting the site, take Contract Documents to site and thoroughly explore to any extent necessary, the existing conditions as relating to fulfilling the requirements of these Contract Documents.
- C. If discrepancies are noted between requirements of Contract Documents and existing conditions, Trade Contractors must so indicate to Engineer during bidding period and receive clarification before bidding. Failure to comply with this requirement will result in Engineer's interpretation during the construction period such that the Engineer's decision will be final and binding as the sole interpreter of the contract requirements.
- D. Extras will not be considered for any work relating to connections with existing systems or adaptability of new systems to existing structures.
- E. Submission of proposals will be considered evidence that Trade Contractors have complied with the requirements of this Article.

1.13 REQUESTS FOR INFORMATION, RFI(s)

- A. Manage RFI(s) in a formal manner. Preparation and submission must comply with the process specified herein to be of maximum benefit to the project. RFI(s) which do not comply with this process will be returned without comment.
- B. All RFI(s):
 - 1. Must be submitted in written form to the party designated at the construction phase kick-off meeting;
 - 2. Must be consecutively numbered, dated, and logged as directed, during the kick-off meeting;
 - 3. Those which are follow-up RFI(s), must use the same RFI number, with a sequential submission number;

4. Must list the RFI number of any reference RFI(s) used in the narrative;
 5. Must present: background; related drawings; specification articles; room, space locations (as designated on Contract Documents including wing, column line designation, floor designation, and/or north, south, and the like), and must be presented as complete, clearly written thoughts, in legibly printed or typed form;
 6. Must be completed by the Plumbing Trade Contractor's Designated Project Foreman, under the control and overview of the Plumbing Trade Contractor's Project Manager;
 7. Must include Plumbing Trade Contractor's Project Foreman's suggested resolution to RFI;
 8. Must evidence a high level of fluency with the Contract Documents, all job progress correspondence, all Addenda, all Construction Bulletins, and specifically the Plumbing/Electrical Specifications including: Section 210010; the sections of Division 22; Division 23; Division 26; and special system and equipment divisions of the specification Divisions 02 thru 33 inclusive.
- C. The Plumbing Trade Contractor's designated Project Manager must demonstrate familiarity with and responsibility for all RFI(s) prepared by the Project Foreman and must periodically submit an initialed log of RFI(s) signifying control of RFI(s) relating to specification and job scope issues.
- D. Issues relating to job scope, work included, methods and means which are either clearly discernable from the Contract Documents and/or clearly the responsibility of the Plumbing Trade Contractor must be answered by Plumbing Trade Contractor's Project Manager and resolved between the Foreman and Project Manager prior to resorting to written RFI(s). The work of the Project Manager must evidence: fluency with the methods and means anticipated by the Plumbing Trade Contractor during the bid phase to plan and complete the work; fluency with the Contract Documents, and all administrative issues related thereto.
- E. Items or issues which relate to non-compliance to associated codes or regulations must reference code interpretations or the published adopted code or regulation. The reference must be either an excerpt of the code or regulation, published addenda to the code or regulation, a formal interpretation written by a representative of the associated agency, or letter of non-compliance from the Authority Having Jurisdiction. All cited code requirements must include the applicable code title, code version or date, and code section number designation. If the RFI does not contain the required information, the RFI will be returned without comment.

1.14 AS-BUILT DRAWINGS

- A. Prepare reproducible (paper) and electronic (cd) record documents in AUTOCAD .dwg format (Version 2000 or later) in accordance with the requirements in Division 01. Use commercial CAD drafting service if Plumbing Trade Contractor does not have CAD capabilities in-house. As an option, if requested by the Plumbing Trade Contractor, an electronic copy (AutoCad .dwg format) of any of the Plumbing Contract Drawings may be provided by the Engineer at a cost of \$55.00, billable to the requesting Contractor. In addition to the requirements specified in Division 01, indicate the following installed conditions:

1. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, and the like). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping, and the like.
 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines and annotated with permanent equipment number approved by Owner. Include Code and equipment service clearances.
 3. Approved substitutions, Addenda and Bulletin Contract Modifications, and actual equipment and materials installed
- B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located, as specified in Division 01, to record the locations and invert elevations of the underground plumbing work.

1.15 EXCAVATION AND BACKFILLING

- A. Perform all excavation, backfilling and pumping necessary for completion of plumbing work. All excavation is considered classified.
- B. Remove from premises or deposit as directed by Engineer all material excavated and not required or suitable for backfilling.
- C. Carefully remove and store topsoil, shrubbery and sod until underground work is complete and trenches are backfilled and then re-install. Replace any damaged items to the satisfaction of the Engineer.
- D. Allow adequate cover over piping and conduit in trenches as applicable. Trench walls must be perpendicular to the top of piping and conduits and trench bottoms must be instrument graded in the direction of flow as required. Earth must be scooped out under pipe hubs to provide a solid bearing for the pipe, duct or conduit on undisturbed earth. Cinder fill, stones or bricks beneath piping are prohibited. Pipe, and conduits less than 6-inches in outside diameter which do not require sloping, shall have hard trench bottoms and shall be supported on undisturbed subgrade. Trench bottoms for sloping utilities, pipes, and conduits over 6-inches in outside diameter shall be excavated 6-inches deeper than elevation and a 6-inch thick tamped bedding shall be installed. Bedding shall be naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- E. Provide sheathing, shoring and bracing necessary to complete excavation and backfilling work and exercise every precaution necessary to prevent accident, injury or death to any human and damage to property of others. Remove all debris, sheathing, shoring and bracing upon completion of work.
- F. It is the responsibility of each Trade Contractor to check with the various Utility Companies and make the necessary arrangements to avoid damage to their property. Each Trade Contractor is responsible for damage during excavation to existing underground structures including, but not limited to electric, structural, piping or

equipment. Such damage must be repaired promptly without cost to the Project. Do not dig until all underground utilities are identified and located.

- G. Backfill after inspection and approval. Backfill must be made with clean earth, free from rocks, frozen particles, debris or other foreign materials. Deposit in uniform layers not over six inches (6") thick with each layer mechanically tamped before the next layer is applied. When approved backfill material is not available from the site, each Trade Contractor, at no additional cost to the project, must provide additional select backfill to complete installation. Partial backfill on piping leaving all joints exposed is mandatory for all underground gas and underground domestic water systems. Final backfill only after testing procedures have been approved.
- H. All trenches that pass under wall foundations must be backfilled with lean concrete, full height, directly under wall footing, and at a 1:1 slope away from wall or column footing. Trenches that are parallel with and deeper than wall foundations must be backfilled with lean concrete on a 1:1 slope away from the bottom of the wall or column footing.
- I. Perform all cutting and patching to driveways, sidewalks, curbs, bituminous paving, walls, and the like, required by performance of excavation and backfilling. Install and maintain temporary paving as directed by Engineer. Make repairs to sidewalks in complete blocks, partial patching will not be acceptable. Provide all materials for patching in strict accordance with applicable Articles of Divisions 01 through 33 of the Contract Specifications. All patching to match adjacent construction.
- J. Where rock is encountered during installation of underground piping systems, carry trenches to a point six inches (6") below invert of pipe and provide a six inch (6") layer of crushed stone or gravel as a cushion.
- K. All excavation work must include all pumping equipment, materials and labor necessary to keep all excavations free of water. Provide well points as required with disposition of water as directed by Architect/Engineer.
- L. Provide suitable indemnity for all accidents to humans, animals or equipment caused by excavating and backfilling work. Provide suitable guards, barricades, red lanterns, flares and take the necessary precaution for an approved and safe installation. All trenches must be backfilled at the end of each working day. Where a trench must be left open, provide coverings of adequate size and strength over entire open area.
- M. Detectable Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6-inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil and dangerous materials.
 - 3. Blue: Water systems.
 - 4. Green: Sewer systems.

- N. Trade Contractors shall engage the services of a Utility Identification Sub-Contractor to identify all existing underground utilities in the path of the proposed trench excavation. It shall be the Utility Identification Sub-Contractor's sole responsibility to search, investigate, test and identify existing underground utilities such as, but not limited to the following: gas piping, water piping, steam piping, condensate piping, electrical lines, sanitary piping, storm water piping, data, telephone, fiber optics and any other utility service, piping, lines or trenches. Before excavation can begin, the Trade Contractors shall provide all utility data concerning the underground utilities to Design Professional, and Owner. Data shall be in the form of a scaled drawing of the proposed excavation with all utilities clearly indicated.

1.16 CONTINUITY OF SERVICES

- A. Generally, no actions can be taken by the Plumbing Trade Contractor that will interrupt any of the existing building services for these buildings or any other building until previously arranged and scheduled with the Engineer and Owner.
- B. Should any service be interrupted by the Plumbing Trade Contractor, immediately provide all labor, including overtime if necessary, and all material and equipment necessary for restoration of such service, at no additional cost to the Project.

1.17 CONTINUITY OF INTERIOR BUILDING SERVICE UTILITIES

- A. For the purposes of this specification section, "Building Service Utilities" include, but are not limited to:
 - 1. Exterior: electrical; domestic water; fire protection water; sanitary; storm; chilled water; space heating water; fuel lines; communication cable; fire alarm; remote metering lines; telemetry lines; and the like;
 - 2. Heating piping systems, complete;
 - 3. Chilled water piping systems, complete;
 - 4. Heating and process steam/condensate systems, complete;
 - 5. Ductwork systems, complete;
 - 6. Medical gas systems, complete;
 - 7. Fire protection systems, complete;
 - 8. Control systems, complete;
 - 9. Plumbing, drainage and storm systems, complete;
 - 10. Process piping systems, complete;
 - 11. Electrical conduit and wiring systems, complete;
 - 12. Electrical lighting and wiring devices, complete;
 - 13. Electrical fire alarm and security systems, complete;
 - 14. Electrical communication systems, complete.
- B. Building Service Utilities are defined for the purposes of this project, and as used in these specifications as:
 - 1. TYPE A Utility System Services. New Internal Building Services, serving: new and/or modified system functions; new and/or modified equipment;

2. TYPE B Utility System Services. Existing Internal Building Services serving: unmodified systems; unmodified equipment; building spaces for which mechanical and electrical systems, and internal operational equipment have not been modified by this project;
 3. TYPE C Utility System Services. Existing Utility Systems Building Services, external to the individual building, or buildings, addressed by the work of this project;
 4. TYPE D Utility System Services. New Utility Systems Building Services, external to the individual building, or buildings, addressed by the Work of this project.
- C. Plan work and schedule to prevent interruption of TYPE B, and/or TYPE C Utility System Services. Refer to the "Scope and Objectives of the Plumbing Work," of this Section for a description of: unmodified systems, unmodified equipment; spaces wherein mechanical and electrical systems are unmodified; and Utility System Services external to the individual building or buildings addressed by the work of this project.
- D. Plan work and schedule installation and connections of TYPE A and TYPE D Utilities to minimize or prevent interruption of TYPE B, and or TYPE C Utility System Services. Refer to "General Requirements Plumbing," Article "Scope and Objectives of the Plumbing Work."
- E. The work required for continuity of these systems on this project includes, but is not limited to, providing all labor and material required for: site investigation/verification; disconnect; removal; rerouting; reconnection; as-built drawing documentation; testing and check out of mechanical and electrical services serving equipment which are implied to be, or specifically indicated to be, continued in operation.
- F. All materials required for relocation work must comply with these specifications. Carefully review all phasing drawings, all Construction Trade drawings, and complete all necessary and prudent site visits to become familiar with all existing building operations, systems and equipment which may be continued, independent of the work of this project, and include all required relocation work described in this section.

1.18 TEMPORARY FACILITIES, UTILITIES AND HEATING

- A. Refer to Division 01 of these specifications.

1.19 SMOKE AND FIRESTOPPING (GENERAL)

- A. Furnish and install a material or a combination of materials to form an effective barrier against the spread of flame, smoke and gases, and to maintain the integrity of the "fire and/or smoke" rated construction. Refer to Division 07 of these specifications. Fire and smoke rated construction is identified on the Architectural Drawings. Provide firestopping in the following locations:
1. Pipe and conduit penetrations through above grade floor slabs and through "fire and/or smoke"-rated partitions and fire walls.
 2. Penetrations of vertical shafts including, but not limited to pipe chases, duct chases, elevator shafts, and utility chutes.
 3. Other locations where indicated or required.

- B. Prepare submittals and submit for approval. Include manufacturer's descriptive data, typical details, installation instructions and the fire/smoke test data and/or report as appropriate for the time rated construction and location. The fire/smoke test data must include a certification by a nationally recognized testing authority that the material has been tested in accordance with ASTM E 814, or UL 1479 fire tests.
- C. Deliver materials in the original unopened packages or containers showing name of the manufacturer and the brand name. Store materials off the ground, and protect from damage and exposure to elements. Damaged, deteriorated or outdated shelf life materials shall not be used and must be removed from the site.

1.20 COORDINATION DRAWINGS

- A. The Contractor will initiate preparation of coordination drawings, control original reproducibles, collect, organize and facilitate the work/input of General Construction Trade Contractor and all other building trades, as applicable, relative to the 100% final submission of the coordination drawings. Coordination drawings will be prepared in accordance with Division 01, to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of equipment and materials in relationship with other systems, installations, and building components. Use proposed equipment submittals, which include certified dimensions, service clearances, etc., to assist in preparation of the coordination drawings. If equipment is submitted for review after completion of the coordination drawings and rejected during the submittal review process, because the equipment fails to meet the project specifications, the Trade Contractor is responsible to revise the coordination drawings and layout the work using equipment which meets the project specifications. Trade Contractor will designate all specified return air plenums, locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 - 1. Proposed locations of piping, ductwork, equipment, and materials. The following shall be included:
 - a. Clearances for installing and maintaining insulation.
 - b. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - c. Equipment connections and support details.
 - d. Exterior wall and foundation penetrations.
 - e. Fire-rated wall and floor penetrations.
 - f. Sizes and location of required concrete pads and bases.
 - g. Valve stem movement.
 - h. Service clearance for equipment behind access doors.
 - i. Location of structural columns, beams and supports.
 - 2. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 - 3. Floor plans, elevations, and details to indicate penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.

4. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling mounted items.
 5. The foregoing information and coordination work must be provided by the applicable Trade Contractor using the coordination drawings as initiated by the Trade Contractor.
 6. The Trade Contractor must submit completed coordination drawings for record purposes, not for technical review and approval, but as proof that the coordination drawings have been completed. The coordination drawings must be completed and submitted for record in advance of submission of sheet metal shop drawings.
- B. Coordinate with, and provide the Trade Contractor, all plumbing system and equipment information, locations, and clearances required, to prepare the coordination drawings.

1.21 TRADE CONTRACTOR'S CERTIFICATION

- A. Upon final completion of all work, each Trade Contractor must provide a notarized letter on Corporate letterhead, executed by a Corporate Officer, or Company Partner, stating that the work has been completed in accordance with the Contract Documents, Addenda, Bulletins, Trade Contractor's Punch List items and Architect's/Engineer's Construction Observation Report(s). Final Payment will not be approved until the notarized letter has been provided. Refer to the following sample letter.

SAMPLE LETTER

ENGINEER/ARCHITECT _____

TRADE CONTRACTOR _____

PROJECT _____ NO. _____

I hereby certify that all work under the HVAC, Plumbing, Fire Protection and Electrical Contract Documents, as applicable, including all addenda, bulletins, Punch List items and Construction Observation Reports, has been completed and the quality and workmanship of the work has been performed in accordance with Contract Documents.

State of: _____

County of: _____

Trade Contractor:

Subscribed and Sworn to before
me this _____ day of
20 _____

Notary Public:

By: _____

Date: _____

My Commission Expires:



1.22 CONNECTIONS TO EXISTING SYSTEMS

- A. Work under this contract may require connections to existing domestic water systems. Include in the bid, all material and labor necessary to perform the following work:
1. Drain the system to level necessary to complete the work;
 2. Fill the system to original fill pressure while venting excess air from the system.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S AND SUB-CONTRACTORS LIST, KEYMEN RESUMES

- A. Before ordering any material or equipment unit, and not later than ten (10) working days after signing of contracts, submit a list of Manufacturers, Sub-Contractors and Suppliers showing make, type, manufacturer's name and trade designation of all materials, and equipment, proposed for use under this contract. Prepare list by reference to

specifications. Identify all long lead submittals which will require an expedited submittal review.

- B. Refer to the Article "Proposal Preparation," in this section. Specifically designate the labor force required of the Plumbing Trade Contractor. As part of the mobilization phase of the work, submit resumes for each Keyman including the Project Manager and Project Foreman.
- C. These lists, when approved, will be supplementary to specifications, and no variations therefrom will be permitted except with the approval of the Engineer.
- D. Prepare the list using the "PROPOSED MANUFACTURERS AND SUB-CONTRACTORS LIST" located at the end of this section.
- E. Submittals will not be processed until the requirements of this Article are satisfactorily completed.

2.2 SUBMITTALS

- A. Provide digital submissions (.pdf format) for all material and equipment as noted in Proposed Manufacturer's and Sub-Contractors List, except where indicated otherwise herein.
 - 1. Prior to submission of product data, shop drawings, and samples, notify the Engineer/Architect of any site conditions differing from those indicated or specified.
 - 2. Prior to submission of product data, shop drawings and samples to the design professional, the Plumbing Trade Contractor shall submit all submittals which require electrical power to the Project Electrical Trade Contractor for the Plumbing Trade Contractor's and Electrical Trade Contractor's coordination and review. Electrical Trade Contractor shall provide approval of electrical power requirements for the Plumbing Trade Contractor's proposed equipment.
 - 3. All submittals of equipment requiring electrical power must be accompanied by the "PLUMBING AND ELECTRICAL CONTRACTORS' COORDINATION OF PLUMBING EQUIPMENT ELECTRICAL REQUIREMENTS TRANSMITTAL COVER SHEET" located at the end of this section. Submittals without this Cover Sheet or an incomplete Cover Sheet will be rejected without review.
 - 4. All submittals must be accompanied by the "PLUMBING CONTRACTOR'S TRANSMITTAL COVER SHEET" located at the end of this section. Submittals without this cover sheet or with an incomplete cover sheet, will be rejected without review.
 - 5. All submittals must be accompanied by the "PLUMBING SUBMITTAL LOG", located at the end of this section. Submit log after final acceptance of the proposed Manufacturer's and Sub-Contractor's list. Revise and update the log with each submittal. Submittals without these logs or without an updated log will be rejected without review.
 - 6. Specifically annotate and sign all exceptions, deletions and additions that vary from the Project Contract Documents. Failing to provide signed annotations for all deletions and additions, recognize and accept that Contract Documents will govern, and will be used to resolve disputes.

- B. Prepare submittals by careful reference to: drawings and specifications; preparatory layout of all work; coordination with all proposed equipment; coordination with related submittals and the work of all other Trade Contractors; space requirements; and TYPE A, TYPE B, TYPE C, and TYPE D Utilities defined in this Section. A review of such submittals by the Engineer/Architect, which include drawings, schedules, and catalog cuts provided by the Trade Contractors, their Sub-Contractors, manufacturers, and vendors, shall not relieve the Trade Contractors from the responsibility for correcting all errors of any sort in the submittals, either identified or undetected by such review.
- C. Regularly provide and update submittal log sheets listing submittal number, product, applicable specification section, dates of submittal and receipt and status. Identify each submittal by Job Name, log number and reference to applicable Specification Article number.
- D. Review Time:
 - 1. Allow two (2) weeks after Engineer's receipt for the Engineer's processing of each submittal, exclusive of Owner's, or other's review in the processing chain. Allow a longer time period where processing must be delayed for coordination with subsequent submittals.
- E. The Engineer's recommendation of acceptance of the equipment proposed by the Plumbing Trade Contractor is conditional upon the Plumbing Trade Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Plumbing Trade Contractor acknowledges compliance with all of the following:
 - 1. Field layout is completed and planning of proposed equipment has coordinated with all related submittals, related trades and space requirements.
 - 2. The Plumbing Trade Contractor has reviewed and approved all submittals prior to submission. Provide all submittals with a signed approval stamp, signifying the following: 1) all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data have been verified; 2) the Engineer/Architect has been notified of all site conditions which affect the work, and which require design resolution, as opposed to resolution by trade decisions; 3) all items are approved by the Plumbing Trade Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements; 4) submission is clearly marked to indicate which manufacturer's options are provided and which are not provided for the proposed equipment; and 5) manufacturers and/or equipment suppliers have been given a set of the contract documents for their review and use as the basis of the submittals.
 - 3. Any and all exceptions requested by the Plumbing Trade Contractor are provided in writing with the submittals. All exceptions, deletions and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide initialed annotations for all deletions and additions, the Plumbing Trade Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.
 - 4. Submittals without the Plumbing Trade Contractor's signed stamp of approval will be returned without review. Initialed approval stamps are not acceptable.
 - 5. The Engineer's acceptance of the proposed equipment constitutes the Engineer's formal approval that the engineering performance and operational utility

requirements, of the proposed equipment, match the Engineer's specified and designed performance requirements. By entering into these Contracts, the Trade Contractors agree that the purpose of submittals is to demonstrate to the Engineer that the Trade Contractors understand the design concept and that they demonstrate their understanding by indicating which materials and equipment they intends to furnish, install and use.

- F. Secure submittals smaller than 8-1/2 x 11 to paper of this size.
- G. Material and equipment fabricated, furnished and/or installed or used without the Engineer's review are subject to rejection by the Engineer.
- H. Corrections or comments made on submittals during review by the Engineer do not relieve the Plumbing Trade Contractor from compliance with the requirements of the Contract Documents. Such review will be only for general conformance with the design concept, and the information given in the Contract Documents and does not include review of quantities, dimensions, sizing, pressure drops, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Plumbing Trade Contractor. Review of a specific item does not indicate acceptance of an assembly of which the item is a component. The Engineer is not responsible for any deviations from the Contract Documents that are not clearly noted by the Plumbing Trade Contractor. The Engineer will not review partial submissions or those for which submissions for correlated items have not been received. The Plumbing Trade Contractor is responsible for: confirming and correlating all quantities, clearance, and dimensions; selecting fabrication processes and techniques of construction; coordinating work with all other Trades, and performing his work in a safe and satisfactory manner.
- I. All submittals must be able to be reproduced. The Plumbing Trade Contractor is responsible for all reproduction and distribution to the General Construction Trade Contractor and all other Trade Contractors as applicable.
- J. If requested for the Plumbing Trade Contractor's use in the preparation of submittals, an electronic copy (AutoCad .dwg format) of any of the Plumbing Contract Drawings may be provided by the Engineer, after receipt of a signed indemnification agreement, at a cost of \$55.00, billable to the Plumbing Trade Contractor.
- K. For additional requirements regarding submittals, refer to Article "Additional Trade Contractor Paid fees and Expenses" in Part 3 of this section.

