ADDITIONS AND RENOVATIONS TO LITTLEBROOK ELEMENTARY SCHOOL

PRINCETON PUBLIC SCHOOLS
PRINCETON - MERCER COUNTY - NEW JERSEY

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New Jersey - Pennsylvania
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FVHD PROJECT #5516D

Consulting Engineers:
Edwards Engineering Group, an L2A Company, Consulting Civil Engineers
Harrison - Hamnett, PC, Consulting Structural Engineers
French & Parrello Associates, P.A., Consulting MEP Engineers

October 10, 2025

VOLUME 1 OF 2

S P E C I F I C A T I O N S

for
ADDITIONS AND RENOVATIONS TO LITTLEBROOK ELEMENTARY SCHOOL
located at 39 Magnolia Lane, Princeton, NJ 08540

for the
PRINCETON PUBLIC SCHOOLS
Princeton, Mercer County, New Jersey

FVHD PROJECT NO. 5516D

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NOTICE TO BIDDERS
Princeton Public Schools
Mercer County, New Jersey

NOTICE IS HEREBY GIVEN that the Princeton Public Schools ("Owner") will receive bids for **Additions and Renovations to Littlebrook Elementary School (FVHD-5516D),** together with all work incidental thereto, in accordance with the requirements of the Bid Documents prepared by Fraytak Veisz Hopkins Duthie, P.C. (FVHD), Architects-Planners, www.fvhdpc.com, **FVHD Project #5516D**.

Bids will be received for: Single Overall Contract (FVHD-5516D)
The Bidder shall be classified as of the date and time of the bid opening in the following discipline:
DPMC: C008 or C009 Prime Contractor with C029, C030, C032, C047 Subcontractors

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. Requests for electronic project documentation must be made through a registered account via the FVHD Contractor Portal at https://www.fvhdpc.com/contractors. Bid Documents are available for no fee from the Architect's website. Hard copies are available for $250 per set. A check or money order should be made payable to Fraytak Veisz Hopkins Duthie, P.C. A direct shipping account number (FedEx or UPS) and preferred shipping speed must also be provided.

Prebid Meeting is scheduled for **Tuesday, February 24, 2026, 10:30 AM,** at Littlebrook Elementary School, 39 Magnolia Lane, Princeton, NJ 08540. Attendance at the prebid meeting is not mandatory but highly recommended.

All Requests for Information (RFI) must be submitted in writing by **March 10, 2026**, and sent to info@fvhdpc.com, or fax to 609-883-2694 or via common carrier to the Architect at the address indicated above. All correspondence must include the Architect's Project Name and Project Number referenced. The Architect is not responsible for misdirected or misrouted correspondence.

Sealed Bids are due by **Tuesday, March 24, 2026, 2:00 PM,** to Princeton Public Schools, Attn: Andrew Harris, 25 Valley Road, Princeton, NJ 08540, and will be publicly opened and read immediately thereafter. Any Bid received after that time shall be rejected.

Bid Proposals shall be submitted in duplicate (one original and one copy) in a separate sealed envelope for each contract, 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. Each proposal shall be accompanied by (1) a bid bond or certified cashier's check payable to the Owner equal to 10% of the amount of the bid, but in no case to exceed $20,000 pursuant to N.J.S.A. 18A:18A-24, and (2) Certificate of Consent of Surety pursuant to N.J.S.A. 18A:18A-25, obligating the issuing surety company to provide the bidder and its subcontractors, if successful, with a NJ Statutory Performance Bond and a NJ Statutory Payment Bond each in the full amount of the contract. The Consent of Surety shall be executed by an approved surety company authorized to do business in the State of NJ and in accordance with N.J.S.A. 2A:44-143, and 2A:44-144; and must be delivered to the above place on or before the hour named. The Owner 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), in the above-listed classifications prior to the date that bids are received. Any Bidder and their Prime Subcontractors who do not possess a valid and active "Notice of Classification" may be ineligible to bid on this Project, and any bid submitted by such Bidder and their Prime Subcontractors may be rejected as non-responsive.

This project is subject to the New Jersey State Prevailing Wage Act, N.J.S.A. 34:11-56.27 et seq.
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).

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.

No bidder who is on the State Treasurer's or the Federal Government's List of Debarred, Suspended or Disqualified Bidders shall be eligible to bid on this project.

Per N.J.S.A. 52:32-44(b) all contractors and subcontractors must provide a Business Registration Certificate prior to contract award.

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.

By Order of the Princeton Public School District
Andrew Harris, Business Administrator/Board Secretary

BIDDING INFORMATION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1. INVITATION TO BID

A. All Bidders are required to prepare bids in accordance with all Drawings and Specifications (Bid Documents) prepared by Fraytak Veisz Hopkins Duthie, P.C. Architects-Planners.

1. Access to Bid Documents:
   a. Requests for electronic project documentation must be made through a registered account via FVHD Architect's Contractor Portal. If you have not already done so, please visit https://www.fvhdpc.com/contractors to register. There is no cost to create an account.
   b. To obtain Bid Documents, you must create/register a Contractor account on the Architect's website and submit a request for Bid Documents at https://www.fvhdpc.com/contractors/bidlisting. Bid Documents are available for no fee from the Architect's website when requested through a registered account via the FVHD Contractor Portal. Hard copies may be requested at an additional fee of $150 per set. A check or money order should be made payable to Fraytak Veizs Hopkins Duthie, P.C.

B. **DISCLAIMER**: Bidders should only rely on original digital and paper versions of the Bid 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 Bid 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 Contract(s), 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 including all costs reasonably inferable and necessary forits proper execution and completion. 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.

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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 (not mandatory) 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 (not mandatory): dschittone@fvhdpc.com.**

2. **Roofing Projects: The Bidder shall review Section 07500 regarding the requirement for the Contractor to engage and pay for the services of a qualified independent Registered Roof Observer (RRO) or Registered Roof Consultant (RRC) Firm.**

E. The Owner reserves the right to accept or reject all bids including Alternate Bids, if any, pursuant to N.J.S.A. 18A:18A-22 under any Contract for a period up to sixty (60) days after receipt of bids.

2. ETHICS IN PURCHASING

A. School District Responsibility

1. Recommendation of Purchases
   a. It is the desire of the Owner 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 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 Owner or anyone proposing to do business with the Owner in accordance with N.J.S.A. 18A:12-21 et seq.

2. Vendor Responsibility:
   a. Offer of Gifts, Gratuities – Prohibited
      1) Any vendor doing business or proposing to do business with the Owner, 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

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Owner or to any member of the official's or employee's immediate family in accordance with N.J.S.A. 18A:12-21 et seq.

b. Vendor Influence – Prohibited:

1) No vendor shall cause to influence or attempt to cause to influence, any official or employee of the Owner, 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 Owner 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 Owner.

3. OBLIGATION OF BIDDER

A. At the time of the opening of bids, each Bidder will be presumed to have become familiar with the site (not mandatory) and to have read and to be thoroughly familiar with the Drawings, Specifications and all other Bid Documents, including all Addenda and Bulletins. The failure or omission of any Bidder to receive or examine any form, instrument or document shall not relieve Bidder from any obligation with respect to their bid. It is recommended the Bidders visit the site and acquaint themselves with the existing conditions; however, failure to do so shall not excuse any obligations or claims for extra compensation.

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.

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 Owner or the award of a Contract.

5. NOTICE OF CLASSIFICATION OF BIDDERS (CONTRACTORS AND PRIME SUBCONTRACTORS)

A. Pursuant to N.J.S.A. 18A:18A-26 et seq., as amended, N.J.S.A. 52:35-1, and N.J.A.C. 17:19-2.1 through N.J.A.C. 17:19-2.7, Bidders and their Subcontractors as required, on any Contract on public work for a Board of Education (Owner) in the State of New Jersey in which the entire cost of the Contract exceeds $20,000.00, must:

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1. 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 and their Subcontractors must submit, a "Notice of Classification" setting forth the type of Work and the amount of Work for which the Bidder and their Subcontractors have been qualified;

2. That there has been no material adverse change in their qualification information;

3. The total amount of uncompleted work on Contracts at the time and the date of the bid due date.

Any Bidder and their Subcontractors who do not possess a valid and active "Notice of Classification" will be ineligible to bid on this Project, and any bid submitted by such Bidder and their Subcontractors 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 and their Subcontractor'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. Bidders must submit Registration Certificates for themselves and listed Subcontractors before award.

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. Pursuant to N.J.S.A. 18A:18A-31, "where there have been developments subsequent to the qualifications and classification of a Bidder which in the opinion of the Owner would affect the responsibility of the Bidder, information to that effect shall forthwith be transmitted to the department for its review and reconsideration of the classification. Before taking final action on any such bid, the Owner concerned shall notify the Bidder and give them an opportunity to present to the department any additional information which might tend to substantiate the existing classification."

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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 their 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.

7. CHANGES TO BID DOCUMENTS, INTERPRETATIONS AND ADDENDA

A. Changes to the Bid Documents may be required to be issued via Addenda. Fraytak Veisz Hopkins Duthie, P.C (FVHD) Architects - Planners will issue notice of the publication of all Addenda to prospective Bidders, who have obtained Bid Documents from Fraytak Veisz Hopkins Duthie, P.C (FVHD) Architects - Planners. **All Bidders may check the Fraytak Veisz Hopkins Duthie, P.C (FVHD) Architects - Planners website www.fvhdpc.com and download Addenda if any are issued for the Project.**

1. All Addenda issued, in accordance with NJSA 18A:18A-21(c)(2), become a part of the Bid Documents as though originally incorporated into the Specifications.

2. For the/all Contract(s) for construction Work, notice shall be provided no later than seven days, Saturdays, Sundays, or holidays excepted, prior to the date for acceptance of bids, to any person who has submitted a bid or who has received a bid package in any of the following ways:
   i) in writing by certified mail or;
   ii) by certified facsimile transmission, meaning that the sender's facsimile machine produces a receipt showing date and time of transmission and that the transmission was successful or;
   iii) by a delivery service that provides certification of delivery to the sender.

3. Bidders must acknowledge receipt of all Addenda on the Bid Proposal Form or the bid shall be deemed non-responsive by the Owner.

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 March 10, 2026, 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.**

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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 Proposal 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).

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 Proposal 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 Proposal Form, attachment of additive information not required by the Specifications, or irregularities of any kind may be rejected by the Owner in accordance with N.J.S.A. 18A:18A-22.**

2. **Any changes, white-outs, strike-outs, etc. on the Bid Proposal Form must be initialed in ink by the person responsible for signing the Bid Proposal Form.**

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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 for 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 Proposal 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 Proposal 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" or "N/C." 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 Proposal 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 Proposal 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.

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:

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1. Bid Bond Form: Bid Bond shall be as per the 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 them (Sundays and holidays excepted).

1. Any failure by the successful Bidder to perform its obligations regarding the time, manner, and substance of compliance with Bid 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.

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 two-year guarantee period.

B. Proposition of Surety:

1. 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, a Performance Bond and a Payment Bond; each in the amount of 100% of the amount bid.

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2. 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, 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).

3. If, at any time after execution and approval of a Contract and Performance-Payment Bond required by Bid 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.

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

11. POWER OF ATTORNEY

A. Attorneys-in-fact who sign Bid Bonds, Performance-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.

12. FORM OF AGREEMENT

A. The form of agreement shall be AIA Document A132/CMa Standard Form of Agreement between Owner and Contractor, Construction Manager as Advisor, 2019 Edition, and in accordance with AIA Document A232/CMa General Conditions of the Contract, Construction Manager as Advisor, 2019 Edition as amended, and all other documents referenced herein.

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.

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.

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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, Princeton Public Schools ("Owner") 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 Owner 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 Owner prior to the time a Contract, purchase order, or other Bid 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 Owner 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 Owner 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

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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 the Owner.

E. The Owner reserves the right to reject all bids, or to waive minor informalities or non-material exceptions in a bid, pursuant to N.J.S.A. 18A:18A-22.

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 twenty (20) calendar days of the notification of the award to them, 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 in accordance with N.J.S.A. 18A:18A-42.

I. A Contractor must not appear on the Division of Employer Accounts - Workplace Accountability in Labor List (the WALL). The Owner shall comply with the requirements of P.L. 2019, c.366.

15. BID PROTESTS AND CONTRACTOR'S RESPONSIBILITY

A. Contractors may submit written challenges to procurement Specifications or to protest an award of Contract to the Purchasing Agent. 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 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;

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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.

16. BID DOCUMENTS

A. The Bid Documents consist of but not limited to the following:

1. Instructions To Bidders in accordance with this Section,

2. General Conditions, AIA Document A232, and as supplemented in the Supplementary General Conditions; Section 00800,

3. Bid Form including attachments as per Bidder's Checklist,

4. 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 A132 and as amended by the Project Specifications.

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

17. TIME OF COMPLETION AND LIQUIDATED DAMAGES

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

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,

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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.

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 may lead to having the bid being rejected as non-responsive.

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.

21. EQUIVALENT PRODUCTS

A. The use of manufacturers' brand names, catalogue numbers and similar proprietary identifying data in the Bid Documents are not intended to eliminate from consideration products that are equivalent in quality, appearance and function to those specified consistent with N.J.S.A. 18A:18A-15(d).

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22. CONTRACT

A. As indicated in the Advertisement for Bids, the Owner is intended to receive sealed bids and to award and administer the Contract for the work required by the Bid Documents as follows:

Single Overall Contract - Little Brook Elementary School

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

Prime Contractor
C008 - General Construction
Or/
C009 - General Construction/Alterations and Additions
and have Subcontractor(s) for the following classification(s) of work:
Subcontractors:
C029 - Structural Steel & Ornamental Iron
C030 - Plumbing
C032 - HVACR
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 Subcontractor(s) bidding the scope of work for the other categories. The Subcontractor(s) must possess the DPMC Classification(s) in that category.**

2. **As required by N.J.S.A. 18A:18A-16 and N.J.S.A. 18A:18A-49, Construction Plans shall be approved by BFP at DOE or Local Code Official.**

END OF SECTION 00100

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BID PROPOSAL FORM

SINGLE OVERALL CONTRACT
LITTLEBROOK ELEMENTARY SCHOOL

DPMC Classifications: C008 or C009 Prime Contractor
with C029, C030, C032, C047 Subcontractors

To: Princeton Public Schools
Board of Education
25 Valley Road, Princeton, NJ 08540

1. The undersigned, having familiarized themself with the local conditions affecting the cost of the Work, the Drawings, the Specifications and other Bid Documents, as in the Advertisement for Bids thereto, for the **Additions and Renovations to Littlebrook Elementary School (FVHD#5516D)**, 39 Magnolia Lane, Princeton, NJ 08540, together with all Work incidental thereto, in accordance with the requirements of the Drawings and Specifications prepared by Fraytak Veisz Hopkins Duthie, P.C., Architects/Planners, Trenton, New Jersey, hereby proposes to furnish all labor, materials and equipment required for all Work and as follows:

   SINGLE OVERALL CONTRACT - LITTLE BROOK ES - BASE BID: All Work at the above referenced school, including applicable Allowances - Section 01020, in accordance with the requirements of Bid Documents. If written amount differs from the numerical figure, only the written amount will be accepted as the correct bid.

   TOTAL BASE BID INCLUDING ALLOWANCE: $_____
   (Numerical)

   _____
   (To be written in-full)

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Submitted by: _____
(Firm Name)

2. **Alternate Proposal(s) - Section 01030** shall be quoted as additions to, deductions from or No Change (NC) to the Base Bid and shall be in accordance with the Specifications for Alternate Bid Work. If written amount differs from the numerical figure, only the written amount will be accepted as the correct bid.

Alternate Bid No. LB1: Classroom Addition and all Related Work including Site Work ADD $_____
(Numerical)

_____
(To be written in full)

Alternate Bid No. LB2: Courtyard Improvements ADD $_____
(Numerical)

_____
(To be written in full)

Alternate Bid No. LB3: Renovation Work at Existing Music Room ADD $_____
(Numerical)

_____
(To be written in full)

Alternate Bid No. LB4: Serving Line Improvements ADD $_____
(Numerical)

_____
(To be written in full)

Alternate Bid No. LB5: Quartz Tile Flooring In Lieu of LVT at Cafeteria/Serving Area ADD $_____
(Numerical)

_____
(To be written in full)

Alternate Bid No. LB6: Parking Lot Expansion ADD $_____
(Numerical)

_____
(To be written in full)

Submitted by:_____
(Firm Name)

3. **UNIT PRICES - SECTION 01151: Materials in Place.**

Bulk rock excavation	$ **300.00** per cu. yd.
Trench or pit rock excavation	$ **400.00** per cu. yd.

UNIT PRICES - GENERAL CONSTRUCTION: Materials in Place.

Excavation (unsuitable soil)	$_____ per cu. yd.
Certified, clean compacted fill	$_____ per cu. yd.
Bituminous Paving (including subbase)	$_____ per sq. yd.
Concrete Curb	$_____ per lin. ft.
Concrete Walk (including subbase)	$_____ per sq. ft.
Cement Based Self Leveling Underlayment per Section 03452	$_____ per sq. ft.
Labor to receive, unload, and handle Owner provided item from truck and install in location as directed by Owner	$_____ laborer/hour
Replacement of existing damaged or deteriorated metal decking	$_____ per sq. ft.
Replacement of existing wet or deteriorated roof insulation board	$_____ per sq. ft.
Replacement of existing damaged or deteriorated wood nailers/ blocking or framing, including removal of existing deteriorated wood, furnishing and installing new galvanized anchor bolts, expansion bolts at 4'-0" o.c. or nails through existing construction to remain:	$_____ per board ft.
a. 2x4 for the above work	$_____ per lin. ft.
b. 2x6 for the above work	$_____ per lin. ft.
c. 2x8 for the above work	$_____ per lin. ft.
d. 2x10 for the above work	$_____ per lin. ft.
e. 2x12 for the above work	$_____ per lin. ft.