2.3 MATERIALS AND EQUIPMENT

- A. All materials and equipment must be new and conform to the grade, quality and standards specified herein.
- B. All equipment offered under these specifications is limited to products regularly produced and recommended for service ratings in accordance with engineering data or other comprehensive literature made available to the public and in effect at the time of opening of bids. Testing agency seals, decals and/or nameplate shall be attached to and visible on all equipment.

- C. Items such as valves, motors, starting equipment, vibration isolating devices, and all other equipment and material, where applicable and practicable, must each be of one manufacturer.
- D. Install equipment in strict accordance with manufacturer's instructions for type and capacity of each piece of equipment used. Obtain these instructions, which will be considered part of these specifications. Type, capacity and application of equipment must be suitable and operate satisfactorily for the purpose intended in the plumbing systems.

2.4 EQUIPMENT VARIATIONS AND SUBSTITUTIONS

- A. Equipment Substitution Definition as follows:
 - 1. A product that is neither the Basis of Design, nor one of the named Alternative Manufacturing Sources.
 - 2. Unless noted otherwise in the Contract Documents, substitutions may be considered after the award of Contracts. Subsequent requests will be considered only when, through no fault of the Plumbing Trade Contractor, none of the specified products are available.
- B. Equipment Variation Definition as follows:
 - 1. A product that is not the Basis of Design, but is named as one of the specified Alternative Manufacturing Sources.
- C. The manufacturers listed in Part 2 of all technical specifications are considered Alternative Manufacturing Sources as described in Paragraphs A and B above.
- D. "Subject to compliance", as used in these specifications, means compliance with all the requirements of the Contract Documents.
- E. The materials and products mentioned in these Contract Documents are specified to establish a standard of: material of manufacture; independent testing agency certifications; quality; function; design; and performance. The phrases "Basis of Design," "standard of design," and "equivalent acceptable," are used to indicate that other similar, comparable products may be used provided such substitutes or variations are accepted by the Engineer as meeting all the salient characteristics and standards necessary, such as: material of manufacture; independent testing agency certifications; quality; function; design; and performance, to meet the Owner's needs and meet the objectives of the Engineer's Project Design.
- F. Where Alternative Manufacturer Sources are listed for an item:
 - 1. Selection must be either the Basis of Design or one of those listed Alternative Manufacturing Sources.
 - 2. There is no guarantee implied that each and every manufacturer listed can meet or exceed the salient characteristics, such as: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as Basis of Design.

- G. Each Trade Contractor is responsible to contact his proposed equipment manufacturer's representative and confirm, prior to preparing submittals, the proposed manufacturer's product meets or exceeds the: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design. Final acceptance will be determined by the Engineer, whose decision is final.
- H. Submittals offered as an Equipment Variation from the Basis of Design shall include a letter, on the product manufacturer's letterhead, certifying that the proposed product is a Comparable Product to the product specified as the Basis of Design and conforms to all the salient characteristics, including: material of manufacture; quality; function; design; and performance of the product specified as the Basis of Design. If directed by the Engineer for Products offered as an Equipment Variation, the Offerer shall provide a Letter of Confirmation from a Registered, Professional Engineer attesting that the Proposed Equipment Variation conforms to all the salient characteristics, including: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design.
- I. Specific products specified without use of the term: equal; equivalent; comparable product; substitution; or similar term; constitute a proprietary specification, and must be provided as specified, unless a written request is submitted to the Engineer for approval up to ten (10) days after the date of project award. Such requests must include a complete description of the proposed product, along with sufficient documentation and other information necessary for a complete evaluation of the proposed product. Such Trade Contractor Requests shall include a letter, on the product manufacturer's letterhead, certifying that the proposed product is a Comparable Product and conforms to all the salient characteristics, including: material of manufacture; independent testing agency certifications; quality; function, design; and performance of the specified product. If approved, the proposed product will be listed in an addendum to notify all bidders that such acceptance has been granted by the Engineer. If not approved, provide the specified product.
- J. Provide Calculations, signed and sealed by a Professional Engineer registered in the State in which the work is taking place, engaged by the Plumbing Trade Contractor, confirming that the equipment proposed as either a Substitution, or Variation, is a Comparable Product to the product specified as the Basis of Design and conforms to all the salient characteristics, including: material of manufacturer; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design. Provide such calculations for major pieces of equipment (water heaters, medical gas equipment, fire pumps, etc.). The Engineer, whose decision will be final, will determine which products will require calculations during the submittal review process.
- K. The Contract Documents have been founded upon Engineering Design selection of materials, products, and pieces of equipment listed at the Basis of Design. In the event that the incorporation of an approved Substitution, Variation, or assembly, into the work, requires revisions or additions to the contractual requirements of either the Trade Contractor proposing the substitution or variation, or any other Trade Contractor, the Trade Contractor proposing the substitution or variation, shall bear the cost of: such revisions or additions to the work of the Trade Contractor proposing such Substitution

and/or Variation; any expenses of all affected trades; and all engineering or architectural services required at no change in the contract sum.

- L. The equipment specifications indicated on the drawings, or in Part 2 of each of the technical specifications, may or may not indicate or include all of the required salient characteristics, components and accessories included with the specified product. Include cost for all such characteristics, components and accessories required to meet or exceed the: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design.
- M. For requirements regarding equipment variations after bid award, refer to Article "Additional Trade Contractor Paid Fees and Expenses" in Part 3 of this section.
- N. Each Trade Contractor negotiating for pricing advantages affecting the Trade Contractor's Bid shall comply with the directives included herein, bear full responsibility for the accuracy and completeness of the submissions required of the Vendor selected by the Trade Contractor. The Proposing Trade Contractor shall bear full responsibility for all extra costs of the Engineer shown to have resulted from inaccurate, and/or incomplete compliance with the directives included in this Specification Article.
- O. All decisions provided by the Engineer, described herein, shall be final.

2.5 INSERTS, HANGER SUPPORTS, CLAMPS, FASTENINGS

- A. All materials, designs and types of inserts, hanger supports and clamps must meet the requirements of the latest edition of the Manufacturers Standardization Society Document MSS-SP-58, Underwriters Laboratories, Inc., National Electrical Code and Factory Mutual Engineering Division Standards where applicable. Insert, hanger support and clamp types referenced herein are shown in MSS-SP-58.
- B. Provide all necessary inserts, hanger supports, fastenings, clamps and attachments necessary for support of the plumbing work. Select the types of all inserts, hanger supports, fastenings, clamps and attachments to suit both new and existing building construction conditions specifically for the purposes intended.
- C. In new overhead cast-in-place concrete construction, provide type 19 steel concrete inserts and fasten to form work before concrete is cast. For cast concrete floor or roof sections too thin to permit the use of inserts, extend the hanger rod through the slab and terminate with a nut and large washer, recessed into the top face of the slab as approved by the Structural Engineer.
- D. Clamps and attachments to steel beams and bar joists must be made using types 20, 21, 23, 25, 27, 28, 29 or 30 as applicable to suit conditions of construction. Clamps and attachments must be selected on the basis of the required load to be supported. Provide all necessary steel angle iron or channel between bar joists, or steel beams where direct attachment cannot be made. Holes are not permitted to be drilled or burned in structural building steel for hanger rod supports. Welding of hangers or supports to structural steel is prohibited unless approved beforehand by the Structural Engineer.

- E. Metallic masonry anchors may be provided for all pre-cast concrete, masonry and cast concrete construction as an alternate to item (C) above. Locate in pre-cast and cast-in-place concrete as directed by the Structural Engineer. Anchor Basis of Design: Dynabolt, Ram-In and/or Tru-Bolt masonry anchors as manufactured by Ramset. Select and install as recommended by the anchor manufacturer for the various applications, stresses and services involved. Comparable products by Redhead, Hilti or Wej-It may be submitted for review. Installation of masonry anchors must be accomplished by pre-drilling concrete or masonry to diameters and depths required to properly accommodate anchor bolts.
- F. Toggle bolts may be used in dry wall and lath and block plaster walls. The use of toggle bolts is restricted to the weight limitations imposed by the toggle bolt manufacturer for the size used.
- G. Except where noted otherwise herein, attachment to wood or material of similar fibrous nature must be made with lag screws and/or wood screws of required size.
- H. Screws with wooden or plastic plugs, or lead anchors are not acceptable.

2.6 PIPING AND CONDUIT SLEEVES

- A. Provide all sleeves required for plumbing work and be fully responsible for the final and permanent locations thereof.
- B. Provide sleeves in the following locations:
 - 1. All pipes and conduits passing through all cast-in-place concrete construction and masonry walls.
 - 2. All pipes and conduits passing through cast-in-place waterproof concrete construction and waterproof masonry walls.
- C. Extend through construction and finish flush with each surface except where noted otherwise. Provide for a minimum 1/2" clearance around conduit, pipe or its covering in the instance of pipe covered with insulation.
- D. All sleeves in waterproof walls and floors must be fitted and sealed with positive hydrostatic mechanical seals. Provide Basis of Design Product "Link Seal" as manufactured by Thunderline Corporation or Comparable Product by Advance Products and Systems, Inc. or Proco Products, Inc. Sleeves must be sized accordingly. Mechanical seals must be placed around piping and/or conduit and inserted into void between inner wall of sleeve and piping and/or conduit. Tighten mechanical seals as required for watertight seal.
- E. All sleeves must be Schedule 40 steel pipe finished with smooth edges. Sleeves in waterproof walls and floors must be fabricated with minimum 1/4" thick rectangular steel plate placed around mid-point of sleeve, continuously welded to sleeve and then place the entire/plate assembly into proper position prior to erection of walls and floors. Otherwise, provide sleeves with a minimum of three (3) lugs for anchoring.
- F. Pack voids between sleeves, piping or conduit, where located in fire or smoke rated assemblies, in accordance with UL Fire Resistance Directory.

- G. Set all sleeves prior to or during erection of walls and floors. In the event that sleeves are omitted or incorrectly located in new walls or slabs, submit a location plan and method of cutting and installing sleeves to the Engineer for review prior to carrying out the work.
- H. If sleeves are omitted or located incorrectly, the particular Trade Contractor who is at fault, at no additional cost to the project, must engage the trade which originally installed the work, to cut and patch to the satisfaction of the Engineer.
- I. Provide mechanical seals and insert into voids between piping and conduits that pass through floors, and which will be exposed in finished areas that have floor drains, including spaces classified as "Janitors Closets," "Toilet Rooms," and the like.
- J. 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 masonry saw or core drill, to insure a neat hole.

PART 3 - EXECUTION

3.1 METHOD OF PROCEDURE

- A. The drawings accompanying these specifications are diagrammatic and intended to cover the approximate and relative locations of the building systems.
- B. Installation, connection and interconnection of all components of these systems must be complete and made in accordance with the manufacturers' instructions and best trade practices.
- C. Erect all parts of equipment furnished at such time and in such manner as not to delay or interfere with other Trade Contractors and their work.
- D. Plug all piping, conduit and ductwork as required during construction to prevent entering of dirt.
- E. Before material is ordered or fabricated, or any work is performed, verify all calculations, sizing, measurements, including lines, grades, pipes and conduit elevations at the building, as applicable, and be responsible for the correctness thereof. No extra compensation will be allowed on account of differences between actual dimensions, routing and measurements and those indicated in the Contract Documents. Any discrepancies discovered must be submitted to the Engineer for consideration before proceeding with the work.
- F. Lay out work and be responsible for the establishment of heights, grades, and the like, for all interior and exterior equipment and systems as applicable, including piping, drains, fixtures, conduit, and the like, included in Contract Documents, in strict accordance with the intent expressed thereby; and all the physical conditions to be met at the building and finished grade, and be responsible for accuracy thereof. The establishment of the location of all work must be performed in consideration of the finished work. In case of conflict, equipment and/or materials must be relocated without cost to the Project, as directed by

the Engineer, regardless of which equipment was installed first. Refer to Article, "Coordination Drawings", in Part 1 of this section.

- G. Cooperate with other Trade Contractors for the proper securing and anchoring of all work included within these specifications. Use extraordinary care in the erection and installation of all equipment and materials to avoid marring surfaces of the work of other Trade Contractors, as each Trade Contractor will be held financially responsible for all such injury caused by the lack of precaution and due to negligence on the part of the Trade Contractor's work force.
- H. Do not run pipe or conduit in any concrete slab three inches (3") or less in thickness. Do not place any pipe or conduit in any slab where the outside diameter of the pipe or conduit is more than one-quarter the thickness of the slab. The sweep of pipe or conduit elbows emerging through concrete slabs must not create any hazard or obstructions.
- I. All piping, conduit and other materials and equipment shown to be mounted below ceilings are to be kept as close to ceiling areas as possible unless otherwise noted.
- J. Install and arrange all equipment, such as valves, air vents, cleanouts, traps and the like, which will be concealed in construction, to be fully accessible for adjustment, service and maintenance. Furnish access doors where required for installation under the General Construction Contract, where applicable. Otherwise, furnish and install all required access doors.

3.2 PROTECTION OF WORK

- A. Provide all piping, equipment, materials and accessories having polished or plated surfaces, machined finishes or unpainted surfaces with a thick coat of a neutral protection grease and carefully cover with thick cloth or heavy building paper held securely in place to protect the finish against damage during the entire period of construction. Protect equipment by the use of canvas tarps, vinyl sheeting or similar materials held securely in place.
- B. Seal all openings in pipes, fittings, conduit and all other materials to exclude dirt, sand, and other foreign materials.
- C. Exercise every precaution to exclude dust, dirt and all other foreign materials from switchgear rooms, transformers, and all mechanical equipment rooms during construction. Rooms and equipment contained therein must be swept and vacuum cleaned at regular intervals. All relays, meters and plumbing equipment containing electrical components must be protected with heavy paper held in place with approved mastic tape to exclude fine dust and particles. Install and maintain sufficient electric heaters in equipment rooms and transformer compartments to keep equipment dry during construction.

3.3 CUTTING AND PATCHING

- A. New Construction:
 - 1. Perform cutting and patching in accordance with Division 01.

2. Provide and set all sleeves, inserts and other items required for the installation of the Plumbing work, and take responsibility for their final and permanent locations.
3. Confer with, and give the General Construction Trade Contractor, where applicable, complete information as to size of openings in all construction, so that such openings may be provided as the building progresses. Otherwise, provide openings as required for the plumbing work.
4. If openings are omitted or incorrect through failure to follow these instructions the particular Trade Contractor must, at no additional cost to the project, engage the trade which originally installed the work to cut and patch to the satisfaction of the Engineer.

B. For existing construction:

1. The General Construction Trade Contractor, where applicable, will perform all cutting and patching required for the work of all trades. Otherwise, all Trade Contractors are responsible for their own cutting and patching.

3.4 CONCRETE AND MASONRY

- A. Provide all cast-in-place concrete, pre-cast concrete and masonry work (brick and block) required for completion of the plumbing work, including interior and exterior concrete slabs.
- B. Engineer will review and approve materials used.
- C. Unless shown or specified otherwise, all equipment foundations and housekeeping pads must be six inches (6") minimum height from floor, of sufficient mass, and secured to the floor.
- D. Refer to Division 03 for concrete specifications.
- E. Unless noted otherwise, concrete bases must be 4" larger than the largest dimension of the base of the supported equipment in both directions. Use 3000 psi, 28 day compressive strength concrete and reinforcement.

3.5 SUPPORTS

- A. Except where noted otherwise in the specifications and shown on drawings, provide all materials, including, but not limited to, equipment supports, supplies and labor necessary as required to adequately support, brace and strengthen new and/or existing equipment and materials installed under/or affected by the plumbing work.
- B. The design, materials, fabrication and erection of structural steel supports must conform to "Specification for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, "Code of Standard Practice for Steel Buildings and Bridges". Welding, where required, must conform to "Code of Arc and Gas Welding in Building Construction" of the American Welding Society.

3.6 ESCUTCHEONS

- A. Except as noted otherwise, provide heavy solid pattern, steel, cast iron or malleable iron escutcheons with set screws and prime coat of paint on all uninsulated piping and conduit exposed to view within structure where passing through floors, partitions, walls or ceilings. Escutcheons are not required in equipment rooms, boiler rooms or other unfinished areas.
- B. For piping with sleeves extending above floor, provide escutcheons with deep recesses.
- C. Provide solid pattern, smooth chrome plated cast brass escutcheons for all chrome plated pipe fixture connections.
- D. Provide nickel plated cast iron escutcheons where pipes pass through toilet rooms, walls or ceilings.

3.7 PAINTING AND FINISHING

- A. All painting, generally, will be provided by the General Construction Trade Contractor, where applicable, except where specifically noted otherwise in the Plumbing Specifications. Otherwise, all Trade Contractors are responsible for their own painting and finishing.
- B. Equipment and material furnished with factory enamel finish will not be painted unless finish has been damaged, in which case the equipment or material must be refinished by the Trade Contractor who furnished it, to the satisfaction of the Engineer.

3.8 PIPING AND CONDUIT UNDER FLOORS

- A. Wherever piping, conduit or piping enclosures are run under a floor slab on grade, the work is to be installed after the General Construction Trade Contractor, where applicable, has brought the sub-grade to the proper level.
- B. Excavate and backfill as required for the installation of plumbing work. The excavation of the sub-grade where required for the installation of the work must be performed, including that for piping, conduit and piping enclosures, by the Plumbing Trade Contractor. When the installation is completed and satisfactorily tested, the remaining space shall be filled with crushed stone or other material similar to that to be used by the General Construction Trade Contractor, where applicable, for the sub-base. The backfill must be stabilized by hand or pneumatic tamping as directed by the Engineer and must be returned to the original sub-grade level.
- C. No piping, conduit or piping enclosures is to be installed in the stone sub-base which is part of the General Construction Trade Contractor's work, where applicable, unless specific permission is granted by the Engineer.
- D. Where piping is noted to be installed in enclosures, such as split terra cotta pipe, necessary protection of the insulation, arrangement and installation will be as hereinafter described in the detailed technical specifications.

- E. Where required by drawing notes, specifications, or applicable electrical codes, conduits installed under floors must be encased in concrete, conforming to the Division 03 specifications.

3.9 ABANDONMENT, REMOVAL AND RELOCATION

- A. Removals shown on drawings are a general indication only, and may not necessarily indicate the full extent of removals which may be required to complete this work.
- B. Where existing partitions, walls, ceilings and floors are to be removed, all piping, conduits, materials, fixtures and equipment attached or fastened thereto or within, as applicable, must be carefully removed.
- C. Where work under this contract interferes with the existing construction, ductwork, piping, conduit or equipment, remove all such materials and route new work to clear the obstruction. Provide additional piping, conduits and material of the same design and quality if the piping and/or conduit is to be continued in use.
- D. Disconnect and remove all accessible piping, conduit, ductwork, materials, fixtures and equipment not required in the new systems. Plug all outlets at the main or riser connection.
- E. Removed materials not desired by the Owner and not to be reset and not specified nor indicated to be reused, become the property of the Plumbing Trade Contractor and must be promptly removed from site.
- F. All demolition work is subject to the direction and approval of the Engineer and must be performed in such manner as not to interfere with the normal operation of the building.
- G. Relocate existing utilities and/or equipment that must remain to maintain operation of building or parts of building outside the work area.

3.10 SUBSURFACE CONCEALED UNKNOWN PHYSICAL CONDITIONS

- A. Subsurface, or otherwise concealed physical conditions which (1) do not differ materially from those indicated in the Project Contract Documents; (2) affect plumbing and electrical work; (3) do not differ materially from those ordinarily found to exist, and which are generally recognized as inherent in the mechanical and electrical construction activities of the character provided for in the Project Contract Documents, are to be anticipated by the Plumbing Trade Contractor, and included in the basic plumbing work.
- B. Unknown physical conditions: which are of an unusual nature; which are materially different in subsurface (otherwise concealed) physical conditions; which affect plumbing and/or electrical work; which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character found in the Project Contract Documents, are the basis for, and require notice by, the applicable Trade Contractor, promptly, before such conditions are disturbed. Such conditions may become the basis for a legitimate claim under "Changed Conditions," affecting the cost, and/or schedule of the work. During the work, the Plumbing Trade Contractor shall provide

reasonable, incidental on-site review, survey and measurements to assist in quantification of such conditions.

3.11 CONCRETE PATCHING (PROCEDURE)

- A. Remove any loose debris, chipped or cracked portions of concrete, and any grease, oil, dirt or other coating materials from the concrete to be patched.
- B. Apply epoxy bonding adhesive to the clean dry surface with a brush or roller to briefly flood the surface allowing good penetration, if completely absorbed, apply additional material. Adhesive Basis of Design: Edison Coatings Inc. Flexi-Bond 540. Comparable product by Sika Corp. or Euclid Chemical Co. may be submitted for review. Refer to Division 03 of these specifications.
- C. Apply new cementitious mortar patch to surface immediately after applying bonding adhesive, bonding agent should be wet while applying concrete patch. Mortar patch equal to Moxie International 2000 Super Patch. Comparable product by Sika Corp. or Euclid Chemical Co. may be submitted for review. Refer to Division 03 of these specifications.
- D. Work patch into any cracks or crevices with a brush, then apply remainder of patch and trowel until level and smooth.
- E. Do not apply patch below 45 deg. F.

3.12 TEMPORARY PARTITIONS

- A. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas. Refer to Division 01 of these specifications.

3.13 INITIAL APPLICATION FOR PAYMENT

- A. Provide the following prior to submitting the initial application for payment:
 - 1. Copy of Plumbing Trade Contractor's and Sub-Contractors' licenses for the state in which the work is being performed.
 - 2. Resumes for the designated Project Manager and Project Foreman.
 - 3. List of independent agencies who will be engaged by the Plumbing Trade Contractor to perform tests, provide certifications, conduct inspections, etc. as required by Contract Documents.
- B. The initial application for payment will not be processed until the items above are submitted.
- C. Provide line items for:
 - 1. Coordination Drawings.
 - 2. Plumbing Testing, Adjusting and Balancing Report.

3.14 FINAL APPLICATION FOR PAYMENT

- A. Provide the following prior to submitting the final application for payment:
1. Refer to Division 01 of these specifications.
 2. Pipe Pressure Test Reports.
 3. Equipment Start-Up Reports for each piece of plumbing equipment.
 4. Operation and Maintenance Manuals and Data.
 5. Testing, Adjusting and Balancing Report for plumbing systems.
 6. Plumbing system and equipment warranties.
 7. Plumbing Contractor Closeout Checklist indicating dates of submitted requirements.
 8. Plumbing Contractor's Punch List of incomplete work items with reason why each work item is not complete and anticipated schedule for completion. Submit at least one week prior to Engineer's final Construction Observation Report site visit.
 9. Signed and dated Engineer's final construction observations report.
 10. Plumbing Trade Contractor's notarized certification letter.
 11. As-built drawings as described in Part 1 of this specification section.
- B. Final payment is contingent upon completion of all items listed above.

3.15 INDEMNIFICATION

- A. The drawings and specifications covering the work of Divisions 22 and 26, as applicable, shall not be interpreted by the Plumbing Trade Contractor as quantification, and/or classification of the construction methods, and/or construction means required to carry out the required construction. There is no explicit or implicit representation that any portion of this work can be installed and/or constructed through any particular normal, reasonable, abnormal, or unusual means and methods. By submission of a pricing bid for this work, the Plumbing Trade Contractor shall accept sole and individual responsibility for the determination and execution of the methods and means selected to complete this work.
- B. The Plumbing Trade Contractor, to the fullest extent permitted by law, agrees to indemnify, hold harmless, and defend Gillan & Hartmann, Inc., its consultants, and the employees and agents of any of them from and against any and all claims, suits, demands, liabilities, losses, damages, and costs ("Losses"), including but not limited to costs of reasonable defense, arising in whole or in part out of the negligence of the Plumbing Trade Contractor, its Sub-Contractors, the officers, employees, agents, and Sub-Contractors of any of them, or anyone for whose acts any of them may be liable, regardless of whether or not such Losses are caused in part by a party indemnified hereunder. Specifically excluded from the foregoing are Losses arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications, and (2) the giving of or failure to give directions by Gillan & Hartmann, Inc., its consultants, and the agents and employees of any of them, provided such giving or failure to give is the primary cause of Loss.
- C. The Plumbing Trade Contractor shall name Gillan & Hartmann, Inc., its agents and consultants on the Plumbing Trade Contractor's policy or policies of comprehensive or commercial general liability insurance. Such insurance shall include products and

completed operations and contractual liability coverages, shall be primary and noncontributing with any insurance maintained by Gillan & Hartmann, Inc. or its agents and consultants, and shall provide that Gillan & Hartmann, Inc. be given thirty days, unqualified written notice prior to any cancellation thereof.

3.16 ADDITIONAL PLUMBING TRADE CONTRACTOR PAID FEES AND EXPENSES

- A. As a material part of Plumbing Trade Contractor's Agreement to complete the work of this Contract, the Plumbing Trade Contractor agrees to reimburse Gillan & Hartmann, Inc. ("Engineer") for the below listed extra engineering work under the following conditions:
1. Engineer's hourly billing rate shall be \$250.00 per hour for all related office hours, travel time and as applicable, on-site time;
 2. Contractor's request(s) for substitution;
 - a. When such requests for substitution are not the result of a bonafide delivery problem or design related problem, and;
 - b. When such requests do not address items of equipment for which the specifications list the basis of design with at least one comparable product, and;
 - c. The Plumbing Trade Contractor's request(s) for substitution must be submitted in writing, and;
 - d. The Engineer will provide the Plumbing Trade Contractor with a written budget, not to exceed quotation for the Engineer's billing, and;
 - e. The Plumbing Trade Contractor shall render written acceptance of the Engineer's extra charges, and;
 - f. The Plumbing Trade Contractor shall pay a retainer, in advance, equal to 80% of the established budget for the Engineer's extra work.
 - g. The balance of the Engineer's charges beyond the retainage shall be paid upon completion of the Engineers' extra work in reviewing the substitution(s). Final payment is due regardless of the Engineer's decision to accept or reject the Plumbing Trade Contractor's substitution request(s), and;
 - h. Late payments shall incur an interest rate of 1½% per month compounded from due date to date of collection, and;
 - i. The Plumbing Trade Contractor's balance due for his/her beneficial contracted work, unpaid beyond 60 days of due date, will be deducted from progress payments due the Plumbing Trade Contractor, and will include all additional administrative costs incurred by the Owner, in affecting such deductions.
 3. Extra Engineering work created by the Plumbing Trade Contractor's failure to resolve the Engineer's Items listed in the Construction Observation Report(s);
 - a. The Engineer's basic services rendered to the Owner include periodic visits to the site and providing written list of items (Construction Observation Report) requiring the Plumbing Trade Contractor's attention, reporting and resolution;
 - b. The Plumbing Trade Contractor shall provide written feedback and prompt resolution of Construction Observation Items including a written schedule for the Plumbing Trade Contractor's completion of these Items followed by a written confirmation of closure;

- c. Should the Plumbing Trade Contractor fail to perform as described above, and should such failure require, in the opinion of the Owner and the Engineer, that the Engineer must expend extra work in bringing closure and resolving the Plumbing Trade Contractor's open Items, the Plumbing Trade Contractor agrees pay the Engineer for all extra work required. The Engineer will provide a written notice of the not to exceed budget for the Engineer's extra work in advance as a prudent notification that the extra work will be initiated. Subsequent failure of the Plumbing Trade Contractor to resolve these outstanding issues will result in the Engineer's completion of the extra work, and billing the Plumbing Trade Contractor accordingly. The Engineer's payment for this additional work shall be deducted from the Plumbing Trade Contractor's final payment for the work under this Contract. Deductions from the Final Payment will be made to cover all the Owner's additional costs in affecting such deductions.
4. The Plumbing Trade Contractor's request for substitution of specified equipment when such specifications list a basis of design and at least one comparable product such requests will be rejected.
5. Extra Engineering work created by the Plumbing Trade Contractor's multiple submissions of a single material or piece of equipment;
 - a. The Engineer's basic services include two reviews for each piece of equipment or material submittal. The Engineer's first review takes place at the initial Plumbing Trade Contractor's submission of that submittal. The Engineer's second review takes place when the Engineer requires a resubmission of that submittal.
 - b. If the Engineer's third review of a particular submittal is required for reasons due to the Plumbing Trade Contractor, the Engineer will provide the Plumbing Trade Contractor with a written budget, not to exceed quotation for the Engineer's extra work in reviewing the submittal.
 - c. The Plumbing Trade Contractor shall render written acceptance of the Engineer's extra charges.
 - d. The Plumbing Trade Contractor shall pay a retainer, in advance, equal to 80% of the established budget for the Engineer's extra work.
 - e. The balance of the Engineer's charges beyond the retainage shall be paid upon completion of the Engineers' extra work in reviewing the submittal.
 - f. Late payments shall incur an interest rate of 1½% per month compounded from due date to date of collection.
 - g. The Plumbing Trade Contractor's balance, unpaid beyond 60 days of due date, will be deducted from progress payments due the Plumbing Trade Contractor for work under this Contract and will include additional administrative costs incurred by the Owner in affecting all such deductions.

PROJECT NAME: Gillan Hartmann, Inc.
PLUMBING SHOP DRAWING LOG

JOB NO.: _____
DATE: 5/25/2016

ITEM NO.	PROPOSED SUBMITTAL DATE	DATE REC'D	MFR. OR CONTRACTOR	DESCRIPTION	Action	Date Return	Re-submit	Distrib.	Sent to Elec.	Checked by
P-01										
P-02										
P-03										
P-04										
P-05										
P-06										
P-07										
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P-19										
P-20										
P-21										
P-22										

Status: Pending (P); Furnish as Submitted (FAS) Furnish As Noted (FAN); Rejected (REJ); No Submission Required (NSR)

**PLUMBING CONTRACTOR'S TRANSMITTAL COVER
SHEET**

TO: GILLAN & HARTMANN, INC.
CONSULTING ENGINEERS
P.O. BOX 345
VALLEY FORGE, PENNSYLVANIA 19481

Date of Transmittal: _____	By Contractor: _____ Contractor's Authorized Staff Signature: _____ Print Name: _____ Project: _____
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By executing this Transmittal Cover, Contractor agrees and accepts that:

- Shop drawings submitted without the Contractor's signed stamp of approval will not be reviewed. Initialed approval stamps are not acceptable. All resulting resubmittals will be provided at the Contractor's expense;
- The Engineer's recommendation of acceptance ("Furnish as Submitted", "Furnish as Noted Below", etc.) of the equipment proposed by the Contractor is conditional upon the Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Contractor acknowledges compliance with all of the following:

The Contractor has completed field layout and planning of proposed equipment and has coordinated all other related shop drawings, related trades involved in Project Construction, and all space requirements;

The Contractor has examined all shop drawings prior to submission. The Contractor forwards all shop drawings with a signed approved stamp, signifying the following: 1) all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data have been verified; 2) the Architect/Engineer have been notified of all site conditions which affect the work, and which require design resolution beyond resolution by Trade Contractors' Field Decisions; 3) all items herein are approved by the Contractor, and have been coordinated and checked with other applicable shop drawings, and contract requirements; 4) submission is clearly marked to indicate which manufacturer's options are provided and which are not provided with the proposed equipment;

Any and all exceptions requested by the Contractor have been included in written form. All exceptions, deletions and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide initialed annotations for all deletions and additions, the Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes;

All Engineer's notes regarding this submission must be incorporated into the Project;

The Engineer's review is limited to comparison of the technical performance of the Contractor's proposed equipment to the specified technical performance;

Equipment submittal is either the Basis-of-Design, or a comparable product to the Basis-of-Design;

A Comparable Product must meet or exceed all the salient characteristics and standards necessary including, but not limited to: material of manufacture; independent testing agency certifications; quality; function; design; and performance required to meet the Owner's needs and meet the objectives of the Professional's Project Design;

Extension of Contract Time and/or claim for delay are not acceptable as created by the Trade Contractor's failure to provide submittals on a timely basis to permit the processing work of the Professional, including multiple resubmittals, and/or failure to provide submittals that are comparable to the Basis of Design Product. Refer to EQUIPMENT VARIATIONS AND SUBSTITUTIONS article in the General Requirements Section of the Specifications.

G&H Project No: _____

G&H Shop Drawing Review No: P-_____

Contractor's Submittal Description: _____, Project _____
(Fill In) (Fill In)

**PLUMBING AND ELECTRICAL TRADES'
COORDINATION OF PLUMBING EQUIPMENT
ELECTRICAL REQUIREMENTS
TRANSMITTAL COVER SHEET**

TO: GILLAN & HARTMANN, INC.
CONSULTING ENGINEERS
P.O. BOX 345
VALLEY FORGE, PENNSYLVANIA 19481

By Plumbing Trade Rep: _____
Contractor's Authorized Staff Signature: _____
Print Name: _____
Date of Transmittal: _____

By Electrical Trade Rep: _____
Contractor's Authorized Staff Signature: _____
Print Name: _____
Date of Transmittal: _____

By executing this Transmittal Cover, the Contractor agrees and accepts that:

1. Submittals without the Plumbing and Electrical Trades' signed stamp of approval will not be reviewed. Initialed approval stamps are not acceptable. All resulting resubmittals will be provided at the Contractor's expense.
2. The Plumbing Trade Representative has submitted the attached Plumbing Equipment Submittal to the Electrical Trade Representative for examination, review, and coordination of the attached Plumbing Equipment Electrical Requirements. The equipment proposed by the Contractor is conditional upon the Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Contractor acknowledges compliance with all of the following:
 - A. The Contractor has completed field layout and planning of proposed equipment and has coordinated all other related submittals, related Trades involved in Project Construction, and all space requirements.
 - B. The Plumbing and Electrical Trades have examined all submittals prior to submission. The Plumbing and Electrical Trades forwards all submittals with a signed transmittal stamp, signifying the following:
 - 1) All field measurements, field construction criteria, electrical power requirements and similar data have been verified;
 - 2) The Architect/Engineer has been notified of all site conditions which affect the work, and which require design resolution beyond resolution by Trade contractors' Field Decisions;
 - 3) All items herein are approved by the Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements;
 - 4) Submission is clearly marked to indicate which manufacturer's options are provided and which are not provided with the proposed equipment.
 - C. Any and all exceptions requested by the Plumbing and Electrical Trades have been included in written form. All exceptions, deletions, and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide the initialed annotations for all deletions and additions, the Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.

G&H Project No: _____

G&H Shop Drawing Review No: _____

END OF SECTION 220010

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 1. Sleeves with waterstop.
 2. Sleeve-seal systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES WITH WATERSTOP

- A. Description: Manufactured sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 1. Designed to form a hydrostatic seal of 20 psig minimum.
 2. Sealing Elements: EPDM-rubber or Nitrile interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Stainless steel.
 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES - GENERAL

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors and concrete walls.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

3.2 INSTALLATION OF SLEEVES WITH WATERSTOP

- A. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls.
- B. Secure nailing flanges to concrete.
- C. Using grout, seal the space around outside of sleeves.

3.3 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at piping entries into building, and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
 - 2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

- B. Prepare test and inspection reports.

3.5 SLEEVE SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above and below Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 2. Concrete Slabs-on-Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

END OF SECTION 220517

SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Bronze ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. Press-end connection: Valves suitable for connection to a pressure-sealed system.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61 and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 3. ASME B16.18 for solder-joint connections.
 - 4. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
 - 1. Handlever: For quarter-turn valves smaller than NPS 4.
- H. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; or a comparable product by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Milwaukee Valve Company.
 - c. WATTS.

2. Description:
 - a. Standard: MSS SP-110 or MSS-145.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Bronze or brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Full.

B. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Press Ends:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; or a comparable product by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Milwaukee Valve Company.
 - c. WATTS.
2. Description:
 - a. Standard: MSS SP-110 or MSS-145.
 - b. CWP Rating: Minimum 200 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Press.
 - f. Press Ends Connections Rating: Minimum 200 psig.
 - g. Seats: PTFE or RTPFE.
 - h. Stem: Bronze or brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
 - k. O-Ring Seal: EPDM or Buna-N.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.

- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in applicable Division 22 Sections for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 4 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 5 and Larger: Flanged ends.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 4 and Smaller:
 - 1. Bronze ball valves, two-piece with full port and bronze or brass trim. Provide with threaded, solder, or press connection-joint ends.

END OF SECTION 220523.12

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Thermal hanger-shield inserts.
 - 4. Fastener systems.
 - 5. Pipe-positioning systems.
 - 6. Equipment supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; maximum weights supported, maximum pipe dimensions supported, support intervals, etc. Include Product Data for components:
 - 1. Trapeze pipe hangers. Include Product Data for components.
 - a. Shop Drawings to be signed and sealed by a qualified professional engineer.
 - 2. Metal framing systems. Include Product Data for components.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as indicated, as defined in applicable Division 01 Sections, to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
 - 3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

- B. Copper Pipe and Tube Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 THERMAL HANGER-SHIELD INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ERICO International Corporation.
 - 2. Pipe Shields Inc.
 - 3. Piping Technology & Products, Inc.
 - 4. Rilco Manufacturing Co., Inc.

- B. Insulation-Insert Material for Cold Piping: ASTM C552, Type II cellular glass with 100-psig minimum compressive strength and vapor barrier.

- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Indoor Applications: Zinc-coated or stainless steel.
 - 2. Outdoor Applications: Stainless steel.

2.6 PIPE-POSITIONING SYSTEMS

- A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.7 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- J. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
5. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 PAINTING

- A. Touchup: Clean abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in applicable Division 09 Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- F. Use padded hangers for piping that is subject to scratching.
- G. Use thermal hanger-shield inserts for insulated piping and tubing.
- H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 3. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
- I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
 - 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 - 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
 - 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 - 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 - 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 - 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 - 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 - 6. C-Clamps (MSS Type 23): For structural shapes.

7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- M. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- N. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- O. Use powder-actuated fasteners instead of building attachments where required in concrete construction.

END OF SECTION 220529

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 3. Detail application of field-applied jackets.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in applicable Division 22 Sections.
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.

- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Johns Manville; a Berkshire Hathaway company ; Micro-Lok. or a comparable product by one of the following:
 - a. Knauf Insulation.
 - b. Manson Insulation Inc.
 - c. Owens Corning.
 - 2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ-SSL.
 - 3. 850 deg F.
 - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C195.
- B. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- C. PVC Jacket Adhesive: Compatible with PVC jacket.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Comply with MIL-PRF-19565C, Type II, for permeance requirements.
 - 4. Color: White.
- C. Vapor-Retarder Mastic, Solvent Based, Outdoor Use: Suitable for outdoor use on below-ambient services.

1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 2. Service Temperature Range: Minus 50 to plus 220 deg F.
 3. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
1. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 3. Color: White.

2.5 LAGGING ADHESIVES

- A. Adhesives shall comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
 2. Service Temperature Range: 0 to plus 180 deg F.
 3. Color: White.

2.6 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:
1. Fire- and water-resistant, flexible, elastomeric sealant.
 2. Service Temperature Range: Minus 40 to plus 250 deg F.
 3. Color: White.

2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

2.8 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..

2.9 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Adhesive: As recommended by jacket material manufacturer.
 - 2. Color: White.
 - 3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

2.10 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 11.5 mils.
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch in width.
 - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Width: 2 inches.
 - 2. Thickness: 6 mils.
 - 3. Adhesion: 64 ounces force/inch in width.
 - 4. Elongation: 500 percent.
 - 5. Tensile Strength: 18 lbf/inch in width.

2.11 SECUREMENTS

- A. Bands:
 - 1. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 3/4 inch wide with wing seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- C. Wire: 0.062-inch soft-annealed, stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.

- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.

- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant.
 - 3. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic

for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in applicable Division 09 Sections.
 - 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- C. Do not field paint aluminum or stainless steel jackets.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.9 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Underground piping.

INTERIOR DOMESTIC COLD WATER (40 TO 60 DEG F) PIPING				
PIPE SIZES (NPS)	MATERIALS	THICKNESS IN INCHES	VAPOR BARRIER REQ'D	FIELD APPLIED JACKET
1-1/2 AND LARGER	MINERAL FIBER	2	YES	YES, ABV GROUND

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper tube and fittings.
 - 2. Piping joining materials.
 - 3. Dielectric fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Coordination Drawings: Piping layout, drawn to scale, showing all plumbing piping and equipment, and coordinated with other building trades.
- C. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Architect and Owner no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Architect and Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Hard Copper Tube: ASTM B 88, Type K water tube, drawn temper.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.
- F. Copper, Brass, or Bronze Pressure-Seal-Joint Fittings:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Viega LLC; or a comparable product by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. NIBCO INC.
 - 2. Fittings: Cast-brass, cast-bronze or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 and larger with stainless steel grip ring and EPDM O-ring seal.
 - 3. Minimum 200-psig working-pressure rating at 250 deg F.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.

2.4 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Nipples:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Grinnell G-Fire by Johnson Controls Company.
 - b. Precision Plumbing Products.
 - c. Sioux Chief Manufacturing Company, Inc.
 - 2. Standard: IAPMO PS 66.
 - 3. Electroplated steel nipple complying with ASTM F 1545.
 - 4. Pressure Rating and Temperature: 300 psig at 225 deg F.
 - 5. End Connections: Male threaded or grooved.
 - 6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

- G. Install piping to permit valve servicing.
- H. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in applicable Division 22 Sections.

3.2 EARTHWORK

- A. Comply with requirements in applicable Division 22 and 31 Sections.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- D. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 4 and Smaller: Use dielectric nipples.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for hangers, supports, and anchor devices in applicable Division 22 Sections.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

- c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
- 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install hangers for copper tubing and piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Support horizontal piping within 12 inches of each fitting.
- D. Support vertical runs of copper tubing and piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in applicable Division 22 Sections.

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
- 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

- B. Clean non-potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L or Type K; wrought-copper, solder-joint fittings; and soldered joints.
- D. Underground domestic water piping shall be the following:
 - 1. Hard copper tube, ASTM B 88, Type L or Type K; wrought-copper, solder-joint fittings; and soldered joints.

3.11 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball valves for piping NPS 4 and smaller.

END OF SECTION 221116

PART 5

MECHANICAL WORK

SECTION 238239.19 - WALL AND CEILING UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes wall and ceiling heaters with propeller fans and electric-resistance heating coils.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings:
 - 1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Include details of anchorages and attachments to structure and to supported equipment.
 - 3. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
 - 4. Wiring Diagrams: Power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wall and ceiling unit heaters to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Berko; Marley Engineered Products.

2. Chromalox, Inc.
3. INDEECO.
4. Marley Engineered Products.
5. QMark; Marley Engineered Products.
6. Or Approved Equal.

2.2 DESCRIPTION

- A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 CABINET

- A. Front Panel: Stamped-steel louver or Extruded-aluminum bar grille, with removable panels fastened with tamperproof fasteners.
- B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.
- C. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.4 COIL

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection. Provide integral circuit breaker for overcurrent protection.

2.5 FAN AND MOTOR

- A. Fan: Aluminum propeller directly connected to motor.
- B. Motor: Permanently lubricated, multispeed.