UNIT PRICES - PLUMBING & DRAINAGE: Materials in Place.

Plumbing Item / Unit	
3″ cast iron pipe below grade	$_____ per lin. ft.
4″ cast iron pipe below grade	$_____ per lin. ft.
6″ cast iron pipe below grade	$_____ per lin. ft.
2" cast iron above grade	$_____ per lin. ft.
3" cast iron above grade	$_____ per lin. ft.
4" cast iron above grade	$_____ per lin. ft.
2-1/2″ Type 'L' copper tubing	$_____ per lin. ft.
3″ Type 'L' copper tubing	$_____ per lin. ft.

Submitted by:_____
(Firm Name)

2" piping insulation	$_____ per lin. ft.
4" piping insulation	$_____ per lin. ft.
1" black steel schedule 40 pipe	$_____ per lin. ft.
1-1/2" black steel schedule 40 pipe	$_____ per lin. ft.
2" black steel schedule 40 pipe	$_____ per lin. ft.
1" Ball valve	$_____ per unit
1-1/2" Ball valve	$_____ per unit
2" Ball valve	$_____ per unit
3″ Ball valve	$_____ per unit
Thermostatic mixing valve MV-1	$_____ per unit
Floor drain FD-1	$_____ per unit

Fire Protection Item / Unit

Sprinkler head with associated 1″ branch piping (approx. 5′-0″ length)	$_____ per unit

UNIT PRICES - HEATING AND VENTILATING: Materials in Place.

7/8″ Type 'L' Copper with brazed joints (refrigerant piping)	$_____ per lin. ft.
1/2″ Type 'L' Copper with brazed joints (refrigerant piping)	$_____ per lin. ft.
7/8″ Piping insulation (refrigerant piping)	$_____ per lin. ft.
1/2″ Piping insulation (refrigerant piping)	$_____ per lin. ft.
3/4″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.
3/4" Ground source piping insulation	$_____ per lin. ft.
1″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.
1" Ground source piping insulation	$_____ per lin. ft.
1-1/2″ Type 'L' copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.
1-1/2" Ground source piping insulation	$_____ per lin. ft.
2″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.
2" Ground source piping insulation	$_____ per lin. ft.
2-1/2″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.

Submitted by:_____
(Firm Name)

2-1/2" Ground source piping insulation	$_____ per lin. ft.
3″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$_____ per lin. ft.
3" Ground source piping insulation	$_____ per lin. ft.
Condensate Pump	$_____ per unit
12" x 8" Volume Damper	$_____ per unit
24″ x 24″ Ceiling Diffuser	$_____ per unit
24″ x 24″ Ceiling Register	$_____ per unit
24″ x 12″ Ceiling Registers	$_____ per unit
24″ x 14″ Supply Grilles	$_____ per unit
46″ x 46″ Return Grilles	$_____ per unit
Unitary Controller	$_____ per unit
Thermostat	$_____ per unit
Ball Valve, under 1″	$_____ per unit
Ball Valve, 1″	$_____ per unit
Ball Valve, 1-1/2″	$_____ per unit
Ball Valve, 2″	$_____ per unit
Ball Valve, 2-1/2″	$_____ per unit
Ball Valve, 3″	$_____ per unit
Balancing Valve, 1″	$_____ per unit
Balancing Valve, 1 ½"	$_____ per unit
Balancing Valve, 2″	$_____ per unit
Balancing Valve, 2 ½″	$_____ per unit
Balancing Valve, 3″	$_____ per unit
Galvanized Steel Ductwork (Rectangular) 20" x 12"	$_____ per lb.
Single-Wall Round Ductwork 12" diameter	$_____ per lb.
Double-Wall Round Ductwork 12" diameter	$_____ per lb.
1-1/2" Mineral-Fiber Board Duct Insulation (Indoors)	$_____ per sq. ft.
2" Mineral-Fiber Blanket Duct wrap Insulation (Indoors)	$_____ per sq. ft.
2" Mineral-Fiber Board Duct Insulation (Outdoors)	$_____ per sq. ft.

Submitted by:_____
(Firm Name)

UNIT PRICES - ELECTRICAL WORK: Materials in Place.

20A-1 Pole branch circuit installation 600V, including MC cable and termination.	$_____ per lin. ft.
20A-1 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
30A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
50A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
60A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
70A-3 Pole feeder installation 600V, including EMT conduit, wire and termination.	$_____ per lin. ft.
80A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
90A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
100A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
150A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
200A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$_____ per lin. ft.
20A Tamper-resistant receptacle including back box, plate, conduit and wiring to the nearest device(20')	$_____ per unit
20A Tamper-resistant GFCI receptacle including back box, plate, conduit and wiring to the nearest device(20')	$_____ per unit
20A Single pole light switch including back box, plate, conduit and wiring to the nearest device(20')	$_____ per unit
20A Single pole three way light switch including back box, plate, conduit and wiring to the nearest device(20')	$_____ per unit
Fire Alarm smoke/heat detector including wiring, programming and testing.	$_____ per unit
Fire Alarm duct smoke detector including wiring, programming and testing.	$_____ per unit
Fire Alarm Horn/strobe including wiring, programming and testing.	$_____ per unit
Fire Alarm monitor/control module including wiring, programming and testing.	$_____ per unit

Submitted by:_____
(Firm Name)

Fire Alarm door holder including wiring, programming and testing.	$_____ per unit
Fire Alarm Pull station including wiring, programming and testing.	$_____ per unit
Fire Alarm Device Wire mesh device guard.	$_____ per unit
Junction Box and 3/4" Empty conduit with drag line and bushing at each end.	$_____ per lin. ft.
Junction Box and 1" Empty conduit with drag line and bushing at each end.	$_____ per lin. ft.
Junction Box and 2" Empty conduit with drag line and bushing at each end.	$_____ per lin. ft.
(1) Ceiling mounted occupancy sensor as indicated on Contract Drawings.	$_____ per unit
(1) Wall switch occupancy sensor as indicated on Contract Drawings.	$_____ per unit
Combination Voice & Data communication outlet including backbox, wall plate, conduit and Cat6 cable to IDF room.	$_____ per unit

THE REMAINDER OF THIS PAGE WAS LEFT INTENTIONALLY BLANK

Submitted by:_____
(Firm Name)

4. 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)

5. In submitting this bid, it is understood that the right is reserved by the Owner to accept or to reject bids pursuant to N.J.S.A. 18A:18-22 and any bid that is non-responsive or submitted by a Bidder that is not responsible, 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.

6. 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.

7. 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

_____
Phone & Fax

_____
Dated

_____
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. Bidders are encouraged to submit all items listed below with the bid. All must be provided prior to award of the contract. Failure to submit documents marked (*) mandatory will be cause for rejection of the bid.

	Reviewed the Bid Documents (Including the permits obtained by the Owner), satisfied themselves regarding the character of the reviewed 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 the Contract Documents contained herein (Owner/Contractor)	
	ITEM	
(*)	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 If Surety is being provided for Subcontractors by Bidder, indicate here _____ Initial	
(*)	Subcontractor Identification List	
(*)	Statement of Ownership Disclosure Certification	
(*)	Division of Property Management & Construction (DPMC) Form 701 - Total Amount of Uncompleted Contracts, N.J.A.C. 17:19-2.13 All Contractor(s) and Named Subcontractor(s)	
(*)	Division of Property Management & Construction (DPMC) Current Notice of Classification - All Contractor(s) and Named Subcontractor(s)	
(*)	Certification of No Material Change of Circumstances - All Contractor(s) and Named Subcontractor(s)	
(*)	Non Collusion Affidavit	
(*)	Equipment Certification	
	Prevailing Wage Certification	
	Sworn Contractor Certification	
	Public Works Contractors Registration Act Certificate (N.J.S.A. 34:11-56.48) All Contractor(s) and Named Subcontractor(s)	
	Business Registration Certificate - All Contractor(s) and Named Subcontractor(s)	
	Federal and State Non-debarment Certifications - All Contractor(s) and Named Subcontractor(s)	

BIDDER'S CHECKLIST

	Certification of Non-Debarment for Federal Government Projects - All Contractor(s) and Named Subcontractor(s)	
	Trade License - All Contractor(s) and Named Subcontractor(s)	
	HVACR Master License (HVACR Contractors)	
	Compliance with New Jersey Prevailing Wage Act	
	Certification of Insurance Statement	
	Political Contribution Disclosure Form	
	Prohibited Russia-Belarus Activities & Iran Investment Activities	
	Americans with Disabilities Act Language	
	Mandatory Equal Employment Opportunity Language	
	Affirmative Action Compliance Notice	
	Performance Record Certification	
	Status of Present Contracts	
	Contractor(s) 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)

Sample

BID BOND

Bond No._____

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

_____ as Principal, and _____ as Surety,
[Full Legal Name of Bidder] [Name of Surety Company]

are bound to Princeton Public School District as Obligee, in the sum of
[Name of Public Agency]

_____ Dollars ($_____),
[Percentage of Bid or Not-to-Exceed Amount]

for which we bind ourselves and our successors.

The Principal has submitted a bid to the Obligee on _____ for the project.
[Date of Bid]

Additions and Renovations to Littlebrook Elementary School (FVHD-5516D) .
[Name of Project and Bid Number]

This bond's condition is that if the Obligee awards the contract to the Principal, and the Principal within the specified time executes the contract and provides any required performance/payment bonds according to bid specifications and N.J.S.A. 2A:44-143 et seq., then this obligation is void. Otherwise, the Principal and Surety are obligated to the Obligee for the difference between the Principal's bid and the amount for which the Obligee contracts with another party. If the Principal fails to execute the contract and furnish required bonds, the Surety will pay the bond amount as liquidated damages.

The Surety agrees that its obligations remain in effect.

This instrument was executed on the _____ .
[Date] day of [Month], 20**[Year]**

PRINCIPAL (BIDDER):
(Full Legal Name of Bidder)

By: _____

Name: _____
(Name of Authorized Representative)

Title: _____
(Title of Authorized Representative)

SURETY:
(Name of Surety Company)

By: _____

Name: _____
(Name of Attorney-in-Face)

Title: _____
(Attorney-in-Fact)

[Corporate Seal]

- Complete document and affix Corporate Seal
- This Bid Bond Must be accompanied by a Power of Attorney for the Attorney-in-Fact which is currently dated and valid for the entire amount of the Bond

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)

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: FVHD-5516D - Additions and Renovations to Littlebrook Elementary School
(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.

CONSENT OF SURETY

SURETY DISCLOSURE STATEMENT AND CERTIFICATION
N.J.S.A. 2A:44-143

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

(1) The surety meets the applicable capital and surplus requirements of R.S.17:17-6 or R.S.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 R.S.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 P.L.1993, c.243 (C.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.

(continued)

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)

SUBCONTRACTOR IDENTIFICATION LIST

Project Title: Additions and Renovations to Littlebrook Elementary School **Project #:** FVHD-5516D

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].

Trade	Company Name/Address/Telephone/Fax/Email	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 - Company Name

Signature of Authorized Representative

Date

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.

Name of Organization: _____

Organization Address: _____

City, State, ZIP: _____

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

☐ Sole Proprietorship (skip Parts II and III, execute certification in Part IV)

☐ 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 owns 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

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 noncorporate 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

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 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.

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)

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: Additions and Renovations to Littlebrook Elementary School

Bid No. FVHD-5516D 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_____

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 by Owner as a part of the construction contract.

Public Law S-1442/A-5345, now P.L. 2023, c. 138, requires public works contractors to register and certify payroll for public works projects to be completed online at https://njwage.nj.gov

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 subs named in this bid understand that this project requires the sub 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

NJ Public Law S-1442/A-5345, now P.L.2023, c.138, requires public works contractors to register and certify payroll online for public works projects at https://njwages.nj.gov.

Name of Company _____

Authorized Agent _____

Authorized Signature _____

SWORN CONTRACTOR CERTIFICATION; QUALIFICATIONS AND CREDENTIALS
(Bidder's Certification)

Pursuant to N.J.S.A. 18A:7G-37, a pre-qualified contractor seeking to bid on 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:

- 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;

- A current, valid Certificate of Authority to perform work in New Jersey issued by the Department of Treasury, a copy of which is submitted with its bid;

- 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;

During the term of the school facilities project, I as principal owner or officer of the company or corporation, as the contractor, will have in place a suitable quality control and quality assurance program and appropriate safety and health plan.

I certify that, at the time of bidding, the amount of the bid proposal and the value of all of its outstanding incomplete contracts do 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- **STAMP**

To be completed, signed, notarized and returned with Bid

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 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 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 $200 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 Ownership 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.**

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Required Pursuant To N.J.S.A. 19:44A-20.26

This form or its permitted facsimile must be submitted to the local unit no later than 10 days prior to the award of the contract.

Part I – Vendor Information

Vendor Name:			
Address:			
City:		State:	Zip:

The undersigned being authorized to certify, hereby certifies that the submission provided herein represents compliance with the provisions of N.J.S.A. 19:44A-20.26 and as represented by the Instructions accompanying this form.

Signature	Printed Name	Title

Part II – Contribution Disclosure

Disclosure requirement: Pursuant to N.J.S.A. 19:44A-20.26 this disclosure must include all reportable political contributions (more than $200 per election cycle) over the 12 months prior to submission to the committees of the government entities listed on the form provided by the local unit.

☐ Check here if disclosure is provided in electronic form.

Contributor Name	Recipient Name	Date	Dollar Amount
			$

☐ Check here if the information is continued on subsequent page(s)

Continuation Page

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Required Pursuant To N.J.S.A. 19:44A-20.26

Page ___ of ______

Vendor Name:

Contributor Name	Recipient Name	Date	Dollar Amount
			$

☐ Check here if the information is continued on subsequent page(s)

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

County Name: Mercer

State: Governor, and Legislative Leadership Committees

Legislative District #s: 12, 14, 15, & 30

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):

East Windsor Township	Hopewell Township	Trenton City
Ewing Township	Lawrence Township	Washington Township
Hamilton Township	Pennington Borough	West Windsor Township
Hightstown Borough	Princeton Borough	
Hopewell Borough	Princeton Township	

Boards of Education (Members of the Board):

East Windsor Regional	Hopewell Valley Regional	Washington Township
Ewing Township	Lawrence Township	West Windsor-Plainsboro Regional
Hamilton Township	Princeton Regional	

Fire Districts (Board of Fire Commissioners):

Chesterfield-Hamilton Fire District No. 1	Hamilton Township Fire District No. 9
Hamilton Township Fire District No. 2	Hopewell Borough Fire District No. 1
Hamilton Township Fire District No. 3	Hopewell Township Fire District No. 1
Hamilton Township Fire District No. 4	Hopewell Township Fire District No. 2
Hamilton Township Fire District No. 5	Hopewell Township Fire District No. 3
Hamilton Township Fire District No. 6	Pennington Borough Fire District No. 1
Hamilton Township Fire District No. 7	Washington Township Fire District No. 1
Hamilton Township Fire District No. 8	

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

Public Works Contracts

Project No. FVHD-5516D Title of Bid Additons & Renovations to Littlebrook ES

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 ☐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 Princeton Public School District **("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)	
☐	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	
Address	
OR	
☐	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)	
☐	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	
Address	
OR	
☐	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)	
☐	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

☐	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

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.

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

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)
- Workplace Accountability in Labor List (The Wall)

Company Name: _____

Authorized Agent: _____

Signature: _____

Date: _____

Prohibited Russia-Belarus Activities & Iran Investment Activities

Person or Entity	

Part 1: Certification

COMPLETE PART 1 BY CHECKING **ONE OF THE THREE BOXES BELOW**

Pursuant to law, any person or entity that is a successful bidder or proposer, or otherwise proposes to enter into or renew a contract, for goods or services must complete the certification below prior to contract award to attest, under penalty of perjury, that neither the person or entity, nor any parent entity, subsidiary, or affiliate, is identified on the Department of Treasury's Russia-Belarus list or Chapter 25 list as a person or entity engaging in prohibited activities in Russia, Belarus or Iran. Before a contract for goods or services can be amended or extended, a person or entity must certify that neither the person or entity, nor any parent entity, subsidiary, or affiliate, is identified on the Department of Treasury's Russia-Belarus list. Both lists are found on Treasury's website at the following web addresses:

https://www.nj.gov/treasury/administration/pdf/RussiaBelarusEntityList.pdf
www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf.

As applicable to the type of contract, the above-referenced lists must be reviewed prior to completing the below certification.

A person or entity unable to make the certification must provide a detailed, accurate, and precise description of the activities of the person or entity, or of a parent entity, subsidiary, or affiliate, engaging in prohibited activities in Russia or Belarus and/or investment activities in Iran. The person or entity must cease engaging in any prohibited activities and provide an updated certification before the contract can be entered into.

If a vendor or contractor is found to be in violation of law, action may be taken as appropriate and as may be 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.

CONTRACT AWARDS AND RENEWALS

☐	*I certify, pursuant to law, that neither the person or entity listed above, nor any parent entity, subsidiary, or affiliate appears on the N.J. Department of Treasury's lists of entities engaged in prohibited activities in Russia or Belarus pursuant to P.L. 2022, c. 3 or in investment 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.* (Skip Part 2 and sign and complete the Certification below.)

CONTRACT AMENDMENTS AND EXTENSIONS	
☐	*I certify, pursuant to law, that neither the person or entity listed above, nor any parent entity, subsidiary, or affiliate is listed on the N.J. Department of the Treasury's lists of entities determined to be engaged in prohibited activities in Russia or Belarus pursuant to P.L. 2022, c. 3. 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.* (Skip Part 2 and sign and complete the Certification below.)
IF UNABLE TO CERTIFY	
☐	*I am unable to certify as above because the person or entity and/or a parent entity, subsidiary, or affiliate is listed on the Department's Russia-Belarus list and/or Chapter 25 Iran list. I will provide a detailed, accurate, and precise description of the activities as directed in Part 2 below, and sign and complete the Certification below. Failure to provide such will prevent the award of the contract to the person or entity, and appropriate penalties, fines, and/or sanctions will be assessed as provided by law.*

Part 2: Additional Information

PLEASE PROVIDE FURTHER INFORMATION RELATED TO PROHIBITED ACTIVITIES IN RUSSIA OR BELARUS AND/OR INVESTMENT ACTIVITIES IN IRAN.