2.6 CONTROLS

- A. Controls: Unit-mounted thermostat.
- B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive wall and ceiling unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall and ceiling unit heaters to comply with NFPA 90A.
- B. Install wall and ceiling unit heaters level and plumb.
- C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

END OF SECTION 238239.19

PART 6
ELECTRICAL WORK

SECTION 260010 - GENERAL REQUIREMENTS ELECTRICAL

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PART 1 - GENERAL REQUIREMENTS ELECTRICAL

1.1 GENERAL

- A. The conditions of Divisions 00 and 01 apply to each and every Trade Contractor or other person or persons supplying any material or labor entering this building and/or site, either directly or indirectly. In the event of a conflict between Section 260010 and Divisions 00 and 01, the terms of Divisions 00 and 01 shall govern.
- B. One Building Trade, the Electrical Building Trade, will be covered by these General Requirements Electrical.
- C. For simplicity, this Building Trade will be referred to further herein as the Electrical Trade Contractor. The Electrical Specifications and all Electrical Drawings, together with all addenda make-up the Electrical Contract Documents, and are a part of the "Project Contract Documents", as described throughout these specifications.
- D. The term "Electrical Trade" as used in the Contract Documents, means the Electrical Building Trade.
- E. The term "indicated" means all information included, detailed, shown and/or implied on the Contract Documents.
- F. The term "existing" is used generally in reference to renovation projects. On new construction projects, the term "existing" is intended to mean work already in place.

1.2 SCOPE AND OBJECTIVES OF THE ELECTRICAL WORK

- A. The Scope and Objectives of the Electrical Work of this Project include, but are not limited to:
 - 1. Refer to Division 01 for Scope of Work and of Alternate Bids;
 - 2. Periodic inspection of completed work and site conditions by the Electrical Trade Contractor's Project Manager to confirm compliance with contract documents and verify suitability to receive subsequent work.
 - 3. Remove all electrical equipment (including but not limited to light fixtures, wiring, conduit, starters, disconnects, fire alarm devices, clock devices, public address system devices, data network devices, and security system devices) within the portion of the Absegami School that is to be demolished.
 - 4. Reprogram the fire alarm system after the fire alarm devices have been removed from the portion of the building that is to be demolished. in the portion of the school that is to be
 - 5. Maintain and refeed two existing electrical feeders that extend from the wing to be demolished out to the small garage building located over near the Stadium Press Box, which feed the Football Field Stadium Lighting and a separate 208/120V transformer and panelboard as shown on the drawings.
 - 6. See the drawings for the complete scope of the project.

1.3 INTENT OF THE ELECTRICAL CONTRACT DOCUMENTS

- A. The intent of the Electrical Contract Documents is to include all items and labor necessary for the proper execution and completion of the Work of the Electrical Trade Contractor. The Contract Documents of all Trades are complimentary to each other; what is required by one shall be as binding as if required by all. Performance of the Electrical Trade Contractor is required only to the extent consistent with the Project Contract Documents and reasonably inferable from them as being necessary to produce the desired results.
- B. It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Design Professional may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work. In the event of such ambiguity or discrepancy, comply with the higher cost product (material plus labor), the more stringent requirement, and supply the better quality or greater quantity of work.

1.4 PROPOSAL PREPARATION

- A. Prior to submitting a pricing quotation/proposal, proceed as follows, and include the following:
 - 1. Visit the site, survey, record, confirm and include in the scope of work, all material and labor necessary to install the equipment and systems indicated. Use the Contract Documents as diagrammatic in nature, since they are not intended to show all details which may affect the electrical bid proposal.
 - 2. Include the work, as applicable, to remove and dispose of conduit, wiring, light fixtures, devices, equipment and appurtenances, not required for new work, unless otherwise indicated to be abandoned in place.
 - 3. Include all disconnections, removals and temporary provisions required to permit rigging, installation, connection, testing and operation of the new equipment. Include all such provisions whether or not shown, detailed or specified within technical sections of the Contract Documents.
 - 4. Include in the work, the following:
 - a. One Project Manager;
 - b. One Project Foreman.
 - 5. Detail, layout, coordination and fit of all of electrical equipment. Plan all disconnections, removals, offsets, temporary provisions, as required, to fit the new equipment into the space, and as required to accommodate maintenance accessibility and service access.
 - 6. Maintain and submit for approval, a written project schedule, on a weekly basis.
 - 7. Organize, administrate, control and log the RFI process for their respective trade. Where applicable, submit all RFI(s) for master RFI log maintained by Lead/Prime Contractor.
- B. In preparing a Bid Price:
 - 1. Thoroughly review and confirm all existing conditions and Contract Document information. Make note in writing of any exceptions, misunderstandings, unclear

areas, unclear directions, and any aspects which will prohibit completion of the work, in total. Failing to supply such notice, all bidders will be accountable for having accepted all conditions at the site which affect their work and their costs. By submitting a bid price, all Trade Contractors certify that the Contract Documents have been thoroughly reviewed and are sufficient for construction, and that the bidding Trade Contractors have adequate information to establish and determine their responsibility for materials, methods, costs, and schedule for their work.

2. Incorporate all requirements of all sections of the Contract Documents.
3. Include the following with the Manufacturer's and Sub-Contractor's Lists:
 - a. The name and telephone number of all Sub-Contractors.
 - b. The manufacturer and model numbers of all equipment proposed by the bidder and as listed on all of the equipment schedules and specified in the Contract Documents.
 - c. Identify each subcontractor and manufacturer. Include reference to article number.

1.5 HAZARDOUS MATERIALS

- A. The use of asbestos, PCB's or any material or product containing hazardous materials in the performance of this contract is not permitted. Certify, in writing, that no hazardous material or product containing a hazardous material, has been furnished or installed.

1.6 DRAWINGS AND SPECIFICATIONS

- A. It is the intent of the specifications and drawings to include under each item all materials, apparatus and labor necessary to properly install, equip, adjust and put into perfect operation the respective portions of the installations specified and to so interconnect the various items or sections of the work as to form a complete and properly operating whole.
- B. Any apparatus, machinery, small items not mentioned in detail which are necessary to complete or perfect any portion of the installation in a substantial manner and in compliance with the requirements stated, implied or intended must be furnished and/or installed without extra cost to the Project. This includes all materials, devices or methods peculiar to the machinery, apparatus or systems furnished and/or installed by the Electrical Trade Contractor.
- C. In referring to drawings, figured dimensions take precedence over scale measurements. Verify all wall locations, ceiling heights, elevations, dimensions, etc. on the architectural drawings, where applicable. Discrepancies must be referred to the Design Professional for decision. Certify and verify all dimensions, routings and layouts in the field and on the coordination drawings before ordering material or commencing work.
- D. Any work called for in the specifications, but not mentioned or shown on the drawings, or called for on the drawings, but not mentioned in the specifications, must be furnished and/or installed as though called for in both.

- E. When any device or part of equipment is herein referred to in the singular number, such as "the pump" such reference is deemed to apply to as many such devices as required to complete the installation.
- F. The term "Provide" means "Furnish and Install". Neither term will be used generally in these specifications, but will be assumed. The term "Furnish" means to obtain and deliver to the job site for installation by other trades.

1.7 LAWS, ORDINANCES, REGULATIONS AND PERMITS

- A. The entire electrical system in all and/or in part must conform to all pertinent laws, ordinances and regulations of all bodies having jurisdiction, notwithstanding anything in these drawings or specifications to the contrary.
- B. Pay all fees and obtain and pay for all permits and inspections required by any authority having jurisdiction in connection with the work under this contract.
- C. Electrical work performed by the Electrical Trade Contractor must comply with the requirements of the National Electrical Code, NFPA and other boards and departments having local jurisdiction. Obtain and pay for all Electrical Inspections by local, municipal and state approving agencies. Inspections performed by the local inspector do not substitute for obtaining Independent Inspection by an authorized independent Electrical Inspection Agency.
 - 1. Qualifications: The EIA is to be an independent company from the Electrical Trade Contractor, registered with the State and a Master certified member of the International Association of Electrical Inspectors.
 - 2. Prepare and submit for review and comment to the Design Professional a schedule of inspections to be performed in coordination with the construction schedule.
 - 3. At a minimum, inspections shall be performed at the Rough-in, Progress and Final levels.
 - 4. The EIA shall submit written report for each level of inspection to the Design Professional to document compliance with current code requirements, including deficiencies and associated required remedial action.

1.8 CONNECTIONS TO UTILITIES

- A. Apply for and obtain services from Utility Companies and municipalities. All charges for which Utility Companies and municipalities must be reimbursed must be paid for by the Electrical Trade Contractor at no additional cost to the Project.

1.9 TESTS

- A. The following requirements are supplementary to tests specified for individual equipment or systems in other specification sections. Give written notice of date of test in ample time to all concerned.

- B. Concealed or insulated work must remain uncovered until all required tests have been completed; but if construction schedule requires, arrange for partial tests on portions of systems as approved. If a Prime Contractor covers or directs a Sub-Contractor to cover electrical work prior to completing the required tests, the Prime Contractor is responsible for any additional costs related to completing the required tests.
- C. As soon as conditions permit, conduct preliminary tests of equipment to ascertain compliance with specified requirements. Make needed changes, adjustments and/or replacements as preliminary tests may indicate, prior to acceptance tests.
- D. Conduct pressure, performance and operating tests as specified or required for each system or piece of equipment installed, modified or affected under this contract in presence of the Design Professional or Owner as well as a representative of agencies having jurisdiction.
- E. Obtain Certificates of Approval and/or Acceptance as specified or required in compliance with regulations of agencies having jurisdiction. Work will not be deemed complete until such Certificates have been delivered to the Design Professional.
- F. Prove conclusively, by testing, that electrical systems operate properly, efficiently and quietly in accordance with intent of drawings, specifications and most widely used construction practices.

1.10 CLEANING

- A. Be responsible for the following:
 - 1. Removal of all lumber, refuse, metal, piping and debris from site resulting from electrical work.
 - 2. Cleaning drippings created by the electrical work, from finished work of other Trades.
 - 3. Cleaning, polishing, waxing of electrical work as required.
- B. After testing, and acceptance of all work by the Design Professional and the Owner, thoroughly clean all electrical equipment and material to the satisfaction of the Design Professional.

1.11 INSTRUCTING OWNER'S PERSONNEL

- A. After all tests and adjustments have been made, fully instruct the representatives of the Owner in all details of operation of the equipment installed under the Electrical Contract Documents.
- B. Operate electrical equipment for sufficient length of time to satisfy Design Professional that requirements of Contract Documents have been fulfilled.
- C. Prepare digital recording of each Owner training session on compact disc.

1.12 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Provide in accordance with Division 01.
- B. Submit digital format PDF of Operating and Maintenance Instructions to the Design Professional for review and processing.
- C. Upon completion of the Design Professional's review and processing of digital format PDF of the Operating and Maintenance Instructions, submit three (3) copies of the final version of the printed instructions to the Owner. Bind instructions in separate, hardback, 3-ring loose leaf binders.
- D. Prepare instruction books by sections and include detailed Operating and Maintenance Instructions for all components of all systems, including wiring, and piping diagrams necessary for clarity. Identify the covers with the name of the project and the words "Operating and Maintenance Instructions - ELECTRICAL".
- E. Each section must have labeled tabs and be clearly marked with equipment or system name and contain detailed parts list data, ordering information therefore and the name, address and telephone number of the closest supply source.
- F. All instructional data must be neatly and completely prepared to the satisfaction of the Design Professional.
- G. Provide complete copy of all warranties in separate tab with the binder.
- H. Provide copies of the as-built drawings in the manuals.
- I. Provide copy of each submittal for each piece of equipment on the project, complete with all tag numbers, Contractor's Transmittal Cover Sheet and Design Professional's final Submittal Review Sheet.
- J. Provide compact disc of Owner training sessions with the manuals.
- K. Provide complete copy of the Electrical System Commissioning Report.

1.13 GUARANTEE

- A. All material, equipment and workmanship must be in first class operating condition in every respect at time of acceptance by Owner. Acceptance by the Owner will be by letter written to the Electrical Trade Contractor.
- B. Unconditionally guarantee in writing all materials, equipment and workmanship for a period of one (1) year from date of acceptance by Owner. During the guarantee period, repair or replace, at the Electrical Trade Contractor's expense, any materials, equipment or workmanship in which defects may develop and provide free service for all equipment and systems involved in the contract during this guarantee period. Beneficial use of any system by any of the Trade Contractors during construction does not constitute acceptance by the Owner. Time period of this beneficial use cannot be included in the guarantee period.

- C. Guarantee must also include restoration to its original condition of all adjacent work that is disturbed in fulfilling this guarantee.
- D. All such repairs and/or replacements must be made without delay and at the convenience of the Owner.
- E. Guarantees furnished by Trade Contractors and/or equipment manufacturers must be counter-signed by the related Trade Contractor for joint and/or individual responsibility for subject item.
- F. Manufacturers' equipment guarantees or warranties extending beyond the guarantee period described in item B above must be transferred to the Owner along with the Trade Contractor's guarantees.

1.14 ENTRANCE OF EQUIPMENT

- A. Determine the method of equipment entrance during initial site visit prior to bidding. Do not scale building openings, door widths and equipment or component sizes off the drawings. Determine sizes from site measurements and the equipment manufacturer. Include cost of equipment manufacturer's knockdown, use of field assembled equipment, field assembly, all work required for access, removals, replacements, general construction, and the like, as required. During preparation of submittals, verify whether knocked-down or pre-disassembled equipment have been proposed all to the extent required to permit entry of equipment to final location. Verify that the use of field assembled (not pre-assembled) equipment complies with manufacturer's warranty, guarantee, listings and requirements.
- B. Perform all necessary rigging required for completion of electrical work.
- C. Deliver products to the site properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Deliver products and equipment to the site properly weatherproofed.
- D. The Trade Contractor who furnishes or purchases the product or equipment is responsible to provide and maintain protection from the weather, dust, dirt, construction debris, etc. until the project is complete.
- E. For all products and equipment which, when installed, have an opening into the building must be provided with a plywood cover, or similar protection, to prevent debris, rain, etc. from entering the building. The Trade Contractor who installs the product or equipment is responsible for such protection beginning at the time of installation.

1.15 VISIT TO SITE

- A. Due to the nature of the work involved under these Contract Documents, all bidders are required to thoroughly examine the site. Coordinate and schedule all site visits with the Owner.

- B. Thoroughly review Contract Documents prior to visiting the site, take Contract Documents to site and thoroughly explore to any extent necessary, the existing conditions as relating to fulfilling the requirements of these Contract Documents.
- C. If discrepancies are noted between requirements of Contract Documents and existing conditions, Trade Contractors must so indicate to Design Professional during bidding period and receive clarification before bidding. Failure to comply with this requirement will result in Design Professional's interpretation during the construction period such that the Design Professional's decision will be final and binding as the sole interpreter of the contract requirements.
- D. Extras will not be considered for any work relating to connections with existing systems or adaptability of new systems to existing structures.
- E. Submission of proposals will be considered evidence that Trade Contractors have complied with the requirements of this Article.

1.16 REQUESTS FOR INFORMATION, RFI(s)

- A. Manage RFI(s) in a formal manner. Preparation and submission must comply with the process specified herein to be of maximum benefit to the project. Prepare, manage, and maintain an RFI Log. RFI(s) which do not comply with this process will be returned without comment.
- B. All RFI(s):
 - 1. Must be submitted in written form to the party designated at the construction phase kick-off meeting;
 - 2. Must be consecutively numbered, dated, and logged as directed, during the kick-off meeting;
 - 3. Those which are follow-up RFI(s), must use the same RFI number, with a sequential submission number;
 - 4. Must list the RFI number of any reference RFI(s) used in the narrative;
 - 5. Must present: background; related drawings; specification articles; room, space locations (as designated on Contract Documents including wing, column line designation, floor designation, and/or north, south, and the like), and must be presented as complete, clearly written thoughts, in legibly printed or typed form;
 - 6. Must be completed by the Electrical Trade Contractor's Designated Project Foreman, under the control and overview of the Electrical Trade Contractor's Project Manager;
 - 7. Must include Electrical Trade Contractor's Project Foreman's suggested resolution to RFI;
 - 8. Must evidence a high level of fluency with the Contract Documents, all job progress correspondence, all Addenda, all Construction Bulletins, and specifically the Mechanical/Electrical Specifications including: all specifications.
- C. The Electrical Trade Contractor's designated Project Manager must demonstrate familiarity with and responsibility for all RFI(s) prepared by the Project Foreman and must periodically submit an initialed log of RFI(s) signifying control of RFI(s) relating to specification and job scope issues.

- D. Issues relating to job scope, work included, methods and means which are either clearly discernable from the Contract Documents and/or clearly the responsibility of the Electrical Trade Contractor must be answered by his Project Manager and resolved between the Foreman and Project Manager prior to resorting to written RFI(s). The work of the Project Manager must evidence: fluency with the methods and means anticipated by the Electrical Trade Contractor during the bid phase to plan and complete the work; fluency with the Contract Documents, and all administrative issues related thereto.
- E. Items or issues which relate to non-compliance to associated codes or regulations must reference code interpretations or the published adopted code or regulation. The reference must be either an excerpt of the code or regulation, published addenda to the code or regulation, a formal interpretation written by a representative of the associated agency, or letter of non-compliance from the Authority Having Jurisdiction. All cited code requirements must include the applicable code title, code version or date, and code section number designation. If the RFI does not contain the required information, the RFI will be returned without comment.

1.17 AS-BUILT DRAWINGS

- A. Prepare reproducible (paper) and electronic (cd) record documents in AUTOCAD .dwg format (Version 2000 or later) in accordance with the requirements in Division 01. Use commercial CAD drafting service if Electrical Trade Contractor does not have CAD capabilities in-house. As an option, if requested by the Electrical Trade Contractor, an electronic copy (AutoCad .dwg format) of any of the Electrical Contract Drawings may be provided by the Design Professional at a cost of \$250.00, paid in advance, to the requesting Contractor. In addition to the requirements specified in Division 01, indicate the following installed conditions:
 - 1. Indicate actual inverts and horizontal locations of underground electrical transmission and distribution equipment, and the like.
 - 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines and annotated with permanent equipment number approved by Owner. Include code and equipment service clearances.
 - 3. Approved substitutions, Addenda and Bulletin Contract Modifications, and actual equipment and materials installed.
- B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located, as specified in Division 01, to record the locations and invert elevations of the underground electrical work.

1.18 SERVICING OF EQUIPMENT AND SYSTEMS

- A. After work has been completed in accordance with the Contract Documents, and prior to final acceptance tests, each Trade Contractor must have manufacturers or their authorized agents of the equipment installed, completely check their equipment and put equipment into proper operation. In each case, the respective Trade Contractor must have the manufacturers thoroughly check the complete installation of the equipment, furnished by the manufacturer, for proper and correct operation under the service intended.

- B. Six months after final acceptance of the work under the Contract Documents, each of the Trade Contractors must have the manufacturers again check their equipment for proper operation and lubrication. Coincidentally, these Trade Contractors must assure that the Owner is properly instructed in the servicing of the equipment.
- C. Prior to expiration of the guarantee period, each Trade Contractor must check all equipment, materials and systems for which he is responsible, make necessary adjustments and/or replacements, and leave systems in first class operating condition.

1.19 SERVICING OF EQUIPMENT AND SYSTEMS (EXISTING/UNMODIFIED)

- A. Selected, designated existing electrical systems and equipment are planned to be continued in service upon project turnover, with no specified repair/modification covered under the Contract Documents. The Owner reserves the right to request repair/maintenance labor and materials, as an Owner requested change, depending on the results presented in the Electrical Trade Contractor's Evaluation Report.
- B. Perform inspection, evaluation, start-up and testing of the electrical systems and equipment listed below or as specified in Division 26, and prepare a full Electrical Evaluation Report listing: defects; deficiencies; required maintenance/repair labor and materials, all as required to restore unmodified systems and equipment to safe reliable code compliant use:
 - 1. Add systems here.
- C. Include within the Electrical Evaluation Report, a detailed breakdown of the proposed additional material and labor required to complete the recommended restoration(s).

1.20 EXCAVATION AND BACKFILLING

- A. Perform all excavation, backfilling and pumping necessary for completion of electrical work. All excavation is considered classified.
- B. Remove from premises or deposit as directed by Design Professional all material excavated and not required or suitable for backfilling.
- C. Carefully remove and store topsoil, shrubbery and sod until underground work is complete and trenches are backfilled and then re-install. Replace any damaged items to the satisfaction of the Engineer.
- D. Allow adequate cover over piping and conduit in trenches as applicable. Trench walls must be perpendicular to the top of piping and conduit and trench bottoms must be instrument graded in the direction of flow as required. Pipes and conduits less than 6-inches in outside diameter which do not require sloping, shall have hard trench bottoms and shall be supported on undisturbed subgrade. Trench bottoms for sloping utilities, pipes and conduits over 6-inches in outside diameter shall be excavated 6-inches deeper than elevation and a 6-inch thick tamped bedding shall be installed. Bedding shall be naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and

natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

- E. Provide sheathing, shoring and bracing necessary to complete excavation and backfilling work and exercise every precaution necessary to prevent accident, injury or death to any human and damage to property of others. Remove all debris, sheathing, shoring and bracing upon completion of work.
- F. It is the responsibility of each Trade Contractor to check with the various Utility Companies and make the necessary arrangements to avoid damage to their property. Each Trade Contractor is responsible for damage during excavation to existing underground structures including, but not limited to electric, structural, piping or equipment. Such damage must be repaired promptly without cost to the Project. Do not dig until all underground utilities are identified and located.
- G. Backfill after inspection and approval. Backfill must be made with clean earth, free from rocks, frozen particles, debris or other foreign materials. Deposit in uniform layers not over six inches (6") thick with each layer mechanically tamped before the next layer is applied. When approved backfill material is not available from the site, each Trade Contractor, at no additional cost to the project, must provide additional select backfill to complete installation. Partial backfill on piping leaving all joints exposed is mandatory for all underground gas and underground domestic water systems. Final backfill only after testing procedures have been approved.
- H. All trenches that pass under wall foundations must be backfilled with lean concrete, full height, directly under wall footing, and at a 1:1 slope away from wall or column footing. Trenches that are parallel with and deeper than wall foundations must be backfilled with lean concrete on a 1:1 slope away from the bottom of the wall or column footing.
- I. Perform all cutting and patching to driveways, sidewalks, curbs, bituminous paving, walls, and the like, required by performance of excavation and backfilling. Install and maintain temporary paving as directed by Design Professional. Make repairs to sidewalks in complete blocks, partial patching will not be acceptable. Provide all materials for patching in strict accordance with applicable Articles of Divisions 01 through 33 of the Contract Specifications. All patching to match adjacent construction.
- J. Where rock is encountered during installation of underground piping systems, carry trenches to a point six inches (6") below invert of pipe and provide a six inch (6") layer of crushed stone or gravel as a cushion.
- K. All excavation work must include all pumping equipment, materials and labor necessary to keep all excavations free of water. Provide well points as required with disposition of water as directed by Design Professional.
- L. Provide suitable indemnity for all accidents to humans, animals or equipment caused by excavating and backfilling work. Provide suitable guards, barricades, red lanterns, flares and take the necessary precaution for an approved and safe installation. All trenches must be backfilled at the end of each working day. Where a trench must be left open, provide coverings of adequate size and strength over entire open area.

- M. Detectable Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6-inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
1. Red: Electric.
 2. Yellow: Oil, gas and dangerous materials.
 3. Orange: Telephone and other communications.
- N. Trade Contractors shall engage the services of a Utility Identification Sub-Contractor to identify all existing underground utilities in the path of the proposed trench excavation. It shall be the Utility Identification Sub-Contractor's sole responsibility to search, investigate, test and identify existing underground utilities such as, but not limited to the following: gas piping, water piping, steam piping, condensate piping, electrical lines, sanitary piping, storm water piping, data, telephone, fiber optics and any other utility service, piping, lines or trenches. Before excavation can begin, the Trade Contractors shall provide all utility data concerning the underground utilities to Design Professional, and Owner. Data shall be in the form of a scaled drawing of the proposed excavation with all utilities clearly indicated.

1.21 CONTINUITY OF SERVICES

- A. Generally, no actions can be taken by the Electrical Trade Contractor that will interrupt any of the existing building services for these buildings or any other building until previously arranged and scheduled with the Design Professional and Owner.
- B. Should any service be interrupted by the Electrical Trade Contractor, immediately provide all labor, including overtime if necessary, and all material and equipment necessary for restoration of such service, at no additional cost to the Project.

1.22 CONTINUITY OF INTERIOR BUILDING SERVICE UTILITIES

- A. For the purposes of this specification section, "Building Service Utilities" include, but are not limited to:
1. Exterior: electrical; domestic water; fire protection water; sanitary; storm; chilled water; space heating water; fuel lines; communication cable; fire alarm; remote metering lines; telemetry lines; and the like;
 2. Heating piping systems, complete;
 3. Chilled water piping systems, complete;
 4. Heating and process steam/condensate systems, complete;
 5. Ductwork systems, complete;
 6. Medical gas systems, complete;
 7. Fire protection systems, complete;
 8. Control systems, complete;
 9. Plumbing, drainage and storm systems, complete;
 10. Process piping systems, complete;
 11. Electrical conduit and wiring systems, complete;

12. Electrical lighting and wiring devices, complete;
 13. Electrical fire alarm and security systems, complete;
 14. Electrical communication systems, complete.
- B. Plan work and schedule to prevent interruption of all Utility System Services. Refer to the "Scope and Objectives of the Electrical Work," of this Section for a description of: unmodified systems, unmodified equipment; spaces wherein mechanical and electrical systems are unmodified; and Utility System Services external to the individual building or buildings addressed by the work of this project.
- C. Plan work and schedule installation and connections of all Utilities to minimize or prevent interruption of all Utility System Services. Refer to "General Requirements Electrical," Article "Scope and Objectives of the Electrical Work."
- D. The work required for continuity of these systems on this project includes, but is not limited to, providing all labor and material required for: site investigation/verification; disconnect; removal; rerouting; reconnection; as-built drawing documentation; testing and check out of mechanical and electrical services serving equipment which are implied to be, or specifically indicated to be, continued in operation.
- E. All materials required for relocation work must comply with these specifications. Carefully review all phasing drawings, all Construction Trade drawings, and complete all necessary and prudent site visits to become familiar with all existing building operations, systems and equipment which may be continued, independent of the work of this project, and include all required relocation work described in this section.

1.23 TEMPORARY FACILITIES, UTILITIES AND HEATING

- A. Refer to the general construction contract documents of these specifications.

1.24 SMOKE AND FIRESTOPPING (GENERAL)

- A. Furnish and install a material or a combination of materials to form an effective barrier against the spread of flame, smoke and gases, and to maintain the integrity of the "fire and/or smoke" rated construction. Refer to the general construction contract documents. Fire and smoke rated construction is identified on the general construction contract documents. Provide firestopping in the following locations:
1. Pipe and conduit penetrations through above grade floor slabs and through "fire and/or smoke"-rated partitions and fire walls.
 2. Penetrations of vertical shafts including, but not limited to pipe chases, duct chases, elevator shafts, and utility chutes.
 3. Other locations where indicated or required.
- B. Prepare submittals and submit for approval. Include manufacturer's descriptive data, typical details, installation instructions and the fire/smoke test data and/or report as appropriate for the time rated construction and location. The fire/smoke test data must include a certification by a nationally recognized testing authority that the material has been tested in accordance with ASTM E 814, or UL 1479 fire tests.

- C. Deliver materials in the original unopened packages or containers showing name of the manufacturer and the brand name. Store materials off the ground, and protect from damage and exposure to elements. Damaged, deteriorated or outdated shelf life materials shall not be used and must be removed from the site.

1.25 COORDINATION DRAWINGS

- A. The HVAC Trade Contractor will initiate preparation of coordination drawings, control original reproducible, collect, organize and facilitate the work/input of General Contractor and all other building trades relative to the 100% final submission of the coordination drawings. Prepare coordination drawings in accordance with Division 1 to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Use proposed equipment submittals, which include certified dimensions, service clearances, etc., to prepare the coordination drawings. If equipment is submitted for review after completion of the coordination drawings and rejected during the submittal review process, because the equipment fails to meet the project specifications, the HVAC Trade Contractor is responsible to revise the coordination drawings and layout the work using equipment which meets the project specifications. HVAC Trade Contractor will designate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 - 1. Proposed locations of conduit, pull boxes, equipment, and materials. Include the following:
 - a. Maximum physical separation to meet National Electrical Code requirements for feeder and secondary transformer tap lengths.
 - b. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
 - c. Equipment connections and support details.
 - d. Exterior wall and foundation penetrations.
 - e. Fire-rated wall and floor penetration.
 - f. Sizes and location of required concrete pads and bases.
 - 2. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 - 3. Floor plans, elevations, and details to indicate penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
 - 4. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling mounted items.
 - 5. The foregoing information and coordination work must be provided by the applicable Trade Contractor using the coordination drawings as initiated by the HVAC Trade Contractor.
 - 6. The HVAC Trade Contractor must submit completed coordination drawings for record purposes, not for technical review and approval, but as proof that the coordination drawings have been completed. The coordination drawings must be

completed and submitted for record in advance of submission of sheet metal shop drawings.

- B. Coordinate with, and provide to the HVAC Trade Contractor, all electrical system and equipment information, locations and clearances required to prepare the coordination drawings.

1.26 TRADE CONTRACTOR'S CERTIFICATION

- A. Upon final completion of all work, each Trade Contractor must provide a notarized letter on Corporate letterhead, executed by a Corporate Officer, or Company Partner, stating that the work has been completed in accordance with the Contract Documents, Addenda, Bulletins, Trade Contractor's Punch List items and Design Professional's Construction Observation Report(s). Final Payment will not be approved until the notarized letter has been provided. Refer to the following sample letter.

SAMPLE LETTER

ENGINEER/ARCHITECT _____

TRADE CONTRACTOR _____

PROJECT _____ NO. _____

I hereby certify that all work under the HVAC, Plumbing, Fire Protection and Electrical Contract Documents, as applicable, including all addenda, bulletins, Punch List items and Construction Observation Reports, has been completed and the quality and workmanship of the work has been performed in accordance with Contract Documents.

State of: _____

County of: _____

Trade Contractor: _____

Subscribed and Sworn to before
me this _____ day of
20 _____

Notary Public: _____

By: _____

Date: _____

My Commission Expires: _____

 (Ctrl) ▾

PART 2 - PRODUCTS

2.1 MANUFACTURER'S AND SUB-CONTRACTORS LIST, KEYMEN RESUMES

- A. Before ordering any material or equipment unit, and not later than ten (10) working days after signing of contracts, submit a list of Manufacturers, Sub-Contractors and Suppliers showing make, type, manufacturer's name and trade designation of all materials, and equipment, proposed for use under this contract. Prepare list by reference to specifications. Identify all long lead submittals which will require an expedited submittal review.
- B. Refer to the Article "Proposal Preparation," in this section. Specifically designate the labor force required of the Electrical Trade Contractor. As part of the mobilization phase of the work, submit resumes for each Keyman including the Project Manager and Project Foreman.
- C. These lists, when approved, will be supplementary to specifications, and no variations therefrom will be permitted except with the approval of the Design Professional.
- D. Prepare the list using the "PROPOSED MANUFACTURERS AND SUB-CONTRACTORS LIST" located at the end of this section.
- E. Submittals will not be processed until the requirements of this Article are satisfactorily completed.

2.2 SUBMITTALS

- A. Provide digital submissions (.pdf format) for all material and equipment as noted in Proposed Manufacturer's and Sub-Contractors List, except where indicated otherwise herein.
 - 1. Prior to submission of product data, shop drawings, and samples, notify the Design Professional of any site conditions differing from those indicated or specified.
 - 2. Prior to submission of product data, shop drawings and samples to the design professional, the HVAC Trade Contractor, the Plumbing Trade Contractor and the Fire Protection Trade Contractor shall submit all submittals which require electrical power to the Project Electrical Trade Contractor for the HVAC Trade Contractor's, the Plumbing Trade Contractor's, the Fire Protection Trade Contractor's and the Electrical Trade Contractor's coordination and review. The Electrical Trade Contractor shall provide approval of electrical power requirements for the HVAC, Plumbing and Fire Protection Trade Contractors' proposed equipment.
 - 3. All submittals of equipment requiring electrical power must be accompanied by the "HVAC AND ELECTRICAL CONTRACTORS' COORDINATION OF HVAC EQUIPMENT ELECTRICAL REQUIREMENTS TRANSMITTAL COVER SHEET", the "PLUMBING AND ELECTRICAL CONTRACTORS' COORDINATION OF PLUMBING EQUIPMENT ELECTRICAL REQUIREMENTS TRANSMITTAL COVER SHEET" and the "FIRE PROTECTION AND ELECTRICAL CONTRACTORS' COORDINATION OF FIRE PROTECTION EQUIPMENT ELECTRICAL REQUIREMENTS TRANSMITTAL COVER SHEET", as applicable, all located at the

- end of this section. Submittals without this Cover Sheet or an incomplete Cover Sheet will be rejected without review.
4. All submittals must be accompanied by the "ELECTRICAL CONTRACTOR'S TRANSMITTAL COVER SHEET" located at the end of this section. Submittals without this cover sheet or with an incomplete cover sheet, will be rejected without review.
 5. All submittals must be accompanied by the "ELECTRICAL SUBMITTAL LOG", located at the end of this section. Submit log after final acceptance of the proposed Manufacturer's and Sub-Contractor's list. Revise and update the log with each submittal. Submittals without these logs or without an updated log will be rejected without review.
 6. Specifically annotate and sign all exceptions, deletions and additions that vary from the Project Contract Documents. Failing to provide signed annotations for all deletions and additions, recognize and accept that Contract Documents will govern, and will be used to resolve disputes.
- B. Prepare submittals by careful reference to: drawings and specifications; preparatory layout of all work; coordination with all proposed equipment; coordination with related submittals and the work of all other Trade Contractors; space requirements; and Utilities defined in this Section. A review of such submittals by the Design Professional, which include drawings, schedules, and catalog cuts provided by the Trade Contractors, their Sub-Contractors, manufacturers, and vendors, shall not relieve the Trade Contractors from the responsibility for correcting all errors of any sort in the submittals, either identified or undetected by such review.
- C. Regularly provide and update submittal log sheets listing submittal number, product, applicable specification section, dates of submittal and receipt and status. Identify each submittal by Job Name, log number and reference to applicable Specification Article number.
- D. All equipment submittals must include, but not be limited to, the following:
1. Manufacturers' catalog designation, photographs and specifications.
 2. Full electrical data, including specifically, electrical characteristics.
 3. Full General Construction data, including operating weights, dimensional data including service access space. Data shall be given to the General Construction Trade Contractor, where applicable, for use in setting steel, supports, and attachments.
 4. Full wiring diagrams, including clearly identified power connections and control connections. Data and diagrams shall be given to the Automatic Temperature Control (ATC) Trade Sub-Contractor for their use and inclusion into their submittals.
 5. Listing of specific electrical performance, calculations and data.
 6. Dimensions, capacities, ratings, material and finish.
 7. Complete the submittal by listing all available options, accessories, configurations and materials, and legibly strike out with single thin line all proposed deletions. Clearly signify whether each and every manufacturer's option, accessory, configuration and material choice is included and which is excluded by the submission.
 8. Annotation of equipment, devices, systems as indicated by the Contract Documents (PNL-1, etc.).

9. Certification of testing by agencies such as ETL, ARI, UL, etc.
10. Such other detailed information as required for proper evaluation.

E. Review Time:

1. Allow two (2) weeks after Design Professional's receipt for the Design Professional's processing of each submittal, exclusive of Owner's, or other's review in the processing chain. Allow a longer time period where processing must be delayed for coordination with subsequent submittals.

F. Submittals for electric motor starters must include a tabulation listing the following:

1. The equipment the starter is intended to control.
2. Horsepower and starter size.
3. Voltage.
4. Phase.
5. Full load amperes.
6. The manufacturer's number or type.
7. Heater numbers and amperage.
8. Quantity of auxiliary contacts required by ATC and fire alarm systems.
9. Pushbutton arrangement.
10. Pilot light arrangement if applicable.

G. Submittals for automatic temperature controls must be coordinated with: 1) all electrical equipment manufacturers' and vendors' submittals including review of electrical submittals by ATC Sub-Contractor for conformance with sequences of operation for each piece of equipment; 2) all electrical requirements of ATC System with Electrical Trade Contractor; and 3) all fire and safety requirements of the Fire Alarm System. ATC submittals shall include copies of all wiring diagrams for all electrical equipment with points of connections clearly identified. ATC submittals shall not be developed and submitted until Electrical Trade Contractor provides all equipment submittals for review.

H. The Design Professional's recommendation of acceptance of the equipment proposed by the Electrical Trade Contractor is conditional upon the Electrical Trade Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Electrical Trade Contractor acknowledges compliance with all of the following:

1. Field layout is completed and planning of proposed equipment has coordinated with all related submittals, related trades and space requirements.
2. The Electrical Trade Contractor has reviewed and approved all submittals prior to submission. Provide all submittals with a signed approval stamp, signifying the following: 1) all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data have been verified; 2) the Design Professional has been notified of all site conditions which affect the work, and which require design resolution, as opposed to resolution by trade decisions; 3) all items are approved by the Electrical Trade Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements; 4) submission is clearly marked to indicate which manufacturer's options are provided and which are not provided for the proposed equipment; and 5) manufacturers and/or equipment suppliers have

been given a set of the contract documents for their review and use as the basis of the submittals.

3. Any and all exceptions requested by the Electrical Trade Contractor are provided in writing with the submittals. All exceptions, deletions and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide initialed annotations for all deletions and additions, the Electrical Trade Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.
 4. Submittals without the Electrical Trade Contractor's signed stamp of approval will be returned without review. Initialed approval stamps are not acceptable.
 5. The Design Professional's acceptance of the proposed equipment constitutes the Engineer's formal approval that the engineering performance and operational utility requirements, of the proposed equipment, match the Design Professional's specified and designed performance requirements. By entering into these Contracts, the Trade Contractors agree that the purpose of submittals is to demonstrate to the Design Professional that the Trade Contractors understand the design concept and that they demonstrate their understanding by indicating which materials and equipment they intend to furnish, install and use.
- I. Secure submittals smaller than 8-1/2 x 11 to paper of this size.
 - J. Material and equipment fabricated, furnished and/or installed or used without the Design Professional's review are subject to rejection by the Design Professional.
 - K. Corrections or comments made on submittals during review by the Design Professional do not relieve the Electrical Trade Contractor from compliance with the requirements of the Contract Documents. Such review will be only for general conformance with the design concept, and the information given in the Contract Documents and does not include review of quantities, dimensions, sizing, pressure drops, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Electrical Trade Contractor. Review of a specific item does not indicate acceptance of an assembly of which the item is a component. The Design Professional is not responsible for any deviations from the Contract Documents that are not clearly noted by the Electrical Trade Contractor. The Design Professional will not review partial submissions or those for which submissions for correlated items have not been received. The Electrical Trade Contractor is responsible for: confirming and correlating all quantities, clearance, and dimensions; selecting fabrication processes and techniques of construction; coordinating work with all other Trades, and performing his work in a safe and satisfactory manner.
 - L. All submittals must be able to be reproduced. The Electrical Trade Contractor is responsible for all reproduction and distribution to the General Construction Trade Contractor and all other Trade Contractors as applicable.
 - M. If requested for the Electrical Trade Contractor's use in the preparation of submittals, an electronic copy (AutoCad .dwg format) of any of the Electrical Contract Drawings may be provided by the Design Professional, after receipt of a signed indemnification agreement, at a cost of \$250.00, paid in advance, by the Electrical Trade Contractor.

- N. For additional requirements regarding submittals, refer to Article "Additional Trade Contractor Paid fees and Expenses" in Part 3 of this section.

2.3 MATERIALS AND EQUIPMENT

- A. All materials and equipment must be new and conform to the grade, quality and standards specified herein.
- B. All equipment offered under these specifications is limited to products regularly produced and recommended for service ratings in accordance with engineering data or other comprehensive literature made available to the public and in effect at the time of opening of bids. Testing agency seals, decals and/or nameplate shall be attached to and visible on all equipment.
- C. Items such as valves, motors, starting equipment, vibration isolating devices, and all other equipment and material, where applicable and practicable, must each be of one manufacturer.
- D. Install equipment in strict accordance with manufacturer's instructions for type and capacity of each piece of equipment used. Obtain these instructions, which will be considered part of these specifications. Type, capacity and application of equipment must be suitable and operate satisfactorily for the purpose intended in the electrical systems.

2.4 EQUIPMENT VARIATIONS AND SUBSTITUTIONS

- A. Equipment Substitution Definition as follows:
 - 1. A product that is neither the Basis of Design, nor one of the named Alternative Manufacturing Sources.
 - 2. Unless noted otherwise in the Contract Documents, substitutions may be considered after the award of Contracts. Subsequent requests will be considered only when, through no fault of the Electrical Trade Contractor, none of the specified products are available.
- B. Equipment Variation Definition as follows:
 - 1. A product that is not the Basis of Design, but is named as one of the specified Alternative Manufacturing Sources.
- C. The manufacturers listed in Part 2 of all technical specifications are considered Alternative Manufacturing Sources as described in Paragraphs A and B above.
- D. "Subject to compliance", as used in these specifications, means compliance with all the requirements of the Contract Documents.
- E. The materials and products mentioned in these Contract Documents are specified to establish a standard of: material of manufacture; independent testing agency certifications; quality; function; design; and performance. The phrases "Basis of Design," "standard of design," and "equivalent acceptable," are used to indicate that other similar, comparable

products may be used provided such substitutes or variations are accepted by the Design Professional as meeting all the salient characteristics and standards necessary, such as: material of manufacture; independent testing agency certifications; quality; function; design; and performance, to meet the Owner's needs and meet the objectives of the Design Professional's Project Design.

- F. Where Alternative Manufacturing Sources are listed for an item:
1. Selection must be either the Basis of Design or one of those listed Alternative Manufacturing Sources.
 2. There is no guarantee implied that each and every manufacturer listed can meet or exceed the salient characteristics, such as: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as Basis of Design.
- G. Each Trade Contractor is responsible to contact each proposed equipment manufacturer's representative and confirm, prior to preparing submittals, the proposed manufacturer's product meets or exceeds the: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design. Final acceptance will be determined by the Design Professional, whose decision is final.
- H. Submittals offered as an Equipment Variation from the Basis of Design shall include a letter, on the product manufacturer's letterhead, certifying that the proposed product is a Comparable Product to the product specified as the Basis of Design and conforms to all the salient characteristics, including: material of manufacture; quality; function; design; and performance of the product specified as the Basis of Design. If directed by the Design Professional for Products offered as an Equipment Variation, the Offerer shall provide a Letter of Confirmation from a Registered, Professional Engineer attesting that the Proposed Equipment Variation conforms to all the salient characteristics, including: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design.
- I. Specific products specified without use of the term: equal; equivalent; comparable product; substitution; or similar term; constitute a proprietary specification, and must be provided as specified, unless a written request is submitted to the Engineer for approval up to ten (10) days after the date of project award. Such requests must include a complete description of the proposed product, along with sufficient documentation and other information necessary for a complete evaluation of the proposed product. Such Trade Contractor Requests shall include a letter, on the product manufacturer's letterhead, certifying that the proposed product is a Comparable Product and conforms to all the salient characteristics, including: material of manufacture; independent testing agency certifications; quality; function, design; and performance of the specified product. If approved, the proposed product will be listed in an addendum to notify all bidders that such acceptance has been granted by the Design Professional. If not approved, provide the specified product.
- J. Provide Calculations, signed and sealed by a Professional Engineer registered in the State in which the work is taking place, engaged by the Electrical Trade Contractor, confirming that the equipment proposed as either a Substitution, or Variation, is a Comparable

Product to the product specified as the Basis of Design and conforms to all the salient characteristics, including: material of manufacturer; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design. Provide such calculations for major pieces of equipment (emergency generators, switchgear, transformers, etc.). The Design Professional, whose decision will be final, will determine which products will require calculations during the submittal review process.