You must provide a detailed, accurate, and precise description of the activities of the person or entity, or of a parent entity, subsidiary, or affiliate, engaging in prohibited activities in Russia or Belarus and/or investment activities in Iran in the space below and, if needed, on additional sheets provided by you.

Part 3: Certification of True and Complete Information

I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments there, to the best of my knowledge, are true and complete. I attest that I am authorized to execute this certification on behalf of the above-referenced person or entity.

I acknowledge that the Contracting Unit is relying on the information contained herein and hereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of any contracts with the Contracting Unit to notify the Contracting Unit in writing of any changes to the answers of information contained herein.

I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification. If I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreement(s) with the Contracting Unit and that the Contracting Unit at its option may declare any contract(s) resulting from this certification void and unenforceable.

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

CERTIFICATION OF INSURANCE STATEMENT

Project Title: Additions and Renovations to Littlebrook Elementary School

Project No.: FVHD-5516D

The Bidder fully understands the Owner's insurance requirements as stated in the Bid Documents and agrees to provide all insurance required by these documents at award of contract.

_____

COMPANY NAME

_____

BIDDER (Signature of Authorized Representative)

_____

BIDDER (Print Name of Authorized Representative)

Note: Failure to sign and submit this document prior to the Contract Award may result in the rejection of your Proposal.

CERTIFICATION OF INSURANCE STATEMENT

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)
DATE ISSUED

PRODUCER:

Insured Insurance Broker/Agent Co.
Address
City, State, Zip Code
Fax #
Telephone #

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED

Your Company's Name
Address
City, State, Zip Code

INSURERS AFFORDING COVERAGE	**NAIC #**
INSURER A: **(A.M. Best Rated A- or better)**	
INSURER B: **(A.M. Best Rated A- or better)**	
INSURER C: **(A.M. Best Rated A- or better)**	
INSURER D: **(A.M. Best Rated A- or better)**	
INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POICY PERIOD INDICATED. NOT WITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY ☑ Commercial General Liability ☐ Claims Made ☑ Occur ☐ _____ Gen'l Aggregate Limit Applies ☐ Policy ☐ Project ☐ Loc	**Policy Number**	**MM/DD/YY**	**MM/DD/YY**	Ea. Occurrence	***$5,000,000***
					Fire Damage (any one Fire)	***$500,000***
					Med Exp (Any one person)	***$15,000***
					Personal & Adv Injury	***$1,000,000***
					General Aggregate	***$3,000,000***
					Products - Comp/Op Agg	***$1,000,000***
B	AUTOMOBILE LIABILITY ☑ Any Auto ☑ All owned Autos ☑ Scheduled Autos ☑ Hired Autos ☑ Non-Owned Autos ☐ _____ ☐ _____	**Policy Number**	**MM/DD/YY**	**MM/DD/YY**	Combined Single Limit (Ea Accident)	***$1,000,000***
					Bodily Injury (Per Person)	$
					Bodily Injury (Per Accident)	$
					Property Damage (Per Accident)	$
	GARAGE LIABILITY ☐ Any Auto ☐ _____				Auto Only-Ea Accident	
					Other than Auto Only: Ea Acc	$
					Agg	$
C	EXCESS/UMBRELLA LIABILITY ☑ Occur ☐ Claims Made ☐ Deductible ☐ Retention $_____	**Policy Number**	**MM/DD/YY**	**MM/DD/YY**	Each Occurrence	***$5,000,000***
					Aggregate	***$5,000,000***
					applicable if underlying limits are less than required	
D	Workers Compensation and Employer's Liability	**Policy Number**	**MM/DD/YY**	**MM/DD/YY**	☑ WC Statutory Limits ☐ Other	
					E.L. Each Accident	***$1,000,000***
					E.L. Disease - Ea Employee	***$1,000,000***
					E.L. Disease - Policy Limit	***$1,000,000***
	Other					

DESCRIPTION OF OPERATIONS/**LOCATIONS**/VEHICLES EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

The following are named as additonal insureds the Owner, CM, Architect and their Consultants Agents and Employees.

CERTIFICATE HOLDER

OWNER
Street Address
City, State, Zip Code

Additional Insured; Insurer Letter:

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

Authorized Representative

Signature

SAMPLE

AMERICANS WITH DISABILITIES ACT OF 1990

Equal Opportunity for Individuals with Disability

The contractor and the Public Body (hereafter "owner") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act")
(42 U.S.C. S121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the owner pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the owner, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the owner's grievance procedure, the contractor agrees to abide by any decision of the owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the owner, or if the owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim, If any action or administrative proceeding is brought against the owner or any of its agents, servants, and employees, the *owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the owner or its representatives. It is expressly agreed and understood that any approval by the owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the owner pursuant to this paragraph.

It is further agreed and understood that the owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

Name of Company_____

Authorized Agent_____

Title or Position _____

Signature_____ Date_____

To be completed, signed, and returned with Bid.

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

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: _____

AFFIRMATIVE ACTION COMPLIANCE NOTICE
N.J.S.A. 10:5-31 and N.J.A.C. 17:27

GOODS AND SERVICES CONTRACTS
(INCLUDING PROFESSIONAL SERVICES)

This form is a summary of the successful bidder's requirement to comply with the requirements of N.J.S.A. 10:5-31 and N.J.A.C. 17:27-1 et seq.

The successful bidder shall submit to the public agency, after notification of award but prior to execution of this contract, one of the following three documents as forms of evidence:

(a) A photocopy of a valid letter that the contractor is operating under an existing Federally approved or sanctioned affirmative action program (good for one year from the date of the letter);

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 in accordance with N.J.A.C. 17:27-4.

The successful vendor may obtain the Affirmative Action Employee Information Report (AA302) from the contracting unit during normal business hours.

The successful vendor(s) must submit the copies of the AA302 Report to the Division of Contract Compliance and Equal Employment Opportunity in Public Contracts (Division). The Public Agency copy is submitted to the public agency, and the vendor copy is retained by the vendor.

The undersigned vendor certifies that he/she is aware of the commitment to comply with the requirements of N.J.S.A. 10:5-31 and N.J.A.C. 17:27.1 et seq. and agrees to furnish the required forms of evidence.

The undersigned vendor further understands that his/her bid shall be rejected as non-responsive if said contractor fails to comply with the requirements of N.J.S.A. 10:5-31 and N.J.A.C. 17:27-1 et seq.

COMPANY: _____ SIGNATURE: _____

PRINT NAME: _____ TITLE: _____

DATE: _____

PERFORMANCE RECORD

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

2. How many years experience in construction work has your organization had:
(a) As a Prime contractor?_____(b) As a subcontractor? _____

3. What is the construction experience of the relevant principal individuals managing your organization and directly responsible at your organization?

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

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

   If so, where and why? _____
   _____
   _____

5. 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.
   _____
   _____
   _____

Continued

PERFORMANCE RECORD
(Continued)

List of all contracts completed by you.

Name of Owner	Name & Location of Project/ Type of Work	Prime or Sub-Contractor	Architect or Engineer in Charge for Owner	Contract Price (Omit Cost)	Date Completed	Was* Time Extension Necessary	Were any Penalties Imposed	Were* Liens Claims or Stop Notice Filed

*Explain "Yes" answers.

Continued

PERFORMANCE RECORD
CERTIFICATION

6. Explanation of details in connection with non-completion of contracts, time extensions, penalties imposed, labor troubles experience, liens, termination of contracts, poor performance, debarment, claims and notices filed against contracts.

_____
_____
_____
_____
_____

7. Within the last five years, please list active and settled litigation with public entities for all contractors, as well as the description and outcome (i.e. settlements).

_____
_____
_____
_____

8. Within the last five years, what percentage of the allowances have been used? _____

9. Within the last five years, how many times has the project allowance been exceeded _____ and by what percentage? _____

10. Are the owners/principals of the company, owners/principals of other companies? _____

    If yes, indicate name and address of Companies:

_____
_____
_____
_____
_____

11. The information above is true and complete to the best of my knowledge and belief.

_____
(Name of Organization)

_____
(Signature)

_____
(Title)

STATE OF)
)ss.
COUNTY OF)

_____, being duly sworn to law, deposes and says that it is authorized to make this affidavit for, and on behalf of, the individual, partnership or corporation herein first named as the Bidder, that deponent is familiar with the books of the said Bidder and that the foregoing statement is a true and accurate statement taken from the books of said Bidder of such financial

condition as of the date herein first named; that the answers to the foregoing interrogatories are true and correct.

Subscribed and sworn to before me

This_____day of_____, 20____

_____
(Signature)

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

CERTIFICATION

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)

STATE OF NEW JERSEY

DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
CONSTRUCTION EEO COMPLIANCE MONITORING PROGRAM

FORM AA-201
Revised 11/11

INITIAL PROJECT WORKFORCE REPORT CONSTRUCTION

Official Use Only

Assignment

Code

For instructions on completing the form, go to: https://www.nj.gov/treasury/contract_compliance/documents/pdf/forms/aa201ins.pdf

1. FID NUMBER

2. CONTRACTOR ID NUMBER

3. NAME AND ADDRESS OF PRIME CONTRACTO R

(Name)

(Street Address)

(City) **(State)** **(Zip Code)**

4. IS THIS COMPANY MINORITY OWNED [ ] OR WOMAN OWNED [ ]

5. NAME AND ADDRESS OF PUBLIC AGENCY AWARDING CONTRACT

Name:
Address:

CONTRACT NUMBER **DATE OF AWARD** **DOLLAR AMOUNT OF AWARD**

6. NAME AND ADDRESS OF PROJECT

Name:
Address:

COUNTY

7. PROJECT NUMBER

8. IS THIS PROJECT COVERED BY A PROJEC LABOR AGREEMENT (PLA)? YES

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)**

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

FORM AA-202
REVISED 11/11

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:
https://www.nj.gov/treasury/contract_compliance/documents/pdf/forms/aa202ins.pdf

3. F ID or SS Number

1.Name and address of Prime Contractor

2. Contractor ID Number

4. Reporting Period

(NAME)

5. Public Agency Awarding Contract **Date of Award**

(ADDRESS)

6. Name and Location of Project **County**

7. Project ID Number

(CITY) (STATE) (ZIP CODE)

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 A. TOTAL	B. BLACK	C. HISPANIC	D. AMERICAN INDIAN	E. ASIAN	F. FEMALES	12. TOTAL NO. OF MIN. EMP.	13. WORK HOURS TOTAL WORK HOURS	A. MIN. W/H	B. FEMALE W/H	14. % OF WORK HRS A. % OF MIN. W/H	B. % OF FEMALE W/H	15. CUM. WORK HRS TOTAL WORK HOURS	A. MIN. HOURS	B. FEMALE HOURS	16. CUM. % OF W/H A. % OF MIN W/H	B. % OF FEM. W/H
			J																	
			AP																	
			J																	
			AP																	
			J																	
			AP																	
			J																	
			AP																	
			J																	
			AP																	

17. COMPLETED BY (PRINT OR TYPE)

(NAME) (SIGNATURE) (TITLE)

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

INSTRUCTIONS FOR COMPLETING MONTHLY PROJECT WORKFORCE REPORT- (AA202)

1. Enter the prime contractor's name, address and zip code number.

2. Enter the **CONTRACTOR ID NUMBER** assigned by the Dept. of Labor & Workforce Development Construction EEO Compliance Monitoring Program.

3. Enter the Federal Identification Number assigned to the contractor by the Internal Revenue Service, or if a Federal Employer Identification Number has not been applied for or issued, or if your business is such that it will not receive a Federal Identification Number, enter the Social Security Number of the owner or of one partner, in the case of a partnership.

4. Reporting Period - enter the beginning and ending dates of the month for the report being submitted. (i.e., 1/1/00 – 1/31/00).

5. Enter the complete name of the public agency awarding the contract. Include the date of contract award.

6. Enter the name and location of the project, including the county in which the project is located.

7. Enter the **PROJECT NUMBER** assigned by the Dept. of Labor & Workforce Development Construction EEO Compliance Monitoring Program.

8. Enter the company name(s) of the contractor(s) performing work at the construction site. List the prime contractor first with subcontractor(s) following.

9. Enter the total percent (%) of project work the contractor or subcontractor has completed, to date.

10. Identify the trades or crafts applicable to the prime contractor and each subcontractor listed in column #8. Use a single line for each trade or craft.

11. Enter the total number of employees for each contractor at each level of classification (J=Journeyworker, AP=Apprentice) and the total number of each minority group - Black, Hispanic, American Indian, Asian and Female. Note: Column A shall include Total Number of employees. Columns B-E shall also include minority females. Column F shall include both non-minority and minority females.

12. Enter the total number of minority employees for each employer at each level of classification. Note: This shall be the sum of columns B-E.

13. Enter the Total Monthly work hours for all employees in each craft at each level of classification.
    (A) Enter the Total Monthly minority work hours for each craft at each level of classification (Columns B-E).
    (B) Enter the Total Monthly female work hours for each craft at each level of classification (Column F).

14. (A) Enter the Total Monthly PERCENT of minority work hours for each craft at each level of classification.
    (B) Enter the Total Monthly PERCENT of female work hours for each craft at each level of classification.

15. Enter the Total Cumulative work hours for each craft at each level of classification.
    (A) Enter the Total Cumulative minority work hours for each craft at each level of classification.
    (B) Enter the Total Cumulative female work hours for each craft at each level of classification.

16. (A) Enter the Cumulative Percent of minority work hours for each craft at each level of classification.
    (B) Enter the Cumulative Percent of female work hours for each craft at each level of classification.

17. Print or type the name of the company official submitting the report; include signature, title, telephone number, and date the report is submitted.

THE CONTACTOR SHOULD RETAIN ONE COPY AND SUBMIT A COPY TO THE PUBLIC AGENCY WHICH AWARDED THE CONTRACT. ANOTHER COPY MUST BE FORWARDED TO:

New Jersey Department of Labor & Workforce Development
Construction EEO Compliance Monitoring Program
PO Box 209
Trenton, NJ 08625-0209
609 292-9550

Form AA302
Rev. 02/22

STATE OF NEW JERSEY

Division of Purchase & Property
Contract Compliance Audit Unit
EEO Monitoring Program

EMPLOYEE INFORMATION REPORT

IMPORTANT-READ INSTRUCTIONS CAREFULLY BEFORE COMPLETING FORM. FAILURE TO PROPERLY COMPLETE THE ENTIRE FORM AND TO SUBMIT THE REQUIRED $150.00 FEE MAY DELAY ISSUANCE OF YOUR CERTIFICATE. DO NOT SUBMIT EEO-1 REPORT FOR SECTION B, ITEM 11. For Instructions on completing the form, go to: https://www.nj.gov/treasury/contract_compliance/documents/pdf/forms/aa302ins.pdf

SECTION A - COMPANY IDENTIFICATION

1. FID. NO. OR SOCIAL SECURITY

2. TYPE OF BUSINESS
☐ 1. MFG ☐ 2. SERVICE ☐ 3. WHOLESALE
☐ 4. RETAIL ☐ 5. OTHER

3. TOTAL NO. EMPLOYEES IN THE ENTIRE COMPANY

4. COMPANY NAME

COMPANY E-MAIL

5. STREET CITY COUNTY STATE ZIP CODE

6. NAME OF PARENT OR AFFILIATED COMPANY (IF NONE, SO INDICATE) CITY STATE ZIP CODE

7. CHECK ONE: IS THE COMPANY: ☐ SINGLE-ESTABLISHMENT EMPLOYER ☐ MULTI-ESTABLISHMENT EMPLOYER

8. IF MULTI-ESTABLISHMENT EMPLOYER, STATE THE NUMBER OF ESTABLISHMENTS IN NJ

9. TOTAL NUMBER OF EMPLOYEES AT ESTABLISHMENT WHICH HAS BEEN AWARDED THE CONTRACT

10. PUBLIC AGENCY AWARDING CONTRACT
CITY COUNTY STATE ZIP CODE

Official Use Only	DATE RECEIVED	INAUG.DATE	ASSIGNED CERTIFICATION NUMBER

SECTION B - EMPLOYMENT DATA

11. Report all permanent, temporary and part-time employees ON YOUR OWN PAYROLL. Enter the appropriate figures on all lines and in all columns. Where there are no employees in a particular category, enter a zero. Include ALL employees, not just those in minority/non-minority categories, in columns 1, 2, & 3. *DONOTSUBMIT ANEEO-1REPORT.*

JOB CATEGORIES	ALL EMPLOYEES	PERMANENT MINORITY/NON-MINORITY EMPLOYEE BREAKDOWN													
	COL. 1	COL. 2	COL. 3	********* MALE*********						********* FEMALE*********					
	Total	Male	Female												
	(Cols.2 &3)			BLACK	HISPANIC	AMER INDIAN	ASIAN	NON MIN	2 OR MORE RACES	BLACK	HISPANIC	AMER INDIAN	ASIAN	NON MIN	2 OR MORE RACES
Officials/ Managers															
Professionals															
Technicians															
Sales Workers															
Office & Clerical															
Craftworkers (Skilled)															
Operatives (Semi-skilled)															
Laborers (Unskilled)															
Service Workers															
TOTAL															
Total employment From previous Report (if any)															
	The data below shall NOT be included in the figures for the appropriate categories above.														
Temporary & Part-Time Employees															

12. HOW WAS INFORMATION AS TO RACE OR ETHNIC GROUP IN SECTION B OBTAINED?
☐ 1. Visual Survey ☐ 2. Employment Record ☐ 3. Other (Specify)

13. DATES OF PAYROLL PERIOD USED
From: To:

14. IS THIS THE FIRST Employee Information Report Submitted?
1. YES ☐ 2. NO ☐

15. IF NO, DATE LAST REPORT SUBMITTED
MO. DAY YEAR

SECTION C - SIGNATUREAND IDENTIFICATION

16. NAME OF PERSON COMPLETING FORM (Print or Type) SIGNATURE TITLE DATE MO DAY YEAR

17. ADDRESS NO. & STREET CITY COUNTY STATE ZIP CODE PHONE (AREA CODE, NO.,EXTENSION)
- -

INSTRUCTIONS FOR COMPLETING THE EMPLOYEE INFORMATION REPORT (FORM AA302)

IMPORTANT: READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE COMPLETING THE FORM. PRINT OR TYPE ALL INFORMATION. FAILURE TO PROPERLY COMPLETE THE ENTIRE FORM **AND TO SUBMIT THE REQUIRED $150.00 NON-REFUNDABLE FEE MAY DELAY ISSUANCE OF YOUR CERTIFICATE** . **IF YOU HAVE A CURRENT CERTIFICATE OF EMPLOYEE INFORMATION REPORT, DO NOT COMPLETE THIS FORM UNLESS YOUR ARE RENEWING A CERTIFICATE THAT IS DUE FOR EXPIRATION. DO NOT COMPLETE THIS FORM FOR CONSTRUCTION CONTRACT AWARDS.**

ITEM 1 - Enter the Federal Identification Number assigned by the Internal Revenue Service, or if a Federal Employer Identification Number has been applied for, or if your business is such that you have not or will not receive a Federal Employer Identification Number, enter the Social Security Number of the owner or of one partner, in the case of a partnership.

ITEM 2 - Check the box appropriate to your TYPE OF BUSINESS. If you are engaged in more than one type of business check the predominate one. If you are a manufacturer deriving more than 50% of your receipts from your own retail outlets, check “Retail”.

ITEM 3 - Enter the total “number” of employees in the entire company, including part-time employees. This number shall include all facilities in the entire firm or corporation.

ITEM 4 - Enter the name by which the company is identified and the company email. If there is more than one company name, enter the predominate one.

ITEM 5 - Enter the physical location of the company. Include City, County, State and Zip Code.

ITEM 6 - Enter the name of any parent or affiliated company including the City, County, State and Zip Code. If there is none, so indicate by entering “None” or N/A.

ITEM 7 - Check the box appropriate to your type of company establishment. “Single-establishment Employer” shall include an employer whose business is conducted at only one physical location. “Multi-establishment Employer” shall include an employer whose business is conducted at more than one location.

ITEM 8 - If “Multi-establishment” was entered in item 8, enter the number of establishments within the State of New Jersey.

ITEM 9 - Enter the total number of employees at the establishment being awarded the contract.

ITEM 10 - Enter the name of the Public Agency awarding the contract. Include City, County, State and Zip Code. This is not applicable if you are renewing a current Certificate.

ITEM 11 - Enter the appropriate figures on all lines and in all columns. THIS SHALL ONLY INCLUDE EMPLOYMENT DATA FROM THE FACILITY THAT IS BEING AWARDED THE CONTRACT. DO NOT list the same employee in more than one job category. **DO NOT attach an EEO-1 Report**.

Racial/Ethnic Groups will be defined:
Black: Not of Hispanic origin. Persons having origin in any of the Black racial groups of Africa.
Hispanic: Persons of Mexican, Puerto Rican, Cuban, or Central or South American or other Spanish culture or origin, regardless of race.
American Indian or Alaskan Native: Persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.
Asian or Pacific Islander: Persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian Sub-continent or the Pacific Islands. This area includes for example, China, Japan, Korea, the Phillippine Islands and Samoa.
Non-Minority: Any Persons not identified in any of the aforementioned Racial/Ethnic Groups.
2 or More Races: Persons identifying as 2 or More Races.

ITEM 12 - Check the appropriate box. If the race or ethnic group information was not obtained by 1 or 2, specify by what other means this was done in 3.

ITEM 13 - Enter the dates of the payroll period used to prepare the employment data presented in Item 12.

ITEM 14 - If this is the first time an Employee Information Report has been submitted for this company, check block “Yes”.

ITEM 15 - If the answer to Item 15 is “No”, enter the date when the last Employee Information Report was submitted by this company.

ITEM 16 - Print or type the name of the person completing the form. Include the signature, title and date.

ITEM 17 - Enter the physical location where the form is being completed. Include City, State, Zip Code and Phone Number.

TYPE OR PRINT IN SHARP BALL POINT PEN

THE VENDOR IS TO COMPLETE THE EMPLOYEE INFORMATION REPORT FORM (AA302) AND RETAIN A COPY FOR THE VENDOR’S OWN FILES. THE VENDOR SHOULD ALSO SUBMIT A COPY TO THE PUBLIC AGENCY AWARDING THE CONTRACT IF THIS IS YOUR FIRST REPORT; AND FORWARD ONE COPY **WITH A CHECK IN THE AMOUNT OF $150.00 PAYABLE TO THE TREASURER, STATE OF NEW JERSEY(FEE IS NON-REFUNDABLE)** TO:

NJ Department of the Treasury
Division of Purchase & Property
Contract Compliance Audit Unit
EEO Monitoring Program
P.O. Box 206
Trenton, New Jersey 08625-0206 **Telephone No. (609) 292-5473**

FREQUENTLY ASKED QUESTIONS

WEBSITE TO OBTAIN FORMS AND LINK TO ONLINE SUBMISSION SITE:
https://www.state.nj.us/treasury/contract_compliance/

WHO SHOULD CHECK OR MONEY ORDER BE PAYABLE TO? The Treasurer, State of New Jersey

HOW TO OBTAIN A DUPLICATE CERTIFICATE: Visit the website above. Then request and pay for a duplicate certificate through the online submission system, or download the Duplicate Request Form and mail with a $75 check or money order. **NOTE:** No fee is required for a name and/or address updates.

HOW LONG DOES IT TAKE TO PROCESS FORM AA-302 AND RECEIVE CERTIFICATE OF EMPLOYEE INFORMATION REPORT? All online submissions take 5 business days to process. An email is then sent to advise the certificate is ready to print. If the Initial AA-302 is mailed it may take up to three (3) weeks. Renewal certificates may take up to two (2) weeks.

HOW LONG ARE CERTIFICATES VALID? For entities with fewer than 50 employees, the certificate is valid for 7 years. For entities with 50 employees or more, the certificate is valid for 3 years.

WHICH ADDRESS SHOULD BE USED? When using the United States Postal Service (regular mail) to deliver the AA-302 form(s) and payment, the following address must be used:

NJ Dept. of the Treasury
Contract Compliance and Audit Unit
EEO Monitoring Program
PO Box 206
Trenton, NJ 08625-0206

When using commercial delivery service such as FEDEX, UPS or other delivery services, the following address must be used:

NJ Dept. of the Treasury
Contract Compliance and Audit Unit
EEO Monitoring Program
33 West State Street, 9th Floor
Trenton, NJ 08625

FOR QUESTIONS RELATED TO CONSTRUCTION FORMS AA-201 AND AA-202: Contact the NJ Dept. of Labor and Workforce Development, Office of Diversity and Compliance, Construction EEO Monitoring Program at 609-292-9550.

HOW TO REGISTER FOR ONLINE SUBMISSION SITE: Visit the website above. Click on Online Submission – Register Now – Creating a Login link, then click on Online Submission/Payment of EEO/AA Employee Information Report link.

RECEIVED RENEWAL NOTICE – HOW DO I RENEW MY CERTIFICATE? Follow the instructions on the renewal notice. The renewal can be completed through the online submission system or download the renewal packet, complete and mail in along with the $150 processing fee.

TO OBTAIN THE STATUS OF THE CERTIFCATE: Please call 609-292-5473 and a representative will be able to assist. Please have the Federal ID or certificate number available. **NOTE:** If submitted online, the certificate takes 5 business days to process.

CAN PAYMENTS BE MADE WITH CREDIT CARDS? Only if the AA-302 form(s) are completed through the online submission system.

DO NONPROFIT ORGANIZATIONS HAVE TO COMPLETE FORM AA-302? Yes, the Employee Information Report (Form AA-302) must be completed by nonprofit organizations to ensure compliance with the EEO requirements.

WHAT DOES THE CERTIFICATE LOOK LIKE? The Certificate of Employee Information Report is yellow in color, 3 ½ X 8 ½ and your assigned certificate number in top right corner. The entity's name and address along with the effective date and expiration date are also included on the certificate. **NOTE:** If submitted online, it is the entity's responsibility to print out the certificate.

THE COMPANY HAS NO EMPLOYEES, SHOULD THE OWNER OPERATING THE BUSINESS REPORT NO EMPLOYEES OR ONE EMPLOYEE FOR THEMSELVES? A company with no employees must report the officials and managers on line #3 and line #11 (officials/managers).

PERFORMANCE 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 _____ (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:

Affix Corporate Seal

_____
Witness

_____
Print or Type Name

By: _____
Print Name:
Print Title:

Surety:

Affix Corporate Seal

_____
Witness

_____
Print or Type Name

By: _____
Print Name:
Print Title:

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 R.S.17:17-6 or R.S.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 R.S.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 P.L.1993, c.243 (C.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)

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:

Affix Corporate Seal

_____
Witness

By: _____
Print Name:
Print Title:

_____
Print or Type Name

Surety:

Affix Corporate Seal

_____
Witness

By: _____
Print Name:
Print Title:

_____
Print or Type Name

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 R.S.17:17-6 or R.S.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 R.S.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 P.L.1993, c.243 (C.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)

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 two (2) 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 two (2) 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)

AIA® Document A132® – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

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)

Princeton Public Schools
25 Valley Road, Princeton, NJ 08540

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

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

Additions and Renovations to Littlebrook Elementary School
39 Magnolia Lane, Princeton, NJ 08540

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

New Road Construction Management Co., Inc.
1876 Greentree Road, Cherry Hill, NJ 08003

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

Fraytak Veisz Hopkins Duthie, P.C.
1515 Lower Ferry Road
Trenton, NJ 08618
FVHD-5516D

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.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.
AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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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 Instructions to Bidders and the Bid Package, 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 Modifications, appears in Article 9. In the event of any conflict among the Contract Documents, the Contractor shall notify the Owner and the Architect of same and follow and comply with their interpretation of same.

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 DATES OF SUBSTANTIAL COMPLETION

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

[ ] The date of this Agreement.

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

[ ] 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 of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:

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(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

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

Portion of Work	Substantial Completion Date

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

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

[**X**] Not later than (898) calendar days from the Notice to Proceed.

[ ] By the following date:

§ 3.4.1.1 If the number of days exceeds the number of days allowed in the specifications, a deduction from the contract price or any wages paid by the Board of Education to any inspector or inspectors necessarily employed by it on the work may be permitted by Owner. All deductions of wages shall be pursuant to the provisions contained in N.J.S.A. 18A:18A-19.

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, 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 one of the following:
(Check the appropriate box.)

[**X**] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum: Section 01030 – Alternate Bids

Item	Price

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§ 4.2.2.2 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

§ 4.2.3 Allowances, if any, included in the Contract Sum: Section 01020 - Allowances
(Identify each allowance.)

Item	Price
Work not specifically shown on the Drawings, the Work shall be Performed as directed in the field	$550,000.00
Construction Manager Office expendable supplies referenced in Section 01505.	$3,000.00
Additional fabricated and erected steel as defined by and specified in Section 05120 – Structural Steel	$36,000.00 (6 tons of steel @ $6,000.00 per ton)
Allow a sum of money in the Base Bid for 10 additional Electrical outlets	
Moving outlets a distance of 10 feet before roughing without additional Cost to the Owner	$0.00

§ 4.2.4 Unit prices, if any: Section 01151 – Unit Prices
(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)	
UNIT PRICES - GENERAL CONSTRUCTION, PLUMBING AND DRAINAGE, HEATING, VENTILATING AND AIR CONDITIONING, AND ELECTRICAL: EARTHWORK			
A. Bulk Rock and Trench or Pit Rock Excavation requiring jackhammering - Per Cubic Yard. Price shall include the breaking up of the rock by other means as directed by the Architect and its removal from the site, specified for other excavated material, and shall be the price over and above the price for earth excavation.			
Unit Price for bulk rock shall be $ 300.00 per cu. yd.		$300.00	per cu. Yd.
Unit Price for trench or pit rock excavation shall be $ 400.00 per cu. yd.		$400.00	per cu. Yd.
UNIT PRICES - GENERAL CONSTRUCTION: Materials in Place. Excavation (unsuitable soil)		$	per cu. yd.
Certified, clean compacted fill		$	per cu. yd.
Bituminous Paving (including subbase)		$	per sq. yd.
Concrete Curb		$	per lin. ft.
Concrete Walk (including subbase)		$	per sq. ft.
Cement Based Self Leveling Underlayment per Section 03452		$	per sq. ft.

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Replacement of existing damaged or deteriorated metal decking	$	per sq. ft.
Replacement of existing wet or deteriorated roof insulation board	$	per sq. ft.
Replacement of existing damaged or deteriorated wood nailers/blocking or framing, including removal of existing deteriorated wood, furnishing and installing new galvanized anchor bolts, expansion bolts at 4'-0" o.c. or nails through existing construction to remain:	$	per board ft.
a. 2x4 for the above Work	$	per lin. ft.
b. 2x6 for the above Work	$	per lin. ft.
c. 2x8 for the above Work	$	per lin. ft.
d. 2x10 for the above Work	$	per lin. ft.
e. 2x12 for the above Work	$	per lin. ft.

UNIT PRICES - PLUMBING & DRAINAGE: Materials in Place.

Plumbing Item / Unit		
3” cast iron pipe below grade	$	per lin. ft.
4” cast iron pipe below grade	$	per lin. ft.
6” cast iron pipe below grade	$	per lin. ft.
2" cast iron above grade	$	per lin. ft.
3" cast iron above grade	$	per lin. ft.
4" cast iron above grade	$	per lin. ft.
2-1/2” Type ‘L’ copper tubing	$	per lin. ft.
3” Type ‘L’ copper tubing	$	per lin. ft.
2" piping insulation	$	per lin. ft.
4" piping insulation	$	per lin. ft.
1" black steel schedule 40 pipe	$	per lin. ft.
1-1/2" black steel schedule 40 pipe	$	per lin. ft.
2" black steel schedule 40 pipe	$	per lin. ft.
1" Ball valve	$	per unit
1-1/2" Ball valve	$	per unit
2" Ball valve	$	per unit
3” Ball valve	$	per unit
Thermostatic mixing valve MV-1	$	per unit
Floor drain FD-1	$	per unit
Fire Protection Item / Unit		
Sprinkler head with associated 1” branch piping (approx. 5’-0” length)	$	per unit

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UNIT PRICES - HEATING AND VENTILATING: Materials in Place.		
7/8” Type ‘L’ Copper with brazed joints (refrigerant piping)	$	per lin. ft.
1/2” Type ‘L’ Copper with brazed joints (refrigerant piping)	$	per lin. ft.
7/8” Piping insulation (refrigerant piping)	$	per lin. ft.
1/2” Piping insulation (refrigerant piping)	$	per lin. ft.
3/4” Type ‘L’ Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
3/4" Ground source piping insulation	$	per lin. ft.
1” Type ‘L’ Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
1" Ground source piping insulation	$	per lin. ft.
1-1/2” Type ‘L’ copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
1-1/2" Ground source piping insulation	$	per lin. ft.
2” Type ‘L’ Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
2" Ground source piping insulation	$	per lin. ft.
2-1/2” Type ‘L’ Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
2-1/2" Ground source piping insulation	$	per lin. ft.
3” Type ‘L’ Copper with brazed joints or Sch 40 Steel pipe, Class 150 w/ Threaded Joints (ground source water piping)	$	per lin. ft.
3" Ground source piping insulation	$	per lin. ft.
Condensate Pump	$	per unit
12" x 8" Volume Damper	$	per unit
24” x 24” Ceiling Diffuser	$	per unit
24” x 24” Ceiling Register	$	per unit
24” x 12” Ceiling Registers	$	per unit
24” x 14” Supply Grilles	$	per unit
46” x 46” Return Grilles	$	per unit

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Unitary Controller	$	per unit
Thermostat	$	per unit
Ball Valve, under 1”	$	per unit
Ball Valve, 1”	$	per unit
Ball Valve, 1-1/2”	$	per unit
Ball Valve, 2”	$	per unit
Ball Valve, 2-1/2”	$	per unit
Ball Valve, 3”	$	per unit
Balancing Valve, 1”	$	per unit
Balancing Valve, 1 ½"	$	per unit
Balancing Valve, 2”	$	per unit
Balancing Valve, 2 ½”	$	per unit
Balancing Valve, 3”	$	per unit
Galvanized Steel Ductwork (Rectangular) 20" x 12"	$	per lb.
Single-Wall Round Ductwork 12" diameter	$	per lb.
Double-Wall Round Ductwork 12" diameter	$	per lb.
1-1/2" Mineral-Fiber Board Duct Insulation (Indoors)	$	per sq. ft.
2" Mineral-Fiber Blanket Duct wrap Insulation (Indoors) $		per sq. ft.
2" Mineral-Fiber Board Duct Insulation (Outdoors)	$	per sq. ft.
UNIT PRICES - ELECTRICAL WORK: Materials in Place. 20A-1 Pole branch circuit installation 600V, including MC cable and termination.	$	per lin. ft.
20A-1 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
30A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
50A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
60A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $		per lin. ft.
70A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $		per lin. ft.
80A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $		per lin. ft.