- K. The Contract Documents have been founded upon Engineering Design selection of materials, products, and pieces of equipment listed at the Basis of Design. In the event that the incorporation of an approved Substitution, Variation, or assembly, into the work, requires revisions or additions to the contractual requirements of either the Trade Contractor proposing the substitution or variation, or any other Trade Contractor, the Trade Contractor proposing the substitution or variation, shall bear the cost of: such revisions or additions to the work of the Trade Contractor proposing such Substitution and/or Variation; any expenses of all affected trades; and all engineering or architectural services required at no change in the contract sum.
- L. The equipment specifications indicated on the drawings, or in Part 2 of each of the technical specifications, may or may not indicate or include all of the required salient characteristics, components and accessories included with the specified product. Include cost for all such characteristics, components and accessories required to meet or exceed the: material of manufacture; independent testing agency certifications; quality; function; design; and performance of the product specified as the Basis of Design.
- M. For requirements regarding equipment variations after bid award, refer to Article "Additional Trade Contractor Paid Fees and Expenses" in Part 3 of this section.
- N. Each Trade Contractor negotiating for pricing advantages affecting the Trade Contractor's Bid shall comply with the directives included herein, bear full responsibility for the accuracy and completeness of the submissions required of the Vendor selected by the Trade Contractor. The Proposing Trade Contractor shall bear full responsibility for all extra costs of the Design Professional shown to have resulted from inaccurate, and/or incomplete compliance with the directives included in this Specification Article.
- O. All decisions provided by the Design Professional, described herein, shall be final.

2.5 VIBRATION ELIMINATION

- A. Provide vibration isolation support provisions for all moving or rotating equipment, machinery and transformers when such provisions are not furnished and/or integrally mounted by the equipment manufacturers. Install in accordance with vibration isolation manufacturer's recommendations unless specified otherwise herein.
- B. Subject to compliance with the requirements, provide products by one of the following:
 - 1. Amber/Booth Company;
 - 2. Korfund Company, Inc.;
 - 3. Mason Industries;

- 4. Or approved equal in accordance with the project substitution provisions of the contract.
- C. Provide all rotating or moving machinery or equipment mounted on, or suspended from, building structure with approved resilient suspension isolation mountings.
- D. Provide vibration isolating connections between all pumps and connecting piping. Length, size, and stiffness as recommended by vibration isolator manufacturer.
- E. Use flexible metallic conduit for all electrical connections to moving or vibrating equipment, such as motors, generators, transformers, and the like.
- F. Rigid pipes, conduit or other extended machine assemblies connected to vibration isolated equipment are not permitted to be tied in directly with the building construction. Connect such elements to the equipment through flexible fittings, and support using isolating equipment as required.
- G. All systems must operate free from objectionable vibration and noise. Take all necessary steps required to achieve this result without additional cost to the Project.

2.6 NOISE CONTROL

- A. Noise levels in all 8 octave bands due to equipment and systems shall not exceed NC 35 within the occupied room, except as follows:

<u>TYPE OF ROOM</u>	<u>NC LEVEL</u>
Audio Suites, Audio Speech Pathology, Phono/Cardiology	25
Operating Rooms	40
Offices, large open	40
Lobbies, Waiting Areas	40
Corridors	40
Bath Rooms and Toilet Rooms	40
Laboratories	45
SPD, Dining Rooms, Food Service/Serving, Therapeutic Pools	45
Kitchens, Locker Rooms, Warehouses, Shop, Laundries, Gymnasiums, Recreation Rooms	50
X-Ray & General Work Rooms	40

- B. For equipment which has no sound power ratings scheduled on the plans, select equipment such that the fore-going noise criteria, local ordinance noise levels, and OSHA requirements are not exceeded. Selection procedure shall be in accordance with ASHRAE 2015 HVAC Applications Handbook, Chapter 48, NOISE AND VIBRATION CONTROL.
- C. An allowance, not to exceed 5db, may be added to the measured value to compensate for the variation of the room attenuating effect between room test condition prior to occupancy and design condition after occupancy which may include the addition of sound absorbing material, such as, furniture. This allowance may not be taken after occupancy. The room attenuating effect is defined as the difference between sound power level emitted to room and sound pressure level in room.

- D. In absence of specified measurement requirements, measure equipment noise levels three feet from equipment and at an elevation of maximum noise generation.
- E. If sound levels are exceeded, provide sound reducing devices, including, but not limited to: sound attenuators; acoustic enclosures; additional equipment insulation or vibration isolators to conform to these specifications. Provide required material and labor at no additional cost to the project.

2.7 INSERTS, HANGER SUPPORTS, CLAMPS, FASTENINGS

- A. All materials, designs and types of inserts, hanger supports and clamps must meet the requirements of the latest edition of the Manufacturers Standardization Society Document MSS-SP-58, Underwriters Laboratories, Inc., National Electrical Code and Factory Mutual Engineering Division Standards where applicable. Insert, hanger support and clamp types referenced herein are shown in MSS-SP-58.
- B. Provide all necessary inserts, hanger supports, fastenings, clamps and attachments necessary for support of the electrical work. Select the types of all inserts, hanger supports, fastenings, clamps and attachments to suit both new and existing building construction conditions specifically for the purposes intended.
- C. In new overhead cast-in-place concrete construction, provide type 19 steel concrete inserts and fasten to form work before concrete is cast. For cast concrete floor or roof sections too thin to permit the use of inserts, extend the hanger rod through the slab and terminate with a nut and large washer, recessed into the top face of the slab as approved by the Design Professional.
- D. Clamps and attachments to steel beams and bar joists must be made using types 20, 21, 23, 25, 27, 28, 29 or 30 as applicable to suit conditions of construction. Clamps and attachments must be selected on the basis of the required load to be supported. Provide all necessary steel angle iron or channel between bar joists, or steel beams where direct attachment cannot be made. Holes are not permitted to be drilled or burned in structural building steel for hanger rod supports. Welding of hangers or supports to structural steel is prohibited unless approved beforehand by a Structural Engineer.
- E. Metallic masonry anchors may be provided for all pre-cast concrete, masonry and cast concrete construction as an alternate to item (C) above. Locate in pre-cast and cast-in-place concrete as directed by the Structural Engineer. Select and install as recommended by the anchor manufacturer for the various applications, stresses and services involved. Accomplish installation of masonry anchors by pre-drilling concrete or masonry to diameters and depths required to properly accommodate anchor bolts.
- F. Subject to compliance with the requirements, provide products by one of the following:
 - 1. Dynabolt;
 - 2. Ram-In;
 - 3. Tru-Bolt manufactured by Ramset;
 - 4. Redhead;
 - 5. Hilti;
 - 6. Wej-It;

- 7. Or approved equal in accordance with the project substitution provisions of the contract.
- G. Toggle bolts may be used in dry wall and lath and block plaster walls. The use of toggle bolts is restricted to the weight limitations imposed by the toggle bolt manufacturer for the size used.
- H. Except where noted otherwise herein, attachment to wood or material of similar fibrous nature must be made with lag screws and/or wood screws of required size.
- I. Screws with wooden or plastic plugs, or lead anchors are not acceptable.

2.8 ACCESS DOORS AND PANELS

- A. For projects which include the work of a General Construction Trade Contractor, furnish and locate for installation under General Construction, all access doors and panels for concealed portions of electrical work requiring accessibility for operation and maintenance. If project does not include a General Construction Trade Contractor, provide access doors as required.
- B. Access doors and panels may not be installed without specific approval of the Design Professional as to location. The proposed location of access doors and panels must be reviewed with the Design Professional and the General Construction Trade Foreman, where applicable, and the locations indicated on the coordination drawings prior to installation of equipment, access doors or panels. Controversies must be resolved at no cost to the Project.
- C. Minimum size of 24" x 18" unless shown, specified or approved otherwise.
- D. Sixteen (16) gauge minimum construction with concealed spring hinges, screw fasteners and painted finish. Color by Architect.
- E. Subject to compliance with the requirements, provide products by one of the following:
 - 1. Milcor;
 - 2. Karp;
 - 3. Mifab;
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- F. For access doors in drywall, provide drywall bead flange.
- G. For access doors in hard plaster or ceramic tile, provide expanded metal casing bead.
- H. For access doors in unplastered masonry and concrete, provide one piece frame for flush mounting.
- I. For access doors in acoustic tile ceilings, provide recessed door panel with room to receive acoustic tile.

- J. Underwriters "B" label access doors where required for access to shafts, corridors, and where located in fire walls and partitions.

2.9 EQUIPMENT ANCHOR BOLTS

- A. Provide and set in place at the time concrete foundations, bases or curbs are poured or formed, all necessary anchor bolts as required for the various equipment specified herein, with hook type anchor bolts of proper size and length to suit the apparatus as recommended by the equipment manufacturer. Set bolts in pipe sleeves of approximately twice the bolt diameter and of length equal to the embedded length of the bolt, with sleeves terminating flush with finished surfaces of foundations, bases or curbs.
- B. When the equipment is set in its proper position and aligned with the anchor bolts, the space between the anchor bolts and the inside wall of the sleeves must be completely filled with non-shrink cementitious grout.
- C. Subject to compliance with the requirements, provide products by one of the following:
 - 1. Crystex as manufactured by L & M Construction Chemicals, Inc.;
 - 2. Master Builders;
 - 3. BASF;
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- D. When a General Construction Trade Contractor provides concrete foundations, bases or curbs, the Electrical Trade Contractor is responsible for all anchor bolts required by the equipment he provides, under the Contract Documents. Assign a supervisory representative to be present at the time foundations, bases or curbs are poured or formed. For projects wherein there is no General Construction Trade Contractor, the Electrical Trade Contractor is responsible for pouring, locating, and setting equipment foundations, bases and curbs and the location of anchor bolts for the equipment provided or installed by him on this Project.
- E. All anchor bolts must be of sufficient strength to withstand any loading imposed by the attached materials or equipment.

2.10 PIPING AND CONDUIT SLEEVES

- A. Provide all sleeves required for electrical work and be fully responsible for the final and permanent locations thereof.
- B. Provide sleeves in the following locations:
 - 1. All pipes and conduits passing through all cast-in-place concrete construction and masonry walls.
 - 2. All pipes and conduits passing through cast-in-place waterproof concrete construction and waterproof masonry walls.

- C. Extend through construction and finish flush with each surface except where noted otherwise. Provide for a minimum 1/2" clearance around conduit, pipe or its covering in the instance of pipe covered with insulation.
- D. All sleeves in waterproof walls and floors must be fitted and sealed with positive hydrostatic mechanical seals. Sleeves must be sized accordingly. Mechanical seals must be placed around piping and/or conduit and inserted into void between inner wall of sleeve and piping and/or conduit. Tighten mechanical seals as required for watertight seal.
- E. Subject to compliance with the requirements, provide products by one of the following:
 - 1. "Link Seal" as manufactured by Thunderline Corporation;
 - 2. Advance Products and Systems, Inc.;
 - 3. Proco Products, Inc.;
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- F. All sleeves must be Schedule 40 steel pipe finished with smooth edges. Sleeves in waterproof walls and floors must be fabricated with minimum 1/4" thick rectangular steel plate placed around mid-point of sleeve, continuously welded to sleeve and then place the entire/plate assembly into proper position prior to erection of walls and floors. Otherwise, provide sleeves with a minimum of three (3) lugs for anchoring.
- G. Pack voids between sleeves, piping or conduit, where located in fire or smoke rated assemblies, in accordance with UL Fire Resistance Directory.
- H. Set all sleeves prior to or during erection of walls and floors. In the event that sleeves are omitted or incorrectly located in new walls or slabs, submit a location plan and method of cutting and installing sleeves to the Design Professional for review prior to carrying out the work.
- I. If sleeves are omitted or located incorrectly, the particular Trade Contractor who is at fault, at no additional cost to the project, must engage the trade which originally installed the work, to cut and patch to the satisfaction of the Design Professional.
- J. Provide mechanical seals and insert into voids between piping and conduits that pass through floors, and which will be exposed in finished areas that have floor drains, including spaces classified as "Janitors Closets," "Toilet Rooms," and the like.
- K. 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 masonry saw or core drill, to insure a neat hole.

2.11 SMOKE/FIRESTOPPING (MATERIALS)

- A. Firestopping materials and systems must consist of commercially manufactured products complying with the following minimum requirements and be asbestos and PCB free:
 - 1. Flame Spread Index: Twenty-five or less when tested in accordance with ASTM E 84.

2. Smoke Density Index: Fifty or less when tested in accordance with ASTM E 84.
3. Nontoxicity: Nontoxic to human beings at all stages of application and during fire conditions.
4. Systems shall comply with Underwriter's Laboratory Listing Requirements.
5. Fire Resistance:
 - a. Materials and systems used to seal penetrations in time rated assemblies must be capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 time temperature fire conditions for 3 hours.
 - b. Materials must not require a rise in temperature to install or activate seal.
 - c. Materials must not contain solvents or require hazardous waste disposal.
 - d. Firestop material must not dissolve in water after curing.

B. Subject to compliance with the requirements, provide products by one of the following:

1. Rectorshield, Inc.;
2. Hilti;
3. 3M;
4. Or approved equal in accordance with the project substitution provisions of the contract.

C. Refer to general construction contract documents of these specifications.

D. Smoke stopping materials must be approved by the authority having jurisdiction.

2.12 FIRE/SMOKE DAMPERS, SMOKE DETECTORS/SMOKE DETECTOR CONTROL

A. All fire/smoke dampers for the project will be provided by the HVAC Trade Contractor.

B. Refer to the general construction contract documents, where applicable, for locations and classification ratings for all smoke and fire rated walls, floors and assemblies, new and existing.

C. Duct mounted smoke detectors will be used to activate smoke dampers unless area detectors are used to activate smoke damper. Tie detectors into the building's fire alarm system. HVAC Trade Contractor will tie detectors into the Building Automation System (BAS) where applicable.

D. Electrical Trade Contractor shall provide area smoke detectors for operation of smoke dampers as applicable and specified. Electrical Trade Contractor shall connect, then test and check-out smoke detectors connected to the building's fire alarm system as specified. Electrical Trade Contractor to check-out smoke detectors tied into the Building Automation System.

E. All new duct mounted smoke detectors shall be furnished by the Electrical Trade Contractor and installed by the HVAC Trade Contractor, and shall be installed generally as located on the HVAC drawings.

- F. Connections for automatic shutdown of air handling units shall be provided by the HVAC Trade Contractor, in compliance with the ATC Section of these specifications. Connections for fire alarm system shall be provided by the Electrical Trade Contractor.
- G. HVAC Trade Contractor shall clearly indicate location of all new smoke detectors required in ductwork on sheet metal shop drawing submissions.
- H. Smoke evacuation system control and actuation shall be provided by the HVAC Trade Contractor, with detection and signal for the fire alarm system provided by the Electrical Trade Contractor.
- I. Area actuation signals and connections for smoke dampers shall be provided by the Electrical Trade Contractor. Locate signal where visible to Building Personnel.

PART 3 - EXECUTION

3.1 METHOD OF PROCEDURE

- A. The drawings accompanying these specifications are diagrammatic and intended to cover the approximate and relative locations of the building systems.
- B. Installation, connection and interconnection of all components of these systems must be complete and made in accordance with the manufacturers' instructions and best trade practices.
- C. Erect all parts of equipment furnished at such time and in such manner as not to delay or interfere with other Trade Contractors and their work.
- D. Plug all piping, conduit and ductwork as required during construction to prevent entering of dirt.
- E. Before material is ordered or fabricated, or any work is performed, verify all calculations, sizing, measurements, including lines, grades, pipes, and conduit elevations at the building, as applicable, and be responsible for the correctness thereof. No extra compensation will be allowed on account of differences between actual dimensions, routing and measurements and those indicated in the Contract Documents. Any discrepancies discovered must be submitted to the Engineer for consideration before proceeding with the work.
- F. Lay out work and be responsible for the establishment of heights, grades, and the like, for all interior and exterior equipment and systems as applicable, including piping, drains, fixtures, conduit, and the like, included in Contract Documents, in strict accordance with the intent expressed thereby; and all the physical conditions to be met at the building and finished grade, and be responsible for accuracy thereof. The establishment of the location of all work must be performed in consideration of the finished work. In case of conflict, equipment and/or materials must be relocated without cost to the Project, as directed by the Design Professional, regardless of which equipment was installed first. Refer to Article, "Coordination Drawings", in Part 1 of this section.

- G. Cooperate with other Trade Contractors for the proper securing and anchoring of all work included within these specifications. Use extraordinary care in the erection and installation of all equipment and materials to avoid marring surfaces of the work of other Trade Contractors, as each Trade Contractor will be held financially responsible for all such injury caused by the lack of precaution and due to negligence on the part of the Trade Contractor's work force.
- H. Do not run pipe or conduit in any concrete slab three inches (3") or less in thickness. Do not place any pipe or conduit in any slab where the outside diameter of the pipe or conduit is more than one-quarter the thickness of the slab. The sweep of pipe or conduit elbows emerging through concrete slabs must not create any hazard or obstructions.
- I. All piping, conduit and other materials and equipment shown to be mounted below ceilings are to be kept as close to ceiling areas as possible unless otherwise noted.
- J. Install and arrange all equipment, such as junction boxes, and the like, which will be concealed in construction, to be fully accessible for adjustment, service and maintenance. Furnish access doors where required for installation under the General Construction Contract, where applicable. Otherwise, furnish and install all required access doors.

3.2 PROTECTION OF WORK

- A. Provide all piping, equipment, materials and accessories having polished or plated surfaces, machined finishes or unpainted surfaces with a thick coat of a neutral protection grease and carefully cover with thick cloth or heavy building paper held securely in place to protect the finish against damage during the entire period of construction. Protect equipment by the use of canvas tarps, vinyl sheeting or similar materials held securely in place.
- B. Seal all openings in pipes, fittings, conduit and all other materials to exclude dirt, sand, and other foreign materials.
- C. Exercise every precaution to exclude dust, dirt and all other foreign materials from switchgear rooms, transformers, and all mechanical equipment rooms during construction. Rooms and equipment contained therein must be swept and vacuum cleaned at regular intervals. All relays, meters and electrical equipment containing electrical components must be protected with heavy paper held in place with approved mastic tape to exclude fine dust and particles. Install and maintain sufficient electric heaters in equipment rooms and transformer compartments to keep equipment dry during construction.

3.3 CUTTING AND PATCHING

- A. New Construction:
 - 1. Perform cutting and patching in accordance with Division 01.
 - 2. Provide and set all sleeves, inserts and other items required for the installation of the electrical work, and take responsibility for their final and permanent locations.
- B. For existing construction:

1. All Trade Contractors are responsible for their own cutting and patching.

3.4 CONCRETE AND MASONRY

- A. Provide all cast-in-place concrete, pre-cast concrete and masonry work (brick and block) required for completion of the electrical work, including interior and exterior concrete slabs.
- B. Design Professional will review and approve materials used.
- C. Unless shown or specified otherwise, all equipment foundations and housekeeping pads must be six inches (6") minimum height from floor, of sufficient mass, and secured to the floor.
- D. Refer to general construction contract documents for concrete specifications.
- E. Unless noted otherwise, concrete bases must be 4" larger than the largest dimension of the base of the supported equipment in both directions. Use 3000 psi, 28 day compressive strength concrete and reinforcement.

3.5 SUPPORTS

- A. Except where noted otherwise in the specifications and shown on drawings, provide all materials, including, but not limited to, equipment supports, supplies and labor necessary as required to adequately support, brace and strengthen new and/or existing equipment and materials installed under/or affected by the electrical work.
- B. The design, materials, fabrication and erection of structural steel supports must conform to "Specification for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, "Code of Standard Practice for Steel Buildings and Bridges". Welding, where required, must conform to "Code of Arc and Gas Welding in Building Construction" of the American Welding Society.

3.6 ROOFING WORK

- A. Existing roofing and flashing is under Manufacturer's and Installer's Warranties. Electrical Trade Contractor shall have all roofing and flashing work performed by warranted roofing installer. Contact Owner or original installer for further information. New penetrations through the roof shall be in full warranty condition. If required by the roof warranty, engage the original roofing installer to perform all roofing and flashing work. Refer to the general construction contract documents of these specifications.

3.7 PAINTING AND FINISHING

- A. All painting, generally, will be provided by the General Construction Trade Contractor, where applicable, except where specifically noted otherwise in the Electrical

Specifications. Otherwise, all Trade Contractors are responsible for their own painting and finishing.

- B. Equipment and material furnished with factory enamel finish will not be painted unless finish has been damaged, in which case the equipment or material must be refinished by the Trade Contractor who furnished it, to the satisfaction of the Design Professional.

3.8 LUBRICATION

- A. Provide proper and necessary lubrication of any items of operating, rotating or moving equipment which is furnished, installed or which must operate as part of the electrical system.
- B. When an item of operating equipment is furnished and installed by a Trade Contractor, it will be that Trade Contractor's responsibility to accomplish the lubrication.
- C. When an item of operating equipment is furnished by one Trade Contractor and installed by another, it is the responsibility of the Trade Contractor furnishing the equipment to apply the lubricants.
- D. All rotating or moving equipment must be lubricated prior to energizing and operating the equipment. Should the Trade Contractor responsible for the lubrication fail to apply lubricants prior to initial start-up and the equipment is damaged as a result of that Trade Contractor's negligence, that Trade Contractor is required to provide all corrective action necessary including replacement, if required, for the proper operation of equipment.
- E. Lubrication must be accomplished in the manner prescribed or recommended by the manufacturer of the specific item. For motor driven equipment this precaution of lubrication will apply individually to the driver and the driven component.
- F. The lubricants must be of the type, grade, specification and manufacture as prescribed or recommended by the manufacturer of the specific equipment item.
- G. Extend lubrication fittings where required to allow maintenance personnel to lubricate the equipment easily and efficiently.
- H. The Trade Contractor who supplies any item of rotating equipment will have the responsibility of securing written instructions on the lubricating procedure and must furnish not less than one year's supply of all necessary lubricants properly identified so they can be replaced.
- I. Any moving or rotating equipment furnished by the Owner that is to be installed, reused and/or serviced must also be lubricated. Except where noted otherwise in the Contract Documents, the Trade Contractor installing, reusing and/or servicing all such equipment is responsible for the proper lubrication thereof, including obtaining proper lubricating instructions from the various manufacturers involved, furnishing and applying the necessary lubricants and leaving the Owner with a one (1) year supply of lubricant.