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90A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $		per lin. ft.
100A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
150A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
200A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination.	$	per lin. ft.
20A Tamper-resistant receptacle including back box, plate, conduit and wiring to the nearest device (20')	$	per unit
20A Tamper-resistant GFCI receptacle including back box, plate, conduit and wiring to the nearest device (20')	$	per unit
20A Single pole light switch including back box, plate, conduit and wiring to the nearest device(20')	$	per unit
20A Single pole three way light switch including back box, plate, conduit and wiring to the nearest device(20')	$	per unit
Fire Alarm smoke/heat detector including wiring, programming and testing.	$	per unit
Fire Alarm duct smoke detector including wiring, programming and testing.	$	per unit
Fire Alarm Horn/strobe including wiring, programming and testing.	$	per unit
Fire Alarm monitor/control module including wiring, programming and testing.	$	per unit
Fire Alarm door holder including wiring, programming and testing.	$	per unit
Fire Alarm Pull station including wiring, programming and testing.	$	per unit
Fire Alarm Device Wire mesh device guard.	$	per unit
Junction Box and 3/4" Empty conduit with drag line and bushing at each end.	$	per lin. ft.
Junction Box and 1" Empty conduit with drag line and bushing at each end.	$	per lin. ft.
Junction Box and 2" Empty conduit with drag line and bushing at each end.	$	per lin. ft.
(1) Ceiling mounted occupancy sensor as indicated on Contract Drawings.	$	per unit
(1) Wall switch occupancy sensor as indicated on Contract Drawings.	$	per unit
Combination Voice & Data communication outlet including backbox, wall plate, conduit and Cat6 cable to IDF room.	$	per unit

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

Liquidated Damages to be assessed in accordance with the Specification requirements, Section 01800, entitled "Time of Completion and Liquidated Damages." By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. TIME IS OF THE ESSENCE. If the Contractor fails to complete his work or fails to complete a portion of his work and therefore not achieve Substantial Completion and/or Final Completion on the respective dates required, s/he shall pay the Owner, as liquidated damages and not as a penalty, ($2,000) per day, which is

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agreed upon as a reasonable and proper measure which the Owner will sustain each calendar day by failure of the Contractor to complete work within the stipulated time. Substantial Completion and Final Completion liquidated damages shall be stacked and be concurrently imposed.

ARTICLE 5 PAYMENTS

§ 5.0 No billings shall be deemed approved and certified by passage of time unless submitted in accordance with the application date as specified in Section 5.1.3 above. Moreover, if the contractor materially fails to perform in accordance with the provisions of the contract, the remedies of the Prompt Payment Act will not be applied, and failure by the Owner to act within the time allowed by N.J.S.A. 2A:30A-1 *et seq*. , resulting from the contractor's significant failure to perform, shall not constitute an implied approval of the Payment Application.

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and 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: Each Application for Payment must be accompanied by Certified Payroll Records for the period covered by the Application. The payroll records shall indicate the proper classification of employees and the payment of overtime, if any. These records shall include each Contractor's subcontractor's certified payroll. Payment will not be authorized if the required payroll records have not been submitted.

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the 25th day of a month, and provided the Application for Payment is approved, and the Owner thereafter approves the Application for Payment, the Owner shall make payment of the amount certified at the next scheduled public meeting of the Board of Education following the Owner's receipt of the Application for Payment. All payments made in accordance with the provisions herein shall comply with the New Jersey Prompt Payment Act.

§ 5.1.3 .1 The Owner will issue timely payments for those duly approved and undisputed to the contractor(s) in accordance with the requirements of the Prompt Payment Act, N.J.S.A. 2A:30A-1 et seq., as described in Section 00860.

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 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 Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment. 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 material supplier, unless such Work has been performed by others whom the Contractor intends to pay. Moreover, if the contractor fail to perform in accordance with the provisions of the contract in a significant way, the remedies of the Prompt Payment Act will not be applied, and failure by the Owner to act within the time allowed by N.J.S.A. 2A:30A-1 et seq. shall not constitute an implied approval of the Payment Application.

§ 5.1.4.2 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, which period shall be a calendar month in accordance with N.J.S.A. 40A:11-16.2. No billings shall be deemed approved and certified by passage of time unless submitted in accordance with the application date as specified in Section 5.1.3 above. 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 material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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§ 5.1.4.3.1 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 for which releases of liens have been furnished; and

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

§ 5.1.4.3.2 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 A232–2019;

.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 A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

(Paragraphs deleted

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

§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

.1 Pursuant to N.J.S.A. 18A: 18-40.3, unless indicated otherwise in the Contract Documents, if the Contractor does have a performance bond, 2% of the amount due on each partial payment shall be withheld by the Owner 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 Owner when the outstanding balance of the Contract is $500,000 or less, until final completion and acceptance of all work covered by the Contract until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3 of the General Conditions.

.2 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocable to that portion of the Work in the schedule of values, less retainage of two percent (2%) when the contract balance is over $500,000 and five percent (5%) when the contract balance is $500,000 or less. **.3** Add 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), less retainage of two percent (2% when the Contract balance is over $500,000 and five percent (5% when the contract balance is $500,000 or less**.**

.4 Retainage shall be withheld until the Owner approves the Architect's determination that the work has been satisfactorily completed and no unsettled claims exist. The final acceptance shall not be binding or conclusive upon the Owner should it subsequently discover that the Contractor has supplied inferior material or workmanship or has departed from the terms of his contract. Should such a condition appear the Owner shall have the right, notwithstanding final acceptance and payment, to cause the work to be properly done in accordance with the drawings and specifications at the cost and expense of the Contractor.

§ 5.2 Final Payment

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§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 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 A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment or as follows: The Architect will submit the final Certificate for Payment once the Contractor has satisfactorily addressed all punch-list items and requisite close-out documents, including but not limited to, the Release of Mechanic Lien claims of all sub-contractors, suppliers and other contractor(s).

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

No interest will be paid. Interest at a rate equal to the prime rate plus 1%.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as 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 Article 15 of AIA Document A232–2019.

[X] Litigation in a court of competent jurisdiction.

[ ] Other: *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction. If there are any claims or disputes, the Contractor is to submit in accordance with Article 15 as a pre-requisite to such a claim. Notwithstanding the foregoing and anything construed to the contrary, the foregoing shall only be applicable in the event that: (i) the Contractor has produced an updated Schedule prior to the alleged material delay; (ii) there are no components of the project for which the Contractor has delayed; and (iii) the alleged materially delayed component of the project affects the critical path and no other Work can continue to keep the project on schedule.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

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§ 7.1.2 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follow: No Termination Fee.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.1.1 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.

§ 8.4 The Contractor's representative shall not be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, 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 A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

(Paragraphs deleted)

§ 8.7 Relationship of the Parties

:

(Paragraphs deleted)

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit (Bond requirements are intended to comply with the Public Works Bond Act, N.J.S.A 2A:44-143-147. Any conflicting provisions are deleted and replaced with those conforming to applicable law.)

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition and its revisions.

(Paragraphs deleted)

.5 Drawings

Number	Title	Date
G001	Title Sheet and Drawing Index	10.10.2025
G002	Abbreviations and General Notes	10.10.2025
G003	Typical Details	10.10.2025
G004	Typical Details	10.10.2025
C-1.0	Existing Conditions	10.10.2025
C-2.0	Demolition Plan	10.10.2025
C-3.0	Site Layout Plan	10.10.2025

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C-4.0	Site Grading Plan	10.10.2025
C-5.0	Site Utility Plan	10.10.2025
C-6.0	Site Landscaping Plan	10.10.2025
C-7.0	Soil Erosion & Sediment Control Plan	10.10.2025
C-7.1	Soil Erosion & Sediment Control Details	10.10.2025
C-8.0	Details	10.10.2025
C-8.1	Details	10.10.2025
C08.2	Details	10.10.2025
C08.3	Details	10.10.2025
A001	Code Analysis Key Plan and Code Information	10.10.2025
A002	Egress Plan - First Floor	10.10.2025
A003	Egress Plan - Second Floor	10.10.2025
A004	Rehabilitation and Accessibility Key	10.10.2025
A005	Temp. Egress Plan - First Floor - Construction Phase 1	10.10.2025
A006	Temp. Egress Plan - Second Floor - Construction Phase 1	10.10.2025
A007	Phasing Key Plans	10.10.2025
A101	Demolition Plans - Block 'A' - First & Second Floors	10.10.2025
A102	Demolition Plan - Block 'B' - First Floor	10.10.2025
A103	Floor Plan - Block 'A' - First Floor	10.10.2025
A104	Floor Plan - Block 'A' - Second Floor	10.10.2025
A105	Floor Plan - Block 'B'	10.10.2025
A106	Reflected Ceiling Plan - Block 'A' - First Floor	10.10.2025
A107	Reflected Ceiling Plan - Block 'A' - Second Floor	10.10.2025
A108	Reflected Ceiling Plan - Block 'B'	10.10.2025
A109	Radon Ventilation Plans - Block 'A' - First & Second Floors	10.10.2025
A110	Radon Ventilation Plan - Block 'B'	10.10.2025
A111	Roof Plans, Existing Roof Warranty Information and Notes	10.10.2025
A112	Roof Details	10.10.2025
A113	Roof Details	10.10.2025
A201	Exterior Elevations	10.10.2025
A202	Exterior Elevations	10.10.2025
A203	Building Sections	10.10.2025
A301	Wall Sections	10.10.2025
A302	Wall Sections	10.10.2025
A303	Wall Sections	10.10.2025
A304	Wall Sections	10.10.2025
A305	Wall Sections	10.10.2025
A306	Wall Section	10.10.2025
A307	Wall Sections	10.10.2025
A400	Equipment Schedules, Details and Notes	10.10.2025
A401	Enlarged Plans & Interior Elevations - Administration Offices and I. T. Offices	10.10.2025
A402	Enlarged Plans & Interior Elevations - Classrooms, S.G.I. & Work Room G10	10.10.2025
A403	Enlarged Plans & Interior Elevations - Science Classrooms and Ensemble Room	10.10.2025
A404	Enlarged Plans & Interior Elevations - Music Department	10.10.2025
A405	Enlarged Plans & Interior Elevations - Cafeteria G108	10.10.2025
A406	Enlarged Plans & Interior Elevations - Multi-Purpose Room	10.10.2025
A407	Enlarged Plans & Interior Elevations - New Cafeteria	10.10.2025
A408	Enlarged Plans & Interior Elevations - Faculty Dining & Life Skills	10.10.2025
A409	Enlarged Plans & Interior Elevations – Toilet Rooms	10.10.2025
A501	Plan Details	10.10.2025
A502	Plan Details	10.10.2025

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A503	Miscellaneous Details	10.10.2025
A504	Stair and Ramp Details	10.10.2025
A505	New Canopy Enlarged Plan and Details	10.10.2025
A506	New Waste Receptacle & Walk-In Enclosure Plan, Elevations and Details	10.10.2025
A507	Millwork Details	10.10.2025
A601	Room Finish and Door Schedules, Details and Notes	10.10.2025
A602	Window, Storefront and Translucent Panel Types and Details	10.10.2025
A603	Door Head & Jamb Details, Saddle Details	10.10.2025
A701	Floor Finish Plans	10.10.2025
A702	Floor Finish Plans	10.10.2025
A703	Floor Finish Plans	10.10.2025
S101	Foundation Plan Block 'B'	10.10.2025
S201	Roof Framing Plan Block ‘B’	10.10.2025
S202	Block - A Roof Framing Plan	10.10.2025
S301	Sections	10.10.2025
S302	Sections	10.10.2025
S303	Sections	10.10.2025
S401	Typical Details / General Notes / Schedules	10.10.2025
P1.0	Plumbing, Symbols, Notes & Schedules	10.10.2025
P2.0	Plumbing Demolition Plan - Block C	10.10.2025
P3.0	Plumbing Underslab Piping Plan - Block A	10.10.2025
P3.1	Plumbing Underslab Piping Plan - Block B	10.10.2025
P3.1	Plumbing Underslab Piping Plan - Block C	10.10.2025
P4.0	Plumbing First Floor Plan – Block A	10.10.2025
P4.1	Plumbing First Floor Plan - Block B	10.10.2025
P4.2	Plumbing First Floor Plan - Block C	10.10.2025
P5.0	Plumbing Roof Plan - Block A	10.10.2025
P5.1	Plumbing Roof Plan - Block B	10.10.2025
P6.0	Plumbing Part Plans	10.10.2025
P7.0	Plumbing Sanitary Riser Diagram	10.10.2025
P7.1	Plumbing Storm and Gas Riser Diagram	10.10.2025
P8.0	Plumbing Details	10.10.2025
M1.0	Mechanical Symbols, Notes & Abbreviations	10.10.2025
M2.0	Mechanical Demolition Plan - Block A	10.10.2025
M2.1	Mechanical Demolition Plan - Block C	10.10.2025
M2.2	Mechanical Demolition Plan – Block A	10.10.2025
M2.3	Mechanical Roof Demolition Plan - Block C	10.10.2025
M3.0	Mechanical New Ductwork Plan – Block A	10.10.2025
M3.1	Mechanical New Ductwork Plan – Block B	10.10.2025
M3.2	Mechanical New Ductwork Plan – Block C	10.10.2025
M4.0	Mechanical New Piping Plan – Block A	10.10.2025
M4.1	Mechanical New Piping Plan – Block B	10.10.2025
M4.2	Mechanical New Piping Plan - Block C	10.10.2025
M5.0	Mechanical Roof Plan – Block A	10.10.2025
M5.1	Mechanical Roof Plan – Block B	10.10.2025
M5.2	Mechanical Roof Plan - Block C	10.10.2025
M6.0	Mechanical Schedules	10.10.2025
M6.1	Mechanical Schedules	10.10.2025
M7.0	Mechanical Details	10.10.2025
M7.1	Mechanical Details	10.10.2025
M7.2	Mechanical Details	10.10.2025
M7.3	Mechanical Details	10.10.2025
M7.4	Mechanical Details	10.10.2025

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.7 Addenda, if any:

Contract Conditions and General Requirements		In Full

Number	Date	Pages

None at this time, but subject to change.

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:

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Part 1	Contract Conditions and General Requirements		In Full

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.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 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.)

Proposal, dated
Exhibit B

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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AIA® Document A132® – 2019 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)
Additions and Renovations to Littlebrook Elementary School
39 Magnolia Lane, Princeton, NJ 08540

THE OWNER:
(Name, legal status, and address)

Princeton Public Schools
25 Valley Road, Princeton, NJ 08540

THE CONTRACTOR:
(Name, legal status, and address)

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 A232™–2019, General Conditions of the Contract for Construction. Article 11 of A232™–2019 contains additional insurance provisions

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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 A232™–2019, General Conditions of the Contract for Construction.

(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 coverage, including coverage for completed operations, shall be submitted with the final

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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. If the Contractor fails to maintain any insurance required hereunder, then, in addition to all other remedies given to the Owner in case of the breach of any conditions or covenants of this Contract, the Owner may (but shall not be obligated to) secure or pay the premium for any such policy or policies and charge the Contractor therefor the cost of such premiums.

§ 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. Such deductibles or self-insured retentions shall be subject to the Owner's approval. The Contractor shall be responsible for all loss not covered because of such deductibles or retentions.

§ 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, and the Construction Manager and the Construction Manager'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, and the Construction Manager and the Construction Manager'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 statue 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.3.1.4 All insurance shall contain a waiver of subrogation against the Owner.

§ 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, and charge the Contractor therefor the cost of such premiums plus fifteen percent (15%) as an administrative fee to the Owner, 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 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.

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§ 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 ten million dollars ($ 10,000,000.00) each occurrence, ten million dollars ($ 10,000,000.00) general aggregate, and ten million dollars ($ 10,000,000.00) 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 and their Consultants, Agents and Employees as additional insured.

§ A.3.2.2.2 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 of project location 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,

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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.3.2.13 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** If there is only one Contractor performing the Work on the Project, 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.)

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[ ] **§ 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**

§ 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
Maintenance Bond	Amount equal to the Contract Sum or as otherwise provided in the Contract Documents

§ 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, 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.

.2 Surety further agrees that in the event of any default by the Owner in the performance of

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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:

None.

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PART 1 - CONTRACT CONDITIONS AND GENERAL REQUIREMENTS

SECTION 00700 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, Construction Manager as Adviser Edition, AIA DOCUMENT A232 – 2019

AIA® Document A232® – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)
Additions and Renovations to Littlebrook Elementary School
39 Magnolia Lane, Princeton, NJ 08540

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)
New Road Construction Management Company, Inc.
1876 Greentree Road, Cherry Hill, NJ 08003

THE OWNER:
(Name, legal status, and address)

Princeton Public Schools
25 Valley Road, Princeton, NJ 08540

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

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

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 Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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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. Unless specifically enumerated in the Agreement, the Contract Documents shall include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.

§ 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 the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their 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 competition of the Work in full compliance with all applicable codes, laws, ordinances and regulations and that questions regarding the bid documents and any interpretation(s) regarding same have been asked by the Contractor, in the form and manner required in the instructions to bidders.

§1.1.2.2 In connection therewith, Contractor specifically represents and warrants to Owner that it has, by careful examination, satisfied itself as to: (1) the nature, location, and character of the general area in which the Project is located, including without limitation, its climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; and (2) the quality and quantity of materials, supplies, tools, equipment, labor, and professional services necessary to complete the Work in the manner and within the cost and time frame required by the Contract Documents; and (3) the condition of existing and planned structures on the site and the ability, safety and appropriateness of same to receive the Work in the manner required by the Contract Documents.

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

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 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.

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§1.1.7.1. Construction Drawings prepared by the Architect are intended to show the scope of work, including but not limited to general arrangement of stairs, equipment, ducts, piping and other elements of the structure, and approximate locations and sizes of equipment. This does not relieve the Contractor from providing all connections and accessories necessary to make structural, mechanical and electrical work complete, ready to operate, in compliance with all applicable codes, laws and other regulations, and acceptable to the Architect. As such, they are not to serve as Shop Drawings.

§1.1.7.2 Locations and arrangements of items are designated by dimensions at less than full scale, unless otherwise noted. Such reductions of scale may vary and will be noted.

§1.1.7.3 Designs, information, reports and other materials and/or data may be performed and/or provided for the project by other than the Architect. Such designs, information, reports and other materials and/or data may include, without limitation, designs, information, reports and other materials and/or data performed and/or provided by the Contractor(s) or by Subcontractors and/or other consultants retained by the Contractor(s) and/or the Owner. Such designs, information, reports and other materials and/or data may include without limitation the locations, quantities, sizes, conditions and scope of specific items of the construction Work required to be provided for the Project. The Contractor shall immediately notify the Construction Manager and Architect in writing upon its discovery or knowledge of any errors, omissions or defects in any designs, information, reports and other materials and/or data prepared or provided by the Contractor or on the Contractor's behalf which are provided to the Architect for the Architect's preparation of its design documentation for the Project. The Contractor shall also be required to immediately notify the Architect in writing in the event that it discovers or becomes aware of any errors, omissions or defects in any designs, information, reports or other materials or data that are provided to the Architect by others for the preparation of the Architect's design documentation. The Contractor shall also be required to immediately notify the Construction Manager and Architect in writing if it discovers or becomes aware of any discrepancies between any design documentation prepared by the Architect and any designs, information, reports or other materials and/or data provided to the Architect by the Contractor(s), the Owner, Subcontractors or Subconsultants retained by the Contractor(s) or Owner, or by others. In such event, the Contractor shall promptly submit a written request for resolution of such discrepancy to the Architect and Owner.

§ 1.1.8 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.

§ 1.1.9 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.

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

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

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

§1.2.3.1 In the event of a conflict or an inconsistency in or among the Contract Documents, or between the Contract Documents and applicable codes in effect at the time the Contract Sum is bid or negotiated, the Contractor shall, unless directed otherwise in writing by and Addendum or Change Order, provide the greatest quantity, highest quality, highest degree of safety and most stringent material, equipment or Work.

§ 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. Any information or data obtained or derived from electronic files to create shop drawings or other submissions must be compared with the hard paper Construction Documents issued by the Architect for construction. Use of electronic documents for any reason is at the user's sole risk.

§ 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

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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 may 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 Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.2 Evidence of the Owner's Financial Arrangements

(Paragraphs deleted)

§ 2.3 Information and Services Required of the Owner

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

§ 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 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 If necessary and requested by the Architect, the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. The furnishing of these surveys and the legal description of the site shall not relieve the Contractor from its duties under the Contract Documents. Neither the Owner nor Architect is required to provide subsurface information. Any such investigations were for their own purposes and are not part of the Contract Documents. If shared, this information is for convenience only and without warranty.

§ 2.3.6 If necessary and requested by the Architect, the Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

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§ 2.4 Owner's Right to Stop the Work

If, in the reasonable belief of the Owner, the Contractor fails to correct alleged defective 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, or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, though, or under Contractor, or disregards the instructions of Architect or Owner when based on the requirements of 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, and the Contractor shall have no claim for damage by reason thereof.

§ 2.4.1 Notwithstanding the foregoing, the Owner shall have the authority to immediately correct, service, repair, replace or otherwise make operational any component of their facilities, including equipment, if, in the sole discretion of the Owner, the damaged component is a threat to education, safety, or security. The Owner is obligated to notify the Contractor of the issue threatening education, safety or security, and the Owner's intent to remedy immediately with other resources, backcharging the Contractor for the cost of said service. However, there is no obligation to provide the Contractor an opportunity to cure, as required for corrective actions necessary to protect the Owner's interest in education, safety, and security.

§ 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 (i) 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, or (ii) Owner and Architect reasonably believe that such correction cannot be properly completed within a twenty-day period, 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 review by the Construction Manager and prior approval of the Architect, and the Construction Manager or 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 Construction Manager's and Architect's and their respective consultants' 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 as approved by the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15. Notwithstanding the above, if deficiencies create an emergency threatening safety or property, the Owner may immediately correct the issue without prior notice, and deduct related costs from payments due the Contractor. This right does not relieve the Contractor of its obligations, nor does it impose any duty on the Owner to act for the benefit of the Contractor or others.

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 Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. The Contractor has carefully examined the Plans, Specifications, and the site of the work, and based on their own investigations, the Contractor has satisfied themselves

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regarding 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, the general local conditions, and all other materials that may in any way affect the work or their performance.

§ 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 2.3.5, 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. 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. 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 Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and 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. If the Contractor performs any construction activity involving an error, inconsistency, nonconformity, or omission in the Contract Documents – which the Contractor either recognized or reasonably should have recognized – and fails to notify the Architect, the Contractor shall assume complete responsibility for such performance, including the full amount of attributable costs for correction and any damages to Owner, Architect, Owner's Representative, or Separate Contractors arising from that work. The Contractor may not be liable to the Owner for damage resulting from errors, inconsistencies or omissions in the Contract Documents that could not have been discovered by a prudent and experienced Contractor in advance and that are not in the nature described in and intended to be covered in the Contract Documents, unless the Contractor recognized or reasonably should have recognized such error, inconsistency or omission and failed to report it to the Architect. If the Contractor proceeds with construction activities involving such recognized or reasonably recognizable errors, inconsistencies, or omissions without notifying the Architect, the Contractor shall assume full responsibility for such work and bear all associated costs for correction.

§ 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 Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require. Notwithstanding the foregoing, as an inducement for the Owner to execute the Owner-Contractor Agreement, the Contractor represents and warrants to the Owner (in addition to the other representations and warranties contained in the Contract Documents) that they are familiar with local ordinances and applicable building codes affecting the Work, and these representations and warranties shall survive the execution and delivery of the Owner-Contractor Agreement and the final completion of the Work.

§ 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 their 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 of Sections 3.2.2. or 3.2.3, 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, unless the Contractor recognized or should have recognized such error, inconsistency, omission or difference and yet knowingly failed to timely report it to the Architect.

§3.2.4.1 The General Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

§3.2.4.2 Should the General Contractor elect to release work without approvals, same shall be at his/her own risk and expense. Such work, if it is determined by the Architect and Construction Manager to not be in accordance with the requirements of the Contract Documents, shall be removed and replaced without additional cost or extension of time.

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§ 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, the Construction Manager, and the 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. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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

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

§ 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, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive. The Owner may back charge the Contractor for expenses incurred due to the Contractor's error, act, omission, or noncompliance, with deductions made from payments due. The Contractor has 30 days to dispute a back charge; failure to do so constitutes acceptance and waiver of any objection.

§ 3.4.3 The Contractor shall maintain sufficient skilled workers on site at all times, as determined by the Contractor to perform the Work in the timeframe specified, with all Work supervised by a qualified Project Superintendent. 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. The Contractor shall also at all times use best efforts and its judgment as an experienced General Contractor to adopt and implement policies and practices which are designed to avoid work stoppages, slowdowns, disputes or strikes; and shall at all times use best efforts to maintain project-wide labor harmony. The Owner reserves the right to require the Contractor to remove from the Project any of its personnel, or Subcontractor's personnel, for violating Owner's policies, rules or regulations.

§3.4.5 All materials delivered to the premises which are to form a part of the work are to be considered the property of the Owner and must not be removed without the Owner's consent. Materials not incorporated into the work shall become the Contractor's property and must be removed from the Project Site at or prior to Substantial Completion, unless other arrangements are made with the Owner.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, 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

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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 Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor's maintenance warranty shall be at least 2 years from Substantial Completion and shall not reduce any Manufacturer's Warranty period.

§ 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 represents that all manufacturer and supplier warranties shall run directly to or be specifically assignable to the Owner. The Contractor warrants that all portions of the Work that will be covered by a manufacturer's or supplier's warranty shall be performed in such a manner so as to preserve all rights under such warranties. The Contractor hereby assigns to the Owner, effective upon the termination of this Contract, all manufacturer's and supplier's warranties relating to the Work; and the Contractor shall, upon request of Owner, execute any documents reasonably requested by Owner to effectuate such assignment. If the Owner attempts to enforce a claim based upon a manufacturer's or supplier's warranty and such manufacturer or supplier refuses to honor such warranty based in whole or in part on a claim of defective installation by the Contractor, the Contractor shall be responsible for any resulting loss or damages incurred by the Owner as a result of the manufacturer's or supplier's refusal to honor such warranty. The Contractor's obligation under this Subparagraph 3.5.3 shall survive the expiration or earlier termination of the Contract.

§ 3.5.4 The Contractor agrees that all warranties in the Contract Documents survive acceptance of, delivery of and payment for the goods, whether any defect shall be latent or patent. The Contractor agrees to correct, without expense to, and to the satisfaction of the Owner, any defects that may develop in the Work. Any facilities, including buildings and their contents, which have been damaged either directly or indirectly by the Work performed by the Contractor shall be repaired within ten (10) working days after receipt of written notice of the defect from the Owner by the Contractor at no cost to the Owner.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof 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 Contractor shall secure and pay for the building permit. The Contractor shall secure and pay 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.

§ 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. The Contractor shall arrange for any inspections by governmental authorities needed to obtain any necessary occupancy permits.

§ 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 Prior to application for final payment, furnish a written certification that the Work is in conformance with applicable laws, ordinances, rules, regulations and lawful orders.

§ 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, Construction Manager, and the Architect before conditions are

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disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, 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, in consultation with the Construction Manager, 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, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either 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, Construction Manager, 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, and in a manner consistent with N.J.S.A. 5:34-9.2, 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; 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..

§ 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 competent superintendent and necessary assistants, acceptable to the Owner and Architect, who shall be in attendance at the Project site during performance of the Work, and until the final completion of all work, including all corrections 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.

§ 3.9.1.1 The Contractor must provide a Superintendent for the project and a Foreman at each site during all work, including by subcontractors, ensuring adequate supervision. If supervision is deemed insufficient, the Contractor must add staff at no extra cost.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within ten (10) days of receiving the Notice to Proceed, the Contractor shall submit resumes for the proposed project manager and full-time superintendent, including at least three similar recent projects with Owner and Architect contact information for each. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, 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.

§3.9.4 The Contractor shall immediately remove from the Project, whenever requested by the Owner or Construction Manager, any employee, Project Manager or Superintendent who is considered by the Owner or Construction Manager to be incompetent or disposed to be disorderly, or who, for any reason, is not satisfactory to the Owner and the Project. The replacement shall be at no additional cost, and that person shall not be employed on the Project again without the consent of the Owner or Construction Manager.

§ 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, and the Construction Manager's use in developing the Project schedule, 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. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 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 Construction Manager's and Architect's approval. The Architect and Construction Manager'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 Construction Manager and 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 participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 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 Construction Manager, Architect, and Owner, and delivered to the Construction Manager 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.

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§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are 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 Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, 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 reviewed and 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 Construction Manager and 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 Construction Manager and 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, the Architect, and the Construction Manager 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

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submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.10.3 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.12 Substitutions – All substitutions or deviations must be clearly noted on shop drawings. The Contractor is responsible for coordinating and covering any additional requirements, including change orders and extra work by other trades. Substitution requests must be submitted with 30 days of Notice to Proceed and should include a credit change order.

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§**3.13.3** The Contractor shall send proper notices, make all necessary arrangements and perform all other services required in order to protect and maintain all marked, identified or known public utilities such a fire lines and plugs, electric, gas, water lines, sewer pipes, mechanical systems and all other items of this nature, and assume all responsibility and pay all costs for which the Owner may be liable if said services are interrupted by actions of the Contractor or Subcontractors . The Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked, and Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked and that Contractor has taken all reasonable precautions to identify all known and unknown utilities or other infrastructure. Only materials and equipment needed for the Work may be stored on site and must be removed when no longer needed. The Contractor is solely responsible for protecting stored items. No signs may be posted without Owner and Construction Manager approval. The Contractor must maintain safe access, keep adjacent areas clear of debris, and minimize disruption. Workers may use only designated facilities and must follow all Owner rules, insurance, and labor agreements. Any issues complying must be reported in writing with alternatives for Owner review.

§ 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, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, 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

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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, or Construction Manager with the Owner's approval, 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, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§3.16.1 The Contractor shall keep only necessary equipment on-site and shall cooperate with the Construction Manager regarding the location of stored material. No Contractor shall unreasonably encumber the Project site (or building) with equipment and stored material, and they shall afford other contractors a reasonable opportunity for the introduction and storage of their materials and the execution of other work.

§ 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, Construction Manager, 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, Architect, or Construction Manager. 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 through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and 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), to the extent caused by the actual or alleged negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts in accordance with the New Jersey Tort Claims Act and the New Jersey Contractual Liability Act. The Contractor shall prevent any mechanics or other liens against the Project. If a lien is filed or served, the Contractor must have it discharged within 20 days or, if contesting in good faith, provide security to prevent foreclosure. The Owner may withhold payments sufficient to protect against the lien.

§3.18.3 The Contractor's indemnity obligations under this Section 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees) and punitive damages (if any) arising out of, or in connection with, and (i) violation of or failure to comply with any law, statute, ordinance, rules, regulations, code or requirement of a public authority that bears upon the performance of the Work by the Contractor, a Subcontractors or any person or entity for whom either is responsible, (ii) means, methods procedures, techniques or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fees, approvals, licenses and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor, Subcontractors or any person or entity for whom either is responsible.

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§3.18.4 The Contractor has determined what local ordinances, if any, will accent his work. The Contractor 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 local controlling agencies are not listed specifically in the Contract Documents.

§3.18.5 If the Contractor makes any significant changes to the form, type, system, or details from the Drawings — due to approval of substitute equipment or otherwise —they shall pay all related costs, including architectural and engineering review fees. All changes require prior written approval from the Architect. The Contractor must reimburse the Owner for site visit or redesign costs caused by the Contractor's fault or deficiencies.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 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 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and 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 reasonably informed 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. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule to maintain all completion dates. Adherence to provided direction is required.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and 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, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work. No claims by any

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Contractor for delay or cost will be entertained if the Owner determines that said Contractor and their Subcontractors have been uncooperative with the Construction Manager.

§ 4.2.6 Communications. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager 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 Construction Manager 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 other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 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. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5,

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and 3.12. The Construction Manager and 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.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 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 Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.19 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 so rendered in good faith.

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

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request 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.

§ 4.2.22 The Architect has final say on material or equipment substitutions and may waive specifications, accept superior alternatives, or require specified products. The Contractor must submit credit proposals and may be responsible for review costs. Approval does not relieve the Contractor of responsibility for the work, guarantees, or necessary related modifications.

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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 other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 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 15 days after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager 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 Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager 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, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

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

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

§ 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, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager 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. The Contractor shall obligate each Subcontractor to comply with the Public Works General Contractor Registration Act of the State of New Jersey.

§ 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

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.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.

§ 5.4.4 When the Contractor sublets any Work, full responsibility for dividing, managing, coordinating, and inspecting the Work remains with the Contractor. The Owner and Architect are not responsible for disputes between the Contractor and Subcontractors; the Contractor must resolve any such issues affecting the project's progress, quality, or completion at no cost to the Owner.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 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 the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them. Owner or separate contractor actions alone don't justify delay or cost claims. Extensions or costs apply only if delays result from: (1) Owner's bad faith, willful misconduct, or fundamental breach (documented and timely); (2) unforeseen, unmitigable delays by separate contractors; or (3) delays indicating Owner's intentional contract abandonment. Minor or typical construction delays don't qualify.

§ 6.1.3 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's own forces, Separate Contractors, Construction Manager and other 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's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and 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 or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable. If the Contractor incurs cost or damage due to the failure of another Separate Contractor(s) to perform their contract with the Owner, no action can be taken against the Owner. The Owner bears no liability for such

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damages. Instead, the Contractor may assert its claim for damages against the Separate Contractor responsible as a third-party beneficiary under the Contract between the other Contractor and the Owner.

§ 6.2.3 Costs from delays, mis-timed work, or defects are the sole responsibility of those at fault. The Owner, Construction Manager, and Architect are not liable for any contractor claims or damages from delays. The only remedy for delay against the Owner is an extension of time to complete the work.
§ 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, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors 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, other 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, or if the Contractor refuses to clean up debris, the Owner may, after 24 hours written notice, clean up. The Construction Manager, with notice to the Architect, will allocate the cost among those responsible as the Owner determines to be just.

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.

§7.1.1.1 When submitting its change proposal, the Contractor shall include and set forth in clear and precise detail breakdowns of labor and materials for all trades involved and the estimated impact on the construction schedule, based upon an impact analysis of the current schedule. The Contractor shall furnish spreadsheets from which the breakdowns were prepared, plus spreadsheets, if requested, of any Subcontractor. Agreement on a Change Order fully settles all related costs and schedule adjustments. No compensation is allowed for work or delays outside the Change Order, and the Contractor is not entitled to lost profits, consequential, or incidental damages.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor, however, the Contractor is obligated to perform and shall in no case refuse to perform. 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

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, 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 Construction Manager and signed by the Owner, Construction Manager 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.

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

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, 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 Contract must proceed diligently with the disputed work. The Construction Manager 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 Construction Manager 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 Construction Manager and 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; and

.4 Costs of supervision and field office personnel directly attributable to the change, provided there's documented evidence of hours and tasks. Claims require prior written approval and detailed supporting documentation, subject to the Architect's review..

§ 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 Construction Manager 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.

§ 7.3.7 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 Construction Manager and 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 Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The 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 Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the

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adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 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. The increased contract unit price shall not apply to quantities scheduled under the contract for delivery before the effective date of the increased contract unit price, unless failure to deliver before that date results from causes reasonably beyond the Contractor's control and without his or her fault or negligence.

§ 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 Construction Manager 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 Construction Manager 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 of twenty-four (24) hours, beginning at 12:00 midnight, unless otherwise specifically defined. The term "working day" (or "business day") shall mean any calendar day except Saturdays, Sundays and legal holidays at the place of the Project. A time limit ending on a weekend or holiday shall be automatically extended to the succeeding working day.