3.9 ELECTRICAL TRADE COORDINATION

- A. Equipment by other Trade Contractors shall be furnished with electrical current characteristics as shown on electrical drawings and specifications.
- B. The nameplate voltage of all motors furnished with mechanical equipment must be within the range of the voltage shown for use with the motor as the upper limit, and 5% less than this voltage as the lower limit.
- C. Other Trade Contractors must furnish all motors, motor starters, specialty motor controllers, float and pressure switches, temperature control, other special automatic controls as indicated in the Contract Documents for all equipment furnished and/or installed under their contract except where noted otherwise.
- D. All electrical equipment furnished by other Trade Contractors must be as recommended by the equipment manufacturers, in accordance with the Electrical Specifications for similar items, and of such type as to work properly with automatic temperature control sequences where required.
- E. The Electrical Trade Contractor must provide all push-buttons, safety switches for motors, and wiring from starters to motors and install all starters furnished to him by other Trade Contractors unless otherwise indicated in the Contract Documents.
- F. Where controllers and/or starters are furnished as an integral part of any equipment, the Trade Contractor supplying the equipment must furnish complete wiring between controllers, starters and motors.
- G. The Electrical Trade Contractor must provide disconnect switches for all equipment furnished and/or installed by other Trade Contractors, except where such switches are an integral part of equipment.
- H. Other Trade Contractors must set all motors and furnish, set and pipe as necessary, float switches, temperature control and other special automatic temperature controls.
- I. Other Trade Contractors must provide all power and control wiring required by their respective section of the specification. The Electrical Trade Contractor must provide all other wiring required for the completion of the work of the other Trade Contractors.
- J. Other Trade Contractors must furnish the Electrical Trade Contractor with complete wiring diagrams as required.
- K. Any electrical work performed by the other Trade Contractors must be performed in accordance with the requirements of the ELECTRICAL Section of these specifications.
- L. For additional coordination items, refer to Article 2.2, "Submittals".

3.10 ELECTRICAL MOTORS AND STARTERS

- A. All motors furnished by all Trade Contractors, unless specified to the contrary in Contract Documents, must conform to the following requirements:

1. Characteristics, dimensions, tolerances, temperature rise, insulation, rating, noise, vibration, and all other characteristics in accordance with the latest standards of IEEE or NEMA.
 2. Unless required by the driven unit, motors must have normal starting torque, NEMA Design B characteristics. Horsepower rating of motor must be equal to or greater than that required by driven equipment. Current density design of motor rating must be limited so that overload protection provided by standard motor starters will be adequate to prevent damaging overheating during stall, single phasing or slightly prolonged acceleration.
 3. Use NEMA Class A or B insulation with motor frames amply sized to provide a 1.15 service factor at an ambient of 40 deg. C maximum. Insulation systems must be designed for an average life of 60,000 hours.
 4. All motors must be high efficiency. Meet or exceed requirements in NEMA Standard MG1, Table 12-10.
 5. Running power factor must be higher than 0.85 for motors 5 HP to 30 HP and higher than 0.90 for motors 40 HP or larger.
 6. Each motor must be mounted on the same bedplate as the equipment driven and be complete with pulleys, slide rails or flexible couplings as required.
 7. Each Trade Contractor is responsible in each instance for the proper selection of motors of suitable characteristics with details submitted for approval to the Design Professional prior to installation.
- B. All starters furnished by all Trade Contractors must conform with the following requirements, unless specified to the contrary in the Contract Documents:
1. All starters for 3-phase equipment must be fully enclosed, across-the-line type equipped with solid state overload protection as herein specified for all three phases, low voltage protection, all necessary auxiliary contacts as required and indicating pilot lights. Starters which are controlled automatically must have two-wire control with "ON-OFF-AUTO" switches. Starters which are controlled manually must have 3-wire control with Start-Stop pushbuttons.
 2. All 3-phase starters remotely controlled must have 120 volt coils and control transformers with disconnecting means. Starters for single phase motors shall be manual toggle switches with thermal overload protection and pilot light. Omit pilot light for unit heaters.
 3. General Purpose NEMA-1 enclosure for indoor use under normal atmospheric conditions. Watertight enclosure NEMA-4 or NEMA-5 for outdoor use or where starters are subjected to the splashing or dripping of water. Explosion-proof enclosure NEMA-7, 9 or 12 for dusty or hazardous locations as required by Article 500 of the National Electrical Code.
 4. Individually equip all starters for three phase motors with solid state adjustable overload protection with automatic protection to prevent single phase operation with the following features:
 - a. Three phase, self-powered with current sensing, phase unbalance and phase loss protection, visible trip indication, trip test function, and power "LED."
 - b. Phase loss protection to include automatic restart with a selectable manual switch.

- C. All controllers, starters and other electrical components furnished as an integral part of any apparatus must be furnished complete with integral wiring as required.
- D. Subject to compliance with the requirements, provide products by one of the following:
 - 1. General Electric Co.;
 - 2. Westinghouse Co.;
 - 3. Square-D Co.;
 - 4. Allen-Bradley Co.;
 - 5. Or approved equal in accordance with the project substitution provisions of the contract.
- E. Submittals for motors and starters must be coordinated with Electrical Trade Contractor.

3.11 ELECTRICAL PROVISIONS FOR PACKAGED MECHANICAL EQUIPMENT

- A. Unless otherwise noted in HVAC, Plumbing and Fire Protection Specifications, all packaged equipment furnished by HVAC, Plumbing and Fire Protection Trade Contractors must be complete with the following electrical provisions:
 - 1. General compliance with provisions of the preceding Article, ELECTRICAL MOTORS AND STARTERS.
 - 2. Starting electrical characteristics of all motors and/or starters must be approved by local utility company and Electrical Engineer.
- B. Approved, factory installed and wired starting, operating and control equipment, terminating in terminal strip for single point power wiring connections by Electrical Trade Contractor must conform with the ELECTRICAL Section of these specifications and must include approved branch fuses for branch power circuits.

3.12 PIPING AND CONDUIT UNDER FLOORS

- A. Wherever piping, conduit or piping enclosures are run under a floor slab on grade, the work is to be installed after the General Construction Trade Contractor, where applicable, has brought the sub-grade to the proper level.
- B. Excavate and backfill as required for the installation of electrical work. The excavation of the sub-grade where required for the installation of the work must be performed, including that for piping, conduit and piping enclosures, by the Electrical Trade Contractor. When the installation is completed and satisfactorily tested, the remaining space shall be filled with crushed stone or other material similar to that to be used by the General Construction Trade Contractor, where applicable, for the sub-base. The backfill must be stabilized by hand or pneumatic tamping as directed by the Design Professional and must be returned to the original sub-grade level.
- C. No piping, conduit or piping enclosures is to be installed in the stone sub-base which is part of the General Construction Trade Contractor's work, where applicable, unless specific permission is granted by the Design Professional.

- D. Where piping is noted to be installed in enclosures, such as split terra cotta pipe, necessary protection of the insulation, arrangement and installation will be as hereinafter described in the detailed technical specifications.
- E. Where required by drawing notes, specifications, or applicable electrical codes, conduits installed under floors must be encased in concrete, conforming to the general construction contract documents specifications.

3.13 EQUIPMENT IDENTIFICATION

- A. Manufacturer: Subject to compliance with the requirements, provide products by one of the following:
 - 1. Seton Nameplate Corporation;
 - 2. Marking Services, Inc.;
 - 3. Brady Worldwide;
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Identify all equipment as to nature, service and purpose by means of permanently attached plastic nameplates having ½" high letters, dull black outside and white core. Nameplates of approved size, beveled edges and engraved through black to white core. Nameplates shall indicate equipment identification names and numbers as approved by the Owner.

3.14 ABANDONMENT, REMOVAL AND RELOCATION

- A. Perform all abandonment, removal and relocation work required for completion of electrical systems.
- B. Removals shown on drawings are a general indication only, and may not necessarily indicate the full extent of removals which may be required to complete this work.
- C. Where existing partitions, walls, ceilings and floors are to be removed, all piping, conduits, materials and equipment attached or fastened thereto or within, as applicable, must be carefully removed.
- D. Where work under this contract interferes with the existing construction, ductwork, piping, conduit or equipment, remove all such materials and route new work to clear the obstruction. Provide additional piping, conduits, and material of the same design and quality if the piping and/or conduit is to be continued in use.
- E. Disconnect and remove all accessible piping, conduit, ductwork, materials, fixtures and equipment not required in the new systems. Plug all outlets at the main or riser connection.
- F. Removed materials not desired by the Owner and not to be reset and not specified nor indicated to be reused, become the property of the Electrical Trade Contractor and must be promptly removed from site.

- G. All demolition work is subject to the direction and approval of the Design Professional and must be performed in such manner as not to interfere with the normal operation of the building.
- H. Relocate existing utilities and/or equipment that must remain to maintain operation of building or parts of building outside the work area.
- I. Equipment Pad Removal:
 - 1. Remove all concrete pads and equipment support structure material related to the Electrical Trade, not indicated or specified for reuse. Remove concrete pads to one (1) inch below adjacent concrete floor surface. Exterior slabs shall be broken and removed as waste materials.
 - 2. Cut-off reinforcement and anchor bolts at or below level of pad removal.
 - a. Resurface area level with adjacent concrete floor surface using a heavy duty aggregate concrete topping consisting of Portland cement Type I or Type III conforming to ASTM C150 with aggregate graded by weight to pass sieves as follows:

Fine (Thin Coat)	or	Course (Heavy Coat)
3/8" 100%		1/2" 100%
No. 4 95-100%		3/8" 30-50%
No. 8 65-80%		No. 4 0-15%
No. 16 45-65%		No. 8 0-5%
No. 30 25-45%		No. 100 0-5%

- b. Topping mix must contain a high range water reducing admixture (super plasticizer) ASTM C494, Type F or Type G.
- c. Coat surface with epoxy bonding agent prior to application of concrete topping.
- d. Produce a heavy duty concrete topping with the following characteristics:

Compressive Strength 5000 psi at 28 days
 Slump 8" maximum
 Water to Cement Ratio 0.44.

3.15 SMOKE AND FIRESTOPPING (METHODS)

- A. Installation of materials must be performed by applicator/installers qualified, trained and approved by the manufacturer of the materials, and be installed in accordance with ASTM E 814.
- B. Install smoke and firestopping at locations required, shown, or specified in accordance with applicable codes, manufacturer's written instructions, and test report, applying to the specific trade equipment as applicable. Cutting and patching of construction and providing sleeves, where required, is shown on drawings or specified in other sections.

1. Filling of Voids: Smoke and firestopping materials must completely fill void spaces regardless of geometric configuration, subject to tolerances established by the manufacturer. Smoke and firestopping for filling voids in floors in which the smallest dimension of the void is 4 in. or more must support the same load as the floor is designed to support or must be protected by a permanent barrier to prevent loading or traffic in the smoke or firestopped areas.
 2. Electrical Cables or Conduits: Smoke and firestopping at penetrations of electrical cables or conduits must comply with the requirements of NFPA No. 70.
 3. Where smoke and firestopping of penetrations in floors, walls and partitions that will be exposed in completed construction, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and provide escutcheons or other trim.
 4. Schedule the installation and required inspection of smoke and firestops for penetrations that will be concealed in completed construction prior to erection of floors, walls, and partitions that would permanently conceal the penetrations.
- C. All areas of smoke and firestopping installation must be accessible until inspection by the applicable code authorities.

3.16 SUBSURFACE CONCEALED UNKNOWN PHYSICAL CONDITIONS

- A. Subsurface, or otherwise concealed physical conditions which (1) do not differ materially from those indicated in the Project Contract Documents; (2) affect electrical work; (3) do not differ materially from those ordinarily found to exist, and which are generally recognized as inherent in the electrical construction activities of the character provided for in the Project Contract Documents, are to be anticipated by the Electrical Trade Contractor, and included in the basic electrical work.
- B. Unknown physical conditions: which are of an unusual nature; which are materially different in subsurface (otherwise concealed) physical conditions; which affect mechanical and/or electrical work; which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character found in the Project Contract Documents, are the basis for, and require notice by, the applicable Trade Contractor, promptly, before such conditions are disturbed. Such conditions may become the basis for a legitimate claim under "Changed Conditions," affecting the cost, and/or schedule of the work. During the work, the Electrical Trade Contractor shall provide reasonable, incidental on-site review, survey and measurements to assist in quantification of such conditions.

3.17 INITIAL APPLICATION FOR PAYMENT

- A. Provide the following prior to submitting the initial application for payment:
 1. Copy of the Electrical Trade Contractor's and Sub-Contractors' licenses for the state in which the work is being performed.
 2. Resumes for the designated Project Manager and Project Foreman.
 3. List of independent agencies who will be engaged by the Electrical Trade Contractor to perform tests, provide certifications, conduct inspections, etc. as required by Contract Documents.

- B. The initial application for payment will not be processed until the items above are submitted.

3.18 FINAL APPLICATION FOR PAYMENT

- A. Provide the following prior to submitting the final application for payment:
 - 1. Refer to general construction contract documents of these specifications.
 - 2. Equipment Start-Up Reports for each piece of electrical equipment.
 - 3. Electrical Inspection Agency's written report.
 - 4. Operating and Maintenance Manuals and Data.
 - 5. Electrical systems and equipment warranties.
 - 6. Electrical System Commissioning Report.
 - 7. Electrical Trade Contractor's Punch List of incomplete work items with reason why each work item is not complete and anticipated schedule for completion. Submit at least one week prior to Engineer's final Construction Observation Report site visit.
 - 8. Electrical Trade Contractor's notarized certification letter.
 - 9. As-built drawings as described in Part 1 of this specification section.
- B. Final payment is contingent upon completion of all items listed above.

3.19 ADDITIONAL ELECTRICAL TRADE CONTRACTOR PAID FEES AND EXPENSES

- A. As a material part of the Electrical Trade Contractor's Agreement to complete the work of this Contract, the Electrical Trade Contractor agrees to reimburse Gillan & Hartmann, Inc. ("Design Professional") for the below listed extra engineering work under the following conditions:
 - 1. Design Professional's hourly billing rate shall be \$150.00 per hour for all related office hours, travel time and as applicable, on-site time;
 - 2. Electrical Trade Contractor's request(s) for substitution;
 - a. When such requests for substitution are not the result of a bonafide delivery problem or design related problem, and;
 - b. When such requests do not address items of equipment for which the specifications list the basis of design with at least one comparable product, and;
 - c. The Electrical Trade Contractor's request(s) for substitution must be submitted in writing, and;
 - d. The Electrical Trade Contractor agrees to compensate the Design Professional \$1,500.00 (per diem) for the review of each proposed substitution;
 - e. The Electrical Trade Contractor shall render written acceptance of the Design Professional's extra charges, and;
 - f. Any balance not paid will be deducted from contractors final payment.
 - 3. Extra Design Professional work created by the Electrical Trade Contractor's multiple submissions of a single material or piece of equipment;

- a. The Design Professional's basic services include two reviews for each piece of equipment or material submittal. The Design Professional's first review takes place at the initial Electrical Trade Contractor's submission of that submittal. The Design Professional's second review takes place when the Design Professional requires a resubmission of that submittal.
 - b. If the Design Professional's third review of a particular submittal is required for reasons due to the Electrical Trade Contractor, the Trade Contractor agrees to compensate the Design Professional \$1,500.00 for each submittal review.
 - c. Any unpaid balance due will be deducted from the Trade Contractors final payment.
4. Extra work created by the Electrical Trade Contractor resolution of substantial completion and final completion construction observation reports and project closeout documentation:
- a. The Design Professional's basic services rendered to the Owner include periodic visits to the site and providing written list of items (Construction Observation Report) requiring the Electrical Trade Contractor's attention, reporting and resolution;
 - b. The Electrical Trade Contractor shall provide written feedback and prompt resolution of Construction Observation Items including a written schedule for the Electrical Trade Contractor's completion of these Items followed by a written confirmation of closure;
 - c. The contract documents specify the Electrical Trade Contractor's requirements including written notification of substantial completion, including contractor's prepared punch list of items to be completed;
 - d. The Design Professional services include: the preparation of one (1) substantial completion/final completion observation report; and one (1) review of the Electrical Trade Contractor's resolution of the substantial completion/final completion observation report.
 - e. The Electrical Trade Contractor agrees to compensate the Design Professional \$1,500.00 (per diem) for the preparation of additional substantial completion/final completion reports as required to achieve final completion.
 - f. Any unpaid balance will be deducted from the contractor's final payment.

PROJECT NAME: Gillan Hartmann, Inc. JOB NO.: DATE: 5/25/2016
 ELECTRICAL SHOP DRAWING LOG

ITEM NO.	PROPOSED DATE OF	ACTUAL DATE OF SUBMITTAL	MFR. OR CONTRACTOR	DESCRIPTION	DESIGN PROFESSIONAL'S ACTION	DATE RETURNED	RE-SUBMIT	Checked by
E-01								
E-02								
E-03								
E-04								
E-05								
E-06								
E-07								
E-08								
E-09								
E-10								
E-11								
E-12								
E-13								
E-14								
E-15								
E-16								
E-17								
E-18								
E-19								

Status: Pending (P); Furnish as Submitted (FAS) Furnish As Noted (FAN); Rejected (REJ); No Submission Required (NSR)

Contractor's Submittal Description: _____, Project _____
(Fill In) (Fill In)

ELECTRICAL CONTRACTOR'S TRANSMITTAL COVER SHEET

TO: GILLAN & HARTMANN, INC.
CONSULTING ENGINEERS
P.O. BOX 345
VALLEY FORGE, PENNSYLVANIA 19481

Date of Transmittal: _____	By Contractor: _____ Contractor's Authorized Staff Signature: _____ Print Name: _____ Project: _____
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By executing this Transmittal Cover, the Contractor agrees and accepts that:

- Submittals without the HVAC/Plumbing/Fire Protection and Electrical Contractor's signed stamp of approval will not be reviewed. Initialed approval stamps are not acceptable. All resulting resubmittals will be provided at the Contractor's expense.
- The Engineer's recommendation of acceptance ("Furnish as Submitted", "Furnish as Noted Below", etc.) of the equipment proposed by the Contractor is conditional upon the Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Contractor acknowledges compliance with all of the following:
 - The Contractor has completed field layout and planning of proposed equipment and has coordinated all other related shop drawings, related trades involved in Project Construction, and all space requirements.
 - The Contractor has examined all shop drawings prior to submission. The Contractor forwards all shop drawings with a signed approved stamp, signifying the following:
 - 1) All field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data have been verified.
 - 2) The Architect/Engineer has been notified of all site conditions which affect the work, and which require design resolution beyond resolution by Trade contractors' Field Decisions;
 - 3) All items herein are approved by the Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements;
 - 4) Submission is clearly marked to indicate which manufacturer's options are provided and which are not provided with the proposed equipment.
 - Any and all exceptions requested by the HVAC/Plumbing/Fire Protection and Electrical Contractors have been included in written form. All exceptions, deletions, and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide the initialed annotations for all deletions and additions, the Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.
 - All Engineer's notes regarding this submission must be incorporated into the Project.
 - The Engineer's review is limited to comparison of the technical performance of the Contractor's proposed equipment to the specified technical performance.
 - Equipment submittal is either the Basis-of-Design, or a comparable product to the Basis-of-Design.
 - A Comparable Product must meet or exceed all the salient characteristics and standards necessary including, but not limited to: material of manufacture; independent testing agency certifications; quality; function; design; and performance required to meet the Owner's needs and meet the objectives of the Professional's Project Design.
 - Extension of Contract Time and/or claim for delay are not acceptable as created by the Trade Contractor's failure to provide submittals on a timely basis to permit the processing work of the Professional, including multiple resubmittals, and/or failure to provide submittals that are comparable to the Basis of Design Product. Refer to EQUIPMENT VARIATIONS AND SUBSTITUTIONS article in the General Requirements Section of the Specifications.

G&H Project No: _____

G&H Shop Drawing Review No: _____ E-_____

Contractor's Submittal Description: _____, Project _____
(Fill In) (Fill In)

**HVAC AND ELECTRICAL TRADES'
COORDINATION OF HVAC EQUIPMENT
ELECTRICAL REQUIREMENTS
TRANSMITTAL COVER SHEET**

TO: GILLAN & HARTMANN, INC.
CONSULTING ENGINEERS
P.O. BOX 345
VALLEY FORGE, PENNSYLVANIA 19481

By HVAC Trade Rep: _____
Contractor's Authorized Staff Signature: _____
Print Name: _____
Date of Transmittal: _____

By Electrical Trade Rep: _____
Contractor's Authorized Staff Signature: _____
Print Name: _____
Date of Transmittal: _____

By executing this Transmittal Cover, the Contractor agrees and accepts that:

1. Submittals without the HVAC and Electrical Trades' signed stamp of approval will not be reviewed. Initialed approval stamps are not acceptable. All resulting resubmittals will be provided at the Contractor's expense.
2. The HVAC Trade Representative has submitted the attached HVAC Equipment Submittal to the Electrical Trade Representative for examination, review, and coordination of the attached HVAC Equipment Electrical Requirements. The equipment proposed by the Contractor is conditional upon the Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Contractor acknowledges compliance with all of the following:
 - A. The Contractor has completed field layout and planning of proposed equipment and has coordinated all other related submittals, related Trades involved in Project Construction, and all space requirements.
 - B. The HVAC and Electrical Trades have examined all submittals prior to submission. The HVAC and Electrical Trades forwards all submittals with a signed transmittal stamp, signifying the following:
 - 1) All field measurements, field construction criteria, electrical power requirements and similar data have been verified;
 - 2) The Architect/Engineer has been notified of all site conditions which affect the work, and which require design resolution beyond resolution by Trade contractors' Field Decisions;
 - 3) All items herein are approved by the Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements;
 - 4) Submission is clearly marked to indicate which manufacturer's options are provided and which are not provided with the proposed equipment.
 - C. Any and all exceptions requested by the HVAC and Electrical Trades have been included in written form. All exceptions, deletions, and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide the initialed annotations for all deletions and additions, the Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.