§ 8.1.5 The Contract Time shall commence as of the date of the Notice to Proceed unless otherwise specified in the Agreement. However, the Work to be performed under this Contract shall not commence until the required insurance has been obtained or approved. The date shall not be postponed by the failure to act by the Contractor or of persons or entities for whom the Contractor is responsible.

§ 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. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. If the Contractor reasonably anticipates, or reasonably should anticipate the potential impact of a delay on the progress of the Work, or if the Work has not progressed to the extent required to maintain the Project Construction Schedule for reasons unrelated to Contractor's entitlement to any extension of the Contract Time under the Contract Documents, and it is reasonably unlikely that the Work will be Substantially Complete by the required date, then the Construction Manager and/or the Owner shall have the right to order Contractor to increase manpower, work hours, and equipment necessary to maintain the Project Construction Schedule ("Acceleration Measures"), and shall be without additional cost or charge to the Owner.

§8.2.4 The Construction Manager, in coordination with the Contractor, will set work hours. The Contractor will be required to work nights, weekends or holidays as necessary to complete the work in accordance with the Schedule.

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NOTE: Standard work hours for this project may be affected by local Noise Ordinance. The Contractor shall be responsible to adhere to the Noise Ordinance, including night, weekend and holiday work. All utility shut downs, interruptions and work in or adjacent to an existing building will be coordinated through the Construction Manager and may have to be performed during hours when the facility is not in operation. All costs associated with this Article 8.2.4 are the responsibility of the Contractor and shall not be considered additional costs to the Owner.

§ 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) a deliberate, willful and malicious act or gross neglect of the Owner, Architect, Construction Manager; (2) by material changes ordered in the Work; (3) by fire, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's reasonable control not due to its fault or negligence, and which could have been prevented or avoided by the affected Party through the exercise of reasonable due diligence; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine. Claims against the Owner for delay costs by another Prime Contractor are subject to Section 8.3.3.

§8.3.1.1 Where the cause of delay is due to the 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 extreme low temperature) for the past five (5) years for the month in question, plus twenty (20) percent. In other words, weather is not deemed to be unusually severe unless it is twenty (20) percent worse that the average for that month over the last five (5) years.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. An extension of time will only be granted if delays affect the Contract Completion Date. Incidental delays that use float do not qualify. The Construction Manager may require a time impact analysis to validate and extension.

§ 8.3.3 No payment or allowance of any kind or extension of time shall be made to the Contractor as compensation for damages on account of hindrance or delay from any cause in the progress of the Work, when the Architect determines the delay to be: (i) avoidable, (ii) caused by the Contractor's negligence or intentional misconduct in whole or in part, (iii) attributed to the Contractor's fault (in whole or in part) for the delay, including but limited to any delay attributable to lack of coordination or cooperation by or between the Contractor and his Subcontractors; (iv) caused by Owner unless based on a sustainable and valid claim of Owner negligence or intentional act; or (v) the result of any reason contemplated by the parties at the time of execution of this Agreement. The Contractor's only remedy for approved delays is a time extension per Section 8.3, equal to the delay period. The Owner and Architect are not liable for any losses or increased costs due to such delays. If the Contractor sues the Owner or Architect over delay costs and does not substantially prevail, the Contractor must reimburse their legal and related fees.

§ 8.3.4 The Contractor shall not be entitled to make a claim for delay (regardless of the cause of the delay) unless within two (2) business days after the beginning of such delay or delays, the Contractor files a written request providing notification of the delay (including specific explanation as to the cause) with the Architect, Construction Manager and Owner. In case of a continuing cause of delay, only one request is necessary.

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. This Article shall be in compliance with the Prompt Payment Act under N.J.S.A. 2A:30A-1, et seq. and the retention procedures established in N.J.S.A. 18A:18A-1, et seq.

§ 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 Construction Manager, 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

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by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. Each item shall show its total scheduled value, value of previous applications, value of the application, percentage completed, value completed and value yet to be completed.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager 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, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 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 Construction Manager and 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. Where the Contract Documents permit payment for materials stored off the Project site, the Contractor shall procure insurance covering the full value of the material and, in addition to the other requisites of the Contract Documents, shall make any other provisions necessary to ensure and protect Owner's title and right of possession and access to such materials. 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 reasonably-incurred costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work and stored materials 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, be free and clear of liens, claims, security interests, or encumbrances whatsoever, that the vesting of such title shall not impose any obligation on Owner or relieve the Contractor of any of its obligations under the Contract, that the Contractor remains responsible for damages or loss to the Work until the Owner accepts responsibility per the Contract Documents, and no Work covered by a Payment Application is subject to any seller's retained interest or encumbrance.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven (7) days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven (7) days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

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§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven (7) days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager'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, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation 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, or Contractors are, 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 the results of subsequent tests and inspections, to the correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect and Owner.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 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 Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or 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. The Owner retains all rights to verify and challenge any payment or work quality discrepancies despite the issuance of such certificates.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. To the extent allowable by the Prompt Payment Act, N.J.S.A. 2A:30A-2(a), the Construction Manager or 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 or Project Certificate for Payment previously issued, to such extent as

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may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the 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 reasonably avoidable delays or 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 or other 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; as permitted by the Prompt Payment Act; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.
.8 failure to maintain the site in a safe and satisfactory manner in accordance with construction practices as determined by the Owner or Architect;
.9 any labor strike or labor disruption whatsoever which impacts the progress of the Work;
.10 claims made or likely to be made against the Owner or its property;
.11 loss caused by the Contractor or its Subcontractors;
.12 failure of the Contractor to correctly and accurately represent the Work performed in a payment request;
.13 the Contractor's failure to use funds previously paid to the Contractor to pay Project-related obligations;
.14 failure to update the Schedule(s);
.15 failure to maintain Record Drawings;
.16 deliberate delay in the submission for approval of names of Subcontractors, materialmen, sources of supply, product date, shop drawings and samples; or
.17 otherwise failure 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. If the Contractor disputes any determination of the Architect with respect to any Applications for Payment, the Contractor shall nevertheless continue to diligently prosecute the Work. In no event shall the General Contractor stop Work, except pursuant to Paragraph 9.7 hereof.
§ 9.5.3 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default of the Contract by reason of withholding payment while any of the above grounds remain uncured.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, 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 Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments
§ 9.6.1 After the Architect has issued a Certificate for Payment or Project 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 Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, within 10 days, in accordance with N.J.S.A. 2A:30A-2(b), 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 Construction Manager 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 Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

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§ 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, Construction Manager 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 material and equipment 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 Provided the Owner has met its payment obligations, the Contractor shall indemnify and defend the Owner against any loss, liability, or expense, including attorney's fees, from lien claims or payment claims by any Subcontractor or supplier. Upon notice of such a claim, the Owner will notify the Contractor. With court approval when required, the Contractor may substitute a surety bond for the property subject to the claim.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue an approved Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not, for reasons other than a default of the Contract, including but not limited to those defaults set forth elsewhere in this Contract, pay the Contractor the certified and approved amount within 14 days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager 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.

§9.7.1 If the Owner is entitled to reimbursement or payment from the Contractor pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor, including costs paid to other Contractors as a result of the Contractor's performance, or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use; provided, however, that as a condition precedent to Substantial Completion, the Contractor shall deliver to the Architect, with a copy to the Owner, all final and unconditional certificates of occupancy and any other permits or approvals necessary for Owner to occupy the entire Project or designate portions thereof.

§9.8.1.1 Substantial Completion shall not be achieved prior to the issuance of the Certificate of Occupancy issued by the state or local authority having jurisdiction.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in strict accordance with the Contract Documents.

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.1 No later than (10) ten calendar days prior to date scheduled for Substantial Completion the Construction Manager and/or Owner may add additional items requiring completion or correction.

.2 The Contractor shall immediately proceed with the Work required by the Punchlist 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 or Construction Manager so determines and directs the Contractor to do so, the Contractor shall request the Construction Manager's final inspection to determine Substantial Completion. 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. Additionally, the Contractor shall prepare and submit to the Architect and Owner a comprehensive final Punchlist of any and all items remaining to be completed or corrected (whether or not included on any previous Punchlists).

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, 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 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, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, 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.

§9.8.6 The Architect's Certificate of Substantial Completion shall be subject to the Owner's final approval.

§ 9.8.7 In no case shall the time established for the completion and correction of items on the list extend beyond thirty (30) days after Certification of Substantial Completion, except for delay beyond the Contractor's reasonable control. The Contractor shall pay for all architectural and consultant services incurred thereafter due to the failure of Contractor to complete and / or correct the Work on the list or to submit documentation and items required for final completion and final payment. Payment for additional architectural and consultant services shall be deducted from the Contract amount.

§ 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 and Construction Manager shall jointly 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 after consultation with the Construction Manager.

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§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their 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 Construction Manager's and Architect's final Certificate for Payment or Project 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. All warranties and guarantees required under or pursuant to the Contract Document shall be assembled and delivered by the Contractor to the Architect as part of the final Application for Payment. The final Certificate for Payment will not be issued by the Architect or Construction Manager until all warranties and guarantees have been received and approved by the Architect and Construction Manager.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (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; and (7) evidence of compliance with all requirements of the Contract Documents: notices, certificates, affidavits, other requirements to complete obligations under the Contract Documents: including but not limited to (a) instruction of Owner's representatives in the operation of mechanical, electrical, plumbing and other systems, (b) delivery of keys to Owner with keying schedule: master, sub-master and special keys, (c) delivery to Architect of Contractor's General Warranty and each written warranty and assignment thereof prepared in duplicate, certificates of inspections, and bonds for Architect's review and delivery to Owner, (d) delivery to Architect a printed or typewritten operating, servicing, maintenance and cleaning instructions for all Work; parts lists and special tools for mechanical and electrical Work, in approval form, (e) delivery to the Architect of specified Project record documents and (f) delivery to Owner of a Final Waiver of Liens (AIA Document G-706 or other form satisfactory to Owner), covering all Work including that of all Subcontractors, vendors, labor, materials and services, executed by an authorized officer and duly notarized. In addition to the foregoing, all other submissions required by other articles and paragraphs of the Specifications including final construction schedule shall be submitted to the Architect before approval of final payment.

§ 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 Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and

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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 through the Construction Manager 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 its 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 of 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 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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§10.1.1 The Contractor's attention is particularly directed to the governing agencies (State, Federal and Municipal, or other requirements) regarding reporting of accidents involving injury, loss of life and property damage.

§10.1.2 The Contractor will serve as the overall Project Safety Coordinator and shall be responsible for all issues of safety and protection. The Contractor, if applicable, shall also designate a safety person at the job site from notice to proceed to Contract completion. The designated safety person shall be responsible for the safety of their work and for their workers, and to make continuous inspections for all safety issues relating to his work. The Owner and their representatives, including but not limited to the Architect, the Construction Manager and the Owner's representative, are not responsible for safety on this project , but will endeavor to promote safety. The Contractor must comply with job Safety Requirements in addition to OSHA and local agency requirements. Failure to comply with safety issues will be ground for withholding of payments.

§ 10.1.3 The Contractor shall also insure that all of its Subcontractors follow its safety program and that this requirement is included in Contractor/Subcontractor Agreements. The Contractor should defend and indemnify Owner, Architect and Construction Manager for any damages or injuries arising for the failure of the Contractor to follow and/or enforce the safety program.

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§ 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;

.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; and

.4 construction or operations by the Owner, Separate Contractors, or other Contractors.

.5 the general public

§ 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, consistent with applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities, and prevailing industry practice.

§ 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. In all cases, the Contractor shall give the Owner reasonable advance notice.

§ 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, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4. 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, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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, Construction Manager 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. The Contractor shall provide and maintain adequate fire protection equipment, comply with reasonable recommendations from the fire insurer or local fire authorities, keep the site orderly, and promptly remove combustible rubbish.

§ 10.2.9 The Contractor shall protect excavations, trenches, buildings, and materials from water of any kind and promptly remove any accumulation, providing and operating all necessary pumps, piping, and equipment.

§ 10.2.10 The Contractor shall remove snow or ice which may result in damage, delay or hazardous conditions.

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§ 10.2.11 The Contractor shall take all necessary precautions to prevent loss or damage to Owner's property on the Project within areas accessible to the Contractor. The Contractor is fully responsible for the security of such property and shall reimburse the Owner for any loss, damage, or injury, including the Owner's Builder's Risk deductible, except when caused directly by the Owner's agents or employees.

§ 10.3 Hazardous Materials

§ 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, Construction Manager and Architect of the condition. The Contractor is responsible for preventing mold in construction areas and must use dehumidification or other temporary heating, cooling, or ventilation as needed. If mold develops, the Contractor bears full responsibility and cost for remediation.

§ 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. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written directive of the Owner. 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. The Contract Time shall be extended as appropriate, but the Contractor shall not be entitled to compensation or damages for any delay.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their 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 reasonable discretion, necessary 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

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insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the 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. The coverage afforded under any insurance obtained pursuant to this paragraph shall be primary and non-contributory. Coverages should be written on an occurrence basis, and shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction. The Contractor shall indemnify, defend and hold harmless all parties or persons described in Section 3.18 from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

§ 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 three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, 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. The Contractor's failure to obtain or maintain adequate insurance coverage shall be considered a material breach of the contract.

§ 11.2 Owner's Liability Insurance

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

(Paragraphs deleted)

§ 11.3 Waivers of Subrogation

§ 11.3.1 To the extent allowable under the New Jersey Tort Claims Act and the New Jersey Contractual Liability Act, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. Bonds shall be obtained from a company lawfully authorized to do business in the location of the site and have an A.M. Best and Company rating of "A-" or better; and the cost of the bonds shall be included in the Contract Sum. The Contractor shall provide a Performance Bond equal to 100 percent of the Contract Sum, a Payment Bond equal to 100 percent of the Contract Sum, and a Two (2) Year Maintenance Bond equal to 100 percent of the Contract Sum. Bonds shall be consistent with the requirements of N.J.S.A. 2A:44-143, and 2A:44-144.

§ 11.4.2 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.

§11.4.3 The Contractor shall deliver the require bonds to the Owner not later than three (3) days following the date of the Agreement.

§11.4.4 The Contractor shall require the attorney who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power of Attorney, indicating the monetary limit of such power.

§11.4.5 The Contractor shall provide Owner and Construction Manager with the name, address, phone number and other contact information of the local agent of the Company issuing the Project bonds.

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 Construction Manager's, Architect's, or authority having jurisdiction's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation, inspection, testing or approval,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 Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or 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, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. 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 Construction Manager or 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 Construction Manager's and 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 two 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 two-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

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that period after receipt of notice from the Owner, Construction Manager 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, loses, 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 obligation shall survive the termination of any or all other obligation or obligations under the contract Documents and it is agreed by the Contractor that in the event the Owner is required to bring suit under this provision against the Contractor to enforce this obligation, the Contractor hereby waives any defense of the statutes of limitations.

§ 12.2.2.2 The two-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 two-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, Separate Contractors, or other 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 two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 2.4. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Architect issued through the Construction Manager, the Owner may remove it and store the salvaged materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, the Owner may, upon ten (10) additional days' written notice, sell such materials and equipment at auction or at private sale, and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

§ 12.2.7 If, in the opinion of the Architect and the Construction Manager, the General Contractor delays Final Completion of the Work beyond a reasonable time after the Date of Substantial Completion of the Project to such extent that the period between the Date of Substantial Completion of the Project and the end of the guarantee period becomes less than eleven (11) months, the start of the guarantee period shall be the date of the final Project Certificate of Payment in lieu of the Date of Substantial Completion of the Project

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the State of New Jersey and any dispute regarding the Contract shall be venued in Superior Court of New Jersey, Essex County.

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§ 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, Construction Manager, 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 Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and 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 prohibit the Owner from delegating their cost to the Contractor.

§ 13.4.2 If the Construction Manager, 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 Construction Manager and 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 Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and 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 Construction Manager's and 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 Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing. The Architect or Owner may require evidence that materials comply with the Contract. No inspection or approval relieves the Contractor of obligations unless the Owner expressly agrees in writing.

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

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§13.4.6.1 Inspections and Tests required to establish with the Contract Documents and specified to be "by Owner", will be made by an independent testing agency selected and paid for by the Owner. Re-testing required as a result of first test showing non-compliance with the Contract Documents will be performed by the same agency, with costs paid for by the Contractor. Representatives of the testing agency shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its function.

§13.4.6.2 The independent agency employed by the Owner shall prepare the test reports, logs and certificates applicable to the specific inspection and test, and promptly deliver the specified number of copies of same to the designated parties. Other required certificates of inspections, testing or approval shall be secured by the Contractor and delivered by him to the Construction Manager and/or Owner's Representative, in such time as not to delay progress of the Work or final payment thereof.

§ 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. Notwithstanding, any payments withheld for time delays, faulty materials, or workmanship, shall not bear interest for period of delay or non-acceptance.

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 under contract with the Contractor because any order of any Court or other public authority having jurisdiction, an act of government, such as a declaration of national emergency, that requires all Work to be stopped; or because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made approved payments on a Certificate for Payment within the time stated in the Contract Documents, the Contractor may, upon seven (7) additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work properly executed only.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** refuses or fails to supply adequate and competent supervision of properly skilled workers or proper quality or quantity of materials, or falls in any respect to prosecute the Work with promptness and diligence;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 disregards the instructions of the Owner, when such instructions are based on the requirement of the Contract Documents;
- .5 is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of the Contractor's creditors, or a trustee or receive is appointed for Contractor or any of its property, or files a petition to take advantage of any debtor's act, or to reorganize under bankruptcy or similar laws;
- **.**6 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with the requirements of the Contract Documents
- **.**7 Breaches any warranty made by the Contractor under or pursuant to the Contact Documents;**.8** otherwise does not comply with the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the

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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 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 damages as contemplated by this Agreement, 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 the 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 this Contract.

Notwithstanding, the Contractor is required to continue performing those portions of the work not suspended by the Owner, as refusal to continue the work not suspended constitutes a breach of contract on the part of the Contractor.

§ 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 Owner shall pay the Contractor for Work properly executed up to the date of the termination in accordance with the Contract Documents; reasonable costs incurred by reason of the termination as determined by Owner, including reasonable documented costs attributable to termination of Subcontracts – mitigated by the Contractor and subject to Owner approval. The Contractor shall, as a condition of receiving the payments 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. Any claims or damages presented by subcontractors, suppliers, or other parties under contract with the Contractor, arising from or in connection with the termination for the Owner's convenience, shall be the sole responsibility of the Contractor. The Owner shall not be liable for, and the Contractor shall not be entitled to claim or recover, the following costs or damages associated with the termination: (a) Loss of anticipated profits or consequential damages; (b) Costs related to the Contractor's general overhead or home office expenses; (c) Costs

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incurred after the effective date of termination; (d) Costs that are not directly attributable to the termination or those lacking proper documentation.

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, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 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 Construction Manager and 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.

§ 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, or disputed item of work, 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. The foregoing written notice shall contain a written statement from the Contractor setting forth in detail the nature and cause of the Claim and an itemized statement of the increase requested to the extent that such costs are reasonably available to the Contractor and accurate. No such written notice shall form the basis of an increase to the Contract Sum unless and until such increase has been authorized by a written Change Order executed and issued according to the terms and conditions set forth herein.

§ 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. Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by the Owner and Architect. No such claim shall be valid unless so made 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.

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§ 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.

Where the cause of delay is due to the 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 extreme low temperature) for the past five (5) years for the month in question, plus twenty (20) percent. In other words, weather is not deemed to be unusually severe unless it is twenty (20) percent worse than the average for that month over the last five (5) years. Notwithstanding, weather events may include those days in which the Contractor is unable to proceed with work on the critical path for more than seven (7) continuous normal Work hours in a day.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor waive Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This waiver is applicable, without limitation, to all consequential damages due to termination by the Owner in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 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, 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, the Construction Manager, 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.

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

§ 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 of 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.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, 15.1.7 and 16.2.6.1, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by a retired Judge of the Superior Court of New Jersey mutually agreed to by the parties. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

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SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

1.1 FUNCTION

A. The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction, Construction Manager as Adviser Edition", AIA Document A232 - 2019 and the Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, AIA Document A132 - 2019. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the remaining unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

B. Refer to Sections in Division 1 "General Requirements" for additional modifications, deletions and additions to the "General Conditions of the Contract for Construction".

1.2 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISER EDITION, AIA DOCUMENT A232-2019.

A. Document is modified in accordance with the following paragraphs and as indicated herein after:

1.3 PARAGRAPH 1.1 - BASIC DEFINITIONS

A. Paragraph 1.1.1 - "The Contract Documents":

Delete last sentence "Unless specifically enumerated in the Agreement, the Contract Documents do not..... proposal requirements)."

B. Supplement Paragraph 1.1 "Basic Definitions", as follows:

1.1.11 The Project Manual. The Project Manual is a volume, or volumes, assembled for the Work that includes, or is deemed to incorporate by reference the General Conditions, Supplementary Conditions, the Bidding Requirements and Documents related thereto, the Specifications, and all Addenda issued prior to the execution of the Contract."

1.1.12 Final Completion. The date the Contract has been fully performed, all the Work has been completed and a final certificate for Payment approved by the Owner has been issued by the Architect.

1.1.13 Or Approved Equal and Equal To. Shall mean products by manufacturers other than those specified in the Contract Documents in which the Contractor may submit for those specified in the Contract Documents and which may be

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incorporated in the Work after review and acceptance by the Architect and acceptance by the Owner.

1.4 PARAGRAPH 1.2 - CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

A. Delete Paragraph 1.2.1 in its entirety and substitute with the following:

1.2.1 The Contract Documents include all items necessary for the proper execution and completion of the Work by the Contractor. The Work shall consist of all items specifically included in the Contract Documents as well as all additional items of Work which are reasonably inferable from that which is specified in order to complete the Work in accordance with the Contract Documents. The Contract Documents are complementary, and what is required by any one Contract Document shall be as binding as if required by all. Any differences between the requirements of the Drawings and the Specifications or any differences noted within the Drawings themselves or within the Specifications themselves have been referred to the Owner, Architect and Construction Manager by Contractor prior to the submission of bids and have been clarified by an Addendum issued to all Bidders.

If any such differences or conflicts were not called to the Owner's, Construction Manager and the Architect's attention prior to submission of bids, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent of the requirements, and, subject to the approval of the Owner, the Contractor shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results.

1.5 PRECEDENCE OF LARGE SCALE DETAILS

A. Supplement Paragraph 1.2 "Correlation and Intent of the Contract Documents", as follows:

1.2.4 The general character of the detail Work is shown on the Drawings but minor modifications may be made in large scale details, in accordance with N.J.A.C. 6A:23A-21.1. 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. 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. 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. 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. Any discrepancies shall be referred to the Architect for adjustment before any Work affected thereby has been performed.

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1.2.5 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 their 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. 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, and which is in the best interests of the Owner.

1.6 PARAGRAPH 2.1 - GENERAL

A. Delete Paragraph 2.1 in its entirety.

1.7 PARAGRAPH 2.2 - EVIDENCE OF THE OWNER'S FINANCIAL ARRANGEMENTS

A. Delete Paragraph 2.2.1 in its entirety.

1.8 PARAGRAPH 2.2 - INFORMATION AND SERVICES REQUIRED OF THE OWNER

A. Delete Paragraph 2.3.7 in its entirety and substitute with the following:

2.3.7 The Architect will furnish the Contractor, without charge, the following number of sets of Drawings and Specifications. Additional copies will be furnished at the Architect's reproduction costs, to be paid by the Contractor.

Single Overall Contract 3 Sets

1.9 PARAGRAPH 2.4 - OWNER'S RIGHT TO STOP THE WORK

A. Edit paragraph 2.4 as follows:

Line 3; after "Documents" add:

"or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor, or disregard the instructions of Architect, Construction Manager or Owner when based on the requirements of the Contract Documents".

1.10 PARAGRAPH 2.5 - OWNER'S RIGHT TO CARRY OUT THE WORK

A. In the 11th line, delete "the Contractor....to the Owner", and substitute with the

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following:

"the Contractor, and/or their Surety shall pay the difference to the Owner."

1.11 PARAGRAPH 3.2 - REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

A. Delete the second sentence in Paragraph 3.2.2 in its entirety and substitute with the following:

"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 days after receiving 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, they will be held responsible for the results of any such errors, inconsistencies or omissions and the cost of rectifying same. Interpretation of this procedure after the ten-day period will be made by the Architect and their decision will be final".

1.12 LAYOUT OF WORK

A. Supplement Paragraph 3.3 "Supervision and Construction Procedures", as follows:

3.3.4 Each Contractor shall lay out their own Work and be responsible for all lines, elevations and measurements of the building, and other Work executed by them under the Contract. They 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 their failure to exercise such precaution.

3.3.5 The Contractor shall coordinate their operations with those of all their Subcontractors.

3.3.6 The Contractor, including their Subcontractors, shall keep fully informed of the progress and the details of the Work of all Subcontractors, and shall notify the CM immediately of lack of progress or defective workmanship on the part of any Subcontractors.

3.3.7 Failure of the Contractor to keep informed of the Work progressing on or off the site, and their failure to give notice of lack of progress of defective workmanship by others, will be construed by Owner and by the CM as acceptance by the Contractor of the status of the Work as being satisfactory for proper coordination with the Contractor's own Work and with the Work of all their Subcontractors.

1.13 WARRANTY

A. Supplement Paragraph 3.5 "Warranty", as follows:

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3.5.1.1 The warranty period for all work of each Contractor shall be **two (2) years** from the date of substantial completion and acceptance by the Owner unless otherwise specified.

1.14 PARAGRAPH 3.7 - PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

A. 3.7.3 In line 3, delete "the costs attributable to correction" and replace with "all costs attributable to the correction thereof or related thereto, including all fines and penalties."

1.15 PARAGRAPH 3.9 - SUPERINTENDENT

A. Supplement Paragraph 3.9 "Superintendent", as follows:

3.9.2.1 Qualifications of superintendent proposed to be used shall be submitted to the Construction Manager and Owner's approval obtained before proceeding with the Work.

3.9.5 The superintendent shall be assigned to the project on a full-time basis from the inception of construction until the completion of all corrective and punch list Work.

1.16 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULES

A. Supplement Paragraph 3.10 "Contractor's Construction Submittal Schedules", as follows:

3.10.1.1 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 bar-graph Progress Schedule upon which shall be indicated the dates for starting and the dates for completion of the Contract and all divisions of the Work in a manner which will coincide with Time For Completion and other project milestone dates.

Schedule "CPM" Requirements:

.1 General Construction Work Contractor shall include in their price the cost of the outsourcing CPM scheduling for entire project and all prime Subcontractors. Utilize "Primavera-Project Planner - current version Software by Primavera Systems Inc.".
.2 CPM consultant to be approved by Architect and the Construction Manager. Initial GC. Schedule to be provided to all Prime Subcontractors within 15 days of Notice to Proceed.
.3 Monthly updates will be required during construction with each payment application.
.4 Interim Progress Updates will be required for each Job Progress Meeting.
.5 Comply with all recommendations and instructions of the Construction Manager for preparation of Project Schedule and associated periodic reports.

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3.10.1.2 This schedule will be distributed to the Prime Subcontractors for Structural Steel, Plumbing, Heating, Ventilating and Air Conditioning and Electrical Work. When approved by the Subcontractors and agreed upon by the Architect, this schedule will become one of the Contract Documents, and shall be altered thereafter only in accordance with duly authorized change orders for extensions of time in accordance with Paragraph 8.3, "Delays and Extensions of Time".

1.17 SUBMITTALS

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

3.12.11 All fabricated Work shall require shop drawings.

3.12.13 The Architect may request samples of any or all materials to be used in the Work. When requested, samples shall be submitted promptly.

3.12.14 Shop drawings and other data, where possible, shall be submitted in the form of reproducible transparency. Catalogs and other printed matter shall be submitted in six (6) copies.

.1 Additional prints for file, distribution and for coordination of the work with other Contractors shall be provided as directed or as required.

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 All submittals shall be separate for each Project. Contractor must indicate on each transmittal the reference to the Architect's Project Number.

.2 Failure to adhere to deadlines for completion of submittals and record/resubmittals.

.3 Failure to provide submittals in good order as required by the Contract Documents.

.4 Failure to provide submittals in relationship to the progress of the Work.

.5 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.

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.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 Subcontractor 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.

3.12.17 The following submittal schedule will be mandatory; time is from date of the notice to proceed, in consecutive calendar days and also in accordance with requirements of Specification Section 01800.

The Contract and Trades: 60 days

3.12.18 Request for Substitutions:

.1 Substitutions may be considered Only within thirty (30) calendar days after the award of the Contract. Subsequent requests will be considered Only when, through no fault of the Contractor or any other persons for whom Contractor is responsible, none of the specified products are available.

.2 Submission of request for substitution shall constitute a representation by the Contractor that they:

.1 Have 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

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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.

.4 Will reimburse the Owner for additional costs for evaluation of the substitution request, re-design if required, and re-approval by authorities having jurisdiction if required.

.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 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 Submit 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 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

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(if any).

.8 Certification by Contractor to the effect that, in their opinion and after their 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.

3.12.19 Approval of Substitutions:

.1 Requests for substitutions, for a requested 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 substitutions which propose a change in either the Contract Sum or Contract Time by procedures required for change order proposals.

3.12.20 "Or Equals"

A. A. Contractor's Request; Governing Criteria: Whenever an item of equipment or material is specified to described in the Contract Documents by using the names of one or more proprietary or items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The Specification or description of such an item is intended to establish the type, function, appearance, and quality required. To the extent allowable by N.J.S.A. 18A:18A-15(d) and unless the Specification or description contains or is followed by words reading "proprietary item," no like, equivalent, or "or equal" item is permitted, Contractor may request that the Architect authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

B. If the Architect, in its sole discretion, determines that an item of equipment or material proposed by the Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, the Architect will deem in an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

C. In the exercise of reasonable judgment, Architect determines that the proposed item:

1. Is at least equal in materials of construction, quality, durability,

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appearance, strength, and design characteristics;
2. Will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
3. Has a proven record of performance and availability of responsive service.

D. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
1. There will be no increase in cost to the Owner or increase in Contract Times; and
2. The item will conform substantially to the detailed requirements of the item named in the Contract Documents.

E. Contractor's Expense: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

F. Architect's Evaluation and Determination: Architect will be allowed a reasonable time to evaluate each "or equal" request. Architect may require Contractor to furnish additional data about the proposed "or equal" item. Architect will be the sole judge of acceptability. No "or equal" item will be ordered, furnished, installed or utilized until Architect's review is complete and Architect determines that the proposed item is an "or equal," which will be evidence by an approved Shop Drawing or other written communication. Architect will advise Contractor in writing of any negative determination.

G. Effect of Architect's Determination: Neither approval nor denial of an "or equal" request will result in any change in Contract Price. The Architect's denial of a submitted n "or equal" request, and the subsequent rejection based on the evaluation of the submitted product data is not equivalent to the Basis of Design will be final and binding, and may not be reversed through an appeal under any provision of the Contract in a manner consistent with N.J.S.A. 18A:18A-15(d).

H. Treatment as a Substitution Request: If Architect determines that an item of equipment or material proposed by Contractor does not qualify as an "or equal" item, Contractor may request that the Architect consider the item a proposed substitute pursuant to 3.12.17.

1.18 LONG LEAD ITEMS

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

3.12.19 In addition to and concurrent with the submission of the "Schedule of Values" as provided under Paragraph 9.2, 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. This will be

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discussed and reviewed regularly at the job site meetings. Upon request by the Architect, the Contractor shall be prepared to produce evidence of having placed orders for specific materials, equipment and components.

1.19 PARAGRAPH 3.13 - USE OF SITE

A. Supplement Paragraph 3.13 “Use of Site”, as follows:

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

3.13.5 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the/each project site without the prior written consent of the Owner.

1.20 CLEANING UP

A. 3.15.1 In line 2, insert "promptly" before "remove." In the last line, add "in addition, the Contractor shall comply with 3.15.4."

B. 3.15.2 In the last line, add ",and withheld from any remaining payments."

C. Supplement Paragraph 3.15 “Cleaning Up”, as follows:

3.15.3 The Contractor shall frequently clean up all refuse, rubbish, scrap, cartons, materials and debris caused by construction operations to the end that the site of the Work shall at all times present a neat, orderly and workmanlike appearance. This includes, without exception, the debris created by the work of all Trades engaged under the Contract. The Contractor shall remove the debris from the/each site and premises and dispose of it by legal means at its own expense for collecting, loading, hauling and dumping.

3.15.4 The Prime Contractor shall also perform or have performed the following immediately prior to the Architect's inspection for Substantial Completion:

.1 Removal of all manufacturer's temporary labels from materials, equipment and fixtures.
.2 Removal of all stains from glass and mirrors; wash, polish, inside and outside.
.3 Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
.4 Removal of spots, plant, soil from resilient flooring.
.5 Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.

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.6 Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.

.7 Final site clean-up shall extend beyond the Contract Limit Lines as reasonably required to insure the complete removal of all construction debris from the/each entire site, including staging areas.

1.21 PARAGRAPH 3.16 - ACCESS TO WORK

A. Supplement Paragraph 3.16 “Access to Work”, as follows:

3.16.1 The Contractor shall promptly notify the Architect and Construction Manager and Owner of the presence of hazardous conditions at the/each site, including the start of hazardous operations or the discovery or exposure of hazardous substances.

1.22 PARAGRAPH 3.18 - INDEMNIFICATION

A. Supplement Paragraph 3.18.1, “Indemnification”, as follows:

.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(s), Engineer(s), and the Construction Manager, harmless from, and against any and all claims, demands, damages, actions or causes of action 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, sickness, disease, 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(s), Engineer(s) and/or Construction Manager 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 the 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 and present), its successors, assigns, employees, agents, Architect(s), or Engineer(s) and Construction Manager, agrees to defend at the Contractor's expense any suit or proceeding brought against Owner, its individual members (past, present and future), its successors, assigns, employees, agents, Architect(s), Engineer(s) and /or Construction Manager, due to, or arising out of the Work performed by the Contractor.

.1 Contractor acknowledges and agrees that obligations and duties of the Construction Manager under the Construction Manager's agreement with the Owner are solely for the benefit of the Owner, that notwithstanding any action of the Construction Manager in connection with the Project.

.2 The Construction Manager shall not in any respect be deemed to have

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assumed any duties or obligations in favor of the Contractor, and that Construction Manager is acting as an agent of and on behalf of the Owner to the extent provided herein.

1.23 RE-DESIGN

A. Supplement Article 3 "Contractor", as follows:

3.19 RE-DESIGN

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, they 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 and details shown shall be made only after written approval from the Architect.

1.24 PARAGRAPH 4.2 - ADMINISTRATION OF THE CONTRACT

A. Supplement Paragraph 4.2.1, as follows:

.1 The Owner has designated New Road Construction Management as Construction Manager, authorized to act in the Owner's behalf to administer, coordinate, and inspect the Work of this Project.

.1 Any and all correspondence, coordination, questions and instructions will be directed to and issued by the Construction Manager to all project participants.

B. 4.2.3 In lines 2 and 3, delete "determine in general" and replace with “endeavor to determine”.

C. 4.2.4 In the 1st line, change "Construction Manager" to "Prime Contractor".

D. 4.2.10 In this Paragraph, change all references "Construction Manager" to read "Architect" and change "Architect" to read "Construction Manager".

E. 4.2.13 After "Construction Manager