G&H Project No: _____

G&H Shop Drawing Review No: _____

Contractor's Submittal Description: _____, Project _____
(Fill In) (Fill In)

**PLUMBING AND ELECTRICAL TRADES'
COORDINATION OF PLUMBING EQUIPMENT
ELECTRICAL REQUIREMENTS
TRANSMITTAL COVER SHEET**

TO: GILLAN & HARTMANN, INC.
CONSULTING ENGINEERS
P.O. BOX 345
VALLEY FORGE, PENNSYLVANIA 19481

By Plumbing Trade Rep: _____ Contractor's Authorized Staff Signature: _____ Print Name: _____ Date of Transmittal: _____	By Electrical Trade Rep: _____ Contractor's Authorized Staff Signature: _____ Print Name: _____ Date of Transmittal: _____
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By executing this Transmittal Cover, the Contractor agrees and accepts that:

1. Submittals without the Plumbing and Electrical Trades' signed stamp of approval will not be reviewed. Initialed approval stamps are not acceptable. All resulting resubmittals will be provided at the Contractor's expense.
2. The Plumbing Trade Representative has submitted the attached Plumbing Equipment Submittal to the Electrical Trade Representative for examination, review, and coordination of the attached Plumbing Equipment Electrical Requirements. The equipment proposed by the Contractor is conditional upon the Contractor fulfilling all obligations of the Contract Documents. By furnishing the proposed equipment, the Contractor acknowledges compliance with all of the following:
 - A. The Contractor has completed field layout and planning of proposed equipment and has coordinated all other related submittals, related Trades involved in Project Construction, and all space requirements.
 - B. The Plumbing and Electrical Trades have examined all submittals prior to submission. The Plumbing and Electrical Trades forwards all submittals with a signed transmittal stamp, signifying the following:
 - 1) All field measurements, field construction criteria, electrical power requirements and similar data have been verified;
 - 2) The Architect/Engineer has been notified of all site conditions which affect the work, and which require design resolution beyond resolution by Trade contractors' Field Decisions;
 - 3) All items herein are approved by the Contractor, and have been coordinated and checked with other applicable submittals, and contract requirements;
 - 4) Submission is clearly marked to indicate which manufacturer's options are provided and which are not provided with the proposed equipment.
 - C. Any and all exceptions requested by the Plumbing and Electrical Trades have been included in written form. All exceptions, deletions, and additions that vary from the Contract Documents have been specifically annotated and initialed. Failing to provide the initialed annotations for all deletions and additions, the Contractor accepts the condition that the Contract Documents will govern, and will be used to resolve disputes.

G&H Project No: _____

G&H Shop Drawing Review No: _____

END OF SECTION 260010

SECTION 260050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Supporting devices for electrical components.
 - 2. Electrical identification.
 - 3. Electricity-metering components.
 - 4. Concrete equipment bases.
 - 5. Electrical demolition.
 - 6. Cutting and patching for electrical construction.
 - 7. Touchup painting.

1.3 SUBMITTALS

- A. Product Data: For electricity-metering equipment.
- B. Shop Drawings: Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 08 Section "Access Doors."
- E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- F. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.
- G. Electrical devices and boxes are indicated on Drawings in approximate locations unless dimensioned. Adjust box or device location up to 10 feet, if required to accommodate intended purpose or owner request, with no additional cost to contract.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs.

1. Channel Thickness: Selected to suit structural loading.
 2. Fittings and Accessories: Products of the same manufacturer as channel supports.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, and wall brackets.
- E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- G. Expansion Anchors: Carbon-steel wedge or sleeve type.
- H. Toggle Bolts: All-steel springhead type.
- I. Powder-Driven Threaded Studs: Heat-treated steel.

2.2 ELECTRICAL IDENTIFICATION

- A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Raceway and Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.
1. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is over laminated with a clear, weather- and chemical-resistant coating.
 2. Color: Black letters on orange background.
 3. Legend: Indicates voltage.
- C. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick (25 mm wide by 0.08 mm thick).
- D. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:
1. Not less than 6 inches wide by 4 mils thick (150 mm wide by 0.102 mm thick).
 2. Compounded for permanent direct-burial service.
 3. Embedded continuous metallic strip or core.
 4. Printed legend that indicates type of underground line.

- E. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
- G. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. (129 sq. cm) and 1/8-inch (3.2-mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.
- H. Interior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.
- I. Exterior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm), galvanized-steel backing, with colors, legend, and size appropriate to the application. 1/4-inch (6-mm) grommets in corners for mounting.
- J. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.3 CONCRETE BASES

- A. Concrete Forms and Reinforcement Materials: As specified in Division 03 Section "Cast-in-Place Concrete."
- B. Concrete: 3000-psi (20.7-MPa), 28-day compressive strength as specified in Division 03 Section "Cast-in-Place Concrete."

2.4 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb (90-kg) design load.

3.3 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch- (6-mm-) diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch (38-mm) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches (610 mm) from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
 - 1. Wood: Fasten with wood screws or screw-type nails.
 - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 3. New Concrete: Concrete inserts with machine screws and bolts.
 - 4. Existing Concrete: Expansion bolts.
 - 5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
 - 6. Steel: Welded threaded studs or spring-tension clamps on steel.
 - a. Field Welding: Comply with AWS D1.1.
 - 7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 - 8. Light Steel: Sheet-metal screws.
 - 9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract

Documents or required by codes and standards. Use consistent designations throughout Project.

- C. Self-Adhesive Identification Products: Clean surfaces before applying.
- D. Identify raceways and cables with color banding as follows:
 - 1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
 - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (8-m) maximum intervals in congested areas.
 - 3. Apply the following colors to the systems listed below:
 - a. Fire Alarm System: Red.
 - b. Fire-Suppression Supervisory and Control System: Red and yellow.
 - c. Combined Fire Alarm and Security System: Red and blue.
 - d. Security System: Blue and yellow.
 - e. Mechanical and Electrical Supervisory System: Green and blue.
 - f. Telecommunication System: Green and yellow.
- E. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- F. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.
- G. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Black.
 - 2. Phase B: Red.
 - 3. Phase C: Blue.
 - 4. Neutral: White.
 - 5. Ground: Green.
- H. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Yellow.
 - 2. Phase B: Brown.
 - 3. Phase C: Orange.
 - 4. Neutral: White with a colored stripe or gray.

5. Ground: Green.

- I. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- J. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.
- K. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
 - 1. Panelboards, electrical cabinets, and enclosures.
 - 2. Access doors and panels for concealed electrical items.
 - 3. Electrical switchboards.
 - 4. Disconnect switches.
 - 5. Enclosed circuit breakers.
 - 6. Motor starters.
 - 7. Push-button stations
 - 8. Contactors.
 - 9. Control devices.
 - 10. Transformers...
- L. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm) overall, use a single line marker.

3.5 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

- A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.6 FIRESTOPPING

- A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Firestopping."

3.7 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.8 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from Project site.
- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.9 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.10 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.

6. Concrete bases.
7. Electrical demolition.
8. Cutting and patching for electrical construction.
9. Touchup painting.

3.11 REFINISHING AND TOUCHUP PAINT

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 09 Section "Painting."
 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260050

SECTION 260519 – LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Metal-clad cable, Type MC, rated 600 V or less.
 - 3. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. VFC: Variable-frequency controller.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

- B. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors. Minimum size #12 AWG .
- D. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83.
 - 2. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
- E. Shield:
 - 1. Type TC-ER: Cable designed for use with VFCs, with oversized crosslinked polyethylene insulation, dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires, and sunlight- and oil-resistant outer PVC jacket.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Comply with UL 1569.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- D. Ground Conductor: Insulated.
- E. Conductor Insulation:
 - 1. Type TFN/THHN/THWN-2: Comply with UL 83.
- F. Armor: Steel, interlocked.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper.
 - 2. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- C. VFC Output Circuits Cable: Extra-flexible stranded for all sizes.
- D. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway. Type MC cable can be provided in lieu of wires in raceways where acceptable to applicable codes and to the Authority Having Jurisdiction.
- E. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- F. VFC Output Circuits: Type TC-ER cable with dual tape shield.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260050 "Basic Electrical Materials and Methods."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260050 "Basic Electrical Materials and Methods."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260050 "Basic for Electrical Materials and Methods."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
 - 3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 - 4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Custom enclosures and cabinets.
 - 2. For handholes and boxes for underground wiring, including the following:
 - a. Duct entry provisions, including locations and duct sizes.

- b. Frame and cover design.
- c. Grounding details.
- d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
- e. Joint details.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension systems with other construction that penetrates ceilings or is supported by them, including but not limited to lighting fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
- B. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 3. Electri-Flex Co.
 - 4. O-Z Gedney; a unit of General Signal.
 - 5. Wheatland Tube Company.
 - 6. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. EMT: ANSI C80.3.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.

- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel, set-screw or compression type.
- H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 3. Arnco Corporation.
 - 4. CANTEX Inc.
 - 5. CertainTeed Corp.; Pipe & Plastics Group.
 - 6. Condux International, Inc.
 - 7. ElecSYS, Inc.
 - 8. Electri-Flex Co.
 - 9. Lamson & Sessions; Carlon Electrical Products.
 - 10. Manhattan/CDT/Cole-Flex.
 - 11. RACO; a Hubbell Company.
 - 12. Thomas & Betts Corporation.
 - 13. Or approved equal in accordance with the project substitution provisions of the contract.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.3 METAL WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Square D; Schneider Electric.
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type, unless otherwise indicated.

- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type Screw-cover type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Thomas & Betts Corporation.
 - b. Walker Systems, Inc.; Wiremold Company (The).
 - c. Wiremold Company (The); Electrical Sales Division.
 - d. Or approved equal in accordance with the project substitution provisions of the contract.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company.
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell Company.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - 9. Scott Fetzer Co.; Adalet Division.
 - 10. Spring City Electrical Manufacturing Company.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The).
 - 13. Woodhead, Daniel Company; Woodhead Industries, inc. Subsidiary.
 - 14. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access Pull, and Junction Boxes: NEMA FB 1, galvanized, cast-iron, unless otherwise indicated.
- F. Hinged-Cover Enclosures: NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- G. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

2.6 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052-or-0.138 inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-Penetration Firestop Systems."

2.7 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Advance Products & Systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
 - 5. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed Conduit: Rigid steel conduit or IMC.
 2. Concealed Conduit, Aboveground: Rigid steel conduit or IMC.
 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
 1. Exposed: EMT
 2. Exposed and Subject to Sever Physical Damage: Rigid steel conduit, IMC. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.and whips to systems furniture .
 5. Damp or Wet Locations: IMC.
 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Basic Electrical Materials and Methods."
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
 - 1. 1-inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
 - 2. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- N. Flexible Conduit Connections: Use a maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations.
- O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 02 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Division 02 Section "Earthwork."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 02 Section "Earthwork."
 - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3-inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60-inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-Penetration Firestop Systems."

- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50-inches and no side greater than 16-inches, thickness shall be 0.052 inch.
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than. 16-inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2-inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Through-Penetration Firestop Systems."
- L. Roof-Penetrations Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.

- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-Penetration Firestop Systems."

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND UTILITY STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Conduit, ducts, and duct accessories for direct-buried and concrete-encased duct banks, and in single duct runs.
 - 2. Poly-Concrete Handholes and boxes

1.3 DEFINITION

- A. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Duct-bank materials, including separators and miscellaneous components.
 - 2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - 3. Handholes, boxes, and other utility structures.
 - 4. Warning tape.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Comply with ANSI C2.
- C. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.

- B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Owner's written permission.

1.8 COORDINATION

- A. Coordinate layout and installation of ducts, manholes, handholes, and boxes with existing arrangement of other utilities, site grading, and surface features as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Engineer.

PART 2 - PRODUCTS

2.1 CONDUIT

- A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 NONMETALLIC DUCTS AND DUCT ACCESSORIES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. ARNCO Corp.
 2. Beck Manufacturing.
 3. Cantex, Inc.
 4. CertainTeed Corp.; Pipe & Plastics Group.
 5. Condux International, Inc.
 6. ElecSys, Inc.
 7. Electri-Flex Company.
 8. IPEX Inc.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Manhattan/CDT; a division of Cable Design Technologies.
 11. Spiraduct/AFC Cable Systems, Inc.
- D. Underground Plastic Utilities Duct: NEMA TC 6 & 8, Type EB-20-PVC, ASTM F 512, UL 651A, with matching fittings by the same manufacturer as the duct, complying with NEMA TC 9.
- E. Duct Accessories:
1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling.
 2. Warning Tape: Underground-line warning tape specified in Division 26 Section "Electrical Identification."

2.3 HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Description: Comply with SCTE 77.
1. Color: Gray.
 2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 5. Cover Legend: Molded lettering, "ELECTRIC."
 6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
 7. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
- B. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. CDR Systems Corporation.
 - d. NewBasis.

PART 3 - EXECUTION

3.1 UNDERGROUND DUCT APPLICATION

- A. Ducts for Electrical Cables Over 600 V: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.
- B. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.
- C. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

3.2 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes:
 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.

3.3 EARTHWORK

- A. Excavation and Backfill: Provide excavation and backfill as required.
- B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Cut and patch existing pavement in the path of underground ducts and utility structures according to Division 01 Section "Cutting and Patching."

3.4 DUCT INSTALLATION

- A. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes to drain in both directions.
- B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations, unless otherwise indicated.
- C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch ducts, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell without reducing duct line slope and without forming a trap in the line.
 - 2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to manhole or handhole.
 - 3. Grout end bells into structure walls from both sides to provide watertight entrances.
- E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Division 26 Section "Basic Electrical Materials and Methods."
- F. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- G. Pulling Cord: Install 100-lbf-test nylon cord in ducts, including spares.

3.5 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas and trafficways, set so cover surface will be flush with finished grade. Set covers of other handholes 1 inch above finished grade.
- D. Install handholes and boxes with bottom below the frost line, 30 inches below grade.

3.6 GROUNDING

- A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding."

3.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
 - 2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
 - 3. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections.
- B. Correct deficiencies and retest as specified above to demonstrate compliance.

END OF SECTION 260543

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

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 the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Molded-case circuit breakers for installation in existing panels.

1.3 DEFINITIONS

- A. GD: General duty.
- B. GFCI: Ground-fault circuit interrupter.
- C. HD: Heavy duty.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current rating.
 - 4. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- B. Shop Drawings: Diagram power, signal, and control wiring.

- C. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Project Closeout" include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - 2. Time-current curves, including selectable ranges for each type of circuit breaker.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Available Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. Square D/Group Schneider.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Or approved equal in accordance with the project substitution provisions of the contract.
- B. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type HD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.

2.3 MOLDED-CASE CIRCUIT BREAKERS FOR INSTALLATION IN EXISTING PANELS

- A. Manufacturers: Provide units compatible with the existing panel in which installed.
- B. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Lugs: Mechanical style with compression lug kits suitable for number, size, trip ratings, and conductor material.
 4. Application Listing: Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

2.4 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches.
- B. Mount individual wall-mounting switches with tops at uniform height, unless otherwise indicated.

- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "260120 Conductors and Cables."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "260050 Basic Electrical Materials and Methods."

3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance testing as follows:
 - 1. Inspect mechanical and electrical connections.
 - 2. Verify switch and relay type and labeling verification.
 - 3. Verify rating of installed fuses.
 - 4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Exclude electrical test in 7.5. Exclude the following NETA ATS (1999) items for breakers with trip settings of 400A or less: 7.6.1.1.2.5; 7.6.1.1.2.6; 7.6.1.1.2.7; 7.6.1.1.2.8; 7.6.1.1.2.9. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 262816

SECTION 265119 - LED EXTERIOR LIGHTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior LED lighting fixtures.

1.3 DEFINITIONS

- A. CRI: Color-rendering index.
- B. CU: Coefficient of utilization.

1.4 SUBMITTALS

- A. LED Light Fixture Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Include confirmation that the light fixtures being provided are either DLC listed or confirmation that a DLC listed fixture is not obtainable for the light fixture.
 - 3. The shop drawing shall include the “L70 Rating” for each light fixture, indicating compliance with a minimum L70 of 50,000 hours.
 - 4. The shop drawing shall indicate, for exterior light fixtures, a rated ambient temperature of 15 degrees-C or lower.
 - 5. The shop drawing shall include photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for fixtures identical to those required for this project.
 - 6. The shop drawing shall include, for each fixture, the rated driver current, indicating compliance with a maximum value of 2 mA.
 - 7. The shop drawing shall indicate the minimum delivered lumens indicating compliance with the minimum value listed in the light fixture schedule.
 - 8. The shop drawing shall indicate the CRI = Color Rendering Index of the light fixture indicating compliance with the CRI value listed in the light fixture schedule.
 - 9. Shop drawings that do not include each of the above light fixture ratings shall be rejected.
- B. Field quality-control test reports.

- C. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
- D. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.
- B. The light fixture catalog number indicated on the project documents is to establish the intent of design but does not necessarily include all required accessories and hardware for a complete installation. Prior to shop drawing submission and fixture purchase, coordinate the final requirements for each light fixture with ceiling construction and finish types as required by the Professional and/or the Institution. Coordination to include but not be limited to: ceiling type; supporting methods & hardware; trim; accessories; fixture finish and color. Submission of bid indicates inclusion of all material and installation as required by these coordination requirements.

1.7 WARRANTY

- A. LED light fixtures provided as a part of this project shall be provided with a 5 year warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Basis-of-Design Product: The design for each lighting fixture is based on the product named in the Lighting Fixture Schedule shown on drawings. Subject to compliance with requirements, provide either the named product, a comparable product by one of the other manufacturers specified, or an approved equal.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.
- E. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
 - 4. Laminated Silver Metallized Film: 90 percent.
- F. Plastic Diffusers, Covers, and Globes:
 - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass, unless otherwise indicated.

2.2 REQUIREMENTS FOR INDIVIDUAL LIGHTING FIXTURES

- A. Fixtures Characteristics: As shown on the drawings.

2.3 LED LIGHT FIXTURES

- A. LED light fixtures provided as a part of this project shall have a minimum L70 rated life of 50,000 hours. The shop drawing submitted for these fixtures shall include this information.
- B. The maximum driver current for each fixture shall not exceed 2mA.
- C. The power factor of the load for each light fixture shall not exceed a value to cause a 60% loaded 277V light fixture branch circuit to have a power factor less than 0.85.
- D. The LED fixtures shall be provided with the special warranty listed in this specification.

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as the primary support element.
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture from the building structure to tabs on the light fixture located not more than 6 inches from the light fixture corner. The wire or rod shall have a breaking strength of the weight of the fixture at a safety factor of 3.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- C. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Adjust aimable lighting fixtures to provide required light intensities.
- E. Connect wiring according to Division 26 Section "Low Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265119

SECTION 283111 – MODIFICATIONS TO THE EXISTING FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specification sections "General Conditions", "Special Requirements", and "General Requirements" form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

- A. This Section includes requirements for the modification of the existing Siemens fire alarm system at the Greater Egg Harbor Absegami School. The modification include the requirement to remove the fire alarm devices located within the wing of the school that is being demolished and reprogram the fire alarm system as required.
- B. All equipment, programming, and material provided for the fire alarm system shall be fully compatible with the existing Siemens fire alarm system.
- C. Coordinate with the equipment manufacturer for requirements (Contact Siemens Representative John Kile at (856-437-9286) and provide all required equipment, labor and material for the existing fire alarm system to modify the existing system to remove devices indicated to be removed and add the new devices indicated on the new work drawings. Include all required costs to modify the system to add, remove, and test the devices as shown on the drawings in the bid price.
- D. After the modifications to the existing fire alarm system are complete, test the system in compliance with the requirements of the Local Authority Having Jurisdiction and NFPA 72.

1.4 DEFINITIONS

- A. FACP: Fire alarm control panel.
- B. LED: Light-emitting diode.
- C. NICET: National Institute for Certification in Engineering Technologies.
- D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.5 SYSTEM DESCRIPTION

- A. The Siemens Fire Alarm System-III is a fully addressable system.
- B. Provide Modifications and programming to the existing system when the devices in the wing have been removed.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 - 1. Provide shop drawings (as required) that are signed and sealed by a Professional Engineer with the following qualifications:
 - a. Trained and certified by manufacturer in fire alarm system design.
 - b. Fire alarm certified by NICET, minimum Level III.
- C. The shop drawings (as required) shall include signed and sealed (By a NICET qualified Professional Engineer) floorplans (showing the locations of all devices), wiring diagrams, riser diagrams, battery calculations and all additional NFPA 72 requirements.
- D. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 01 Section "Submittals," make an identical submittal to authorities having jurisdiction (Pennsylvania Department of Labor & Industry) for review and approval prior to submission to the Professional. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Professional for review.
- E. Documentation:
 - 1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Institution, Professional, and authorities having jurisdiction.
 - 2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Institution, Professional, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
 - a. Hard copies on paper to Institution, Professional, and authorities having jurisdiction.

1.7 QUALITY CONTROL

- A. Installer/Programmer Qualifications: Personnel certified by NICET as Fire Alarm Level II.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA

70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 PROJECT CONDITIONS

- A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Institution or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
 - 1. Notify District no fewer than five days in advance of proposed interruption of fire alarm service.
 - 2. Do not proceed with interruption of fire alarm service without District's written permission.

PART 2 - PRODUCTS

2.1 EXISTING FIRE ALARM SYSTEM

- A. Provide equipment and programming that is fully compatible with the existing fire alarm system.

PART 3 - EXECUTION

3.1 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 26.
- B. Install instructions frame in a location visible from the FACP.
- C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.2 GROUNDING

- A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Before requesting final approval of the installation, submit a written statement using

- the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
 - a. Include the existing system in tests and inspections.
 3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
 4. Testing: Follow procedure and record results complying with requirements in NFPA 72.
 5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.

3.4 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.
- B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Institution's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices.

END OF SECTION 283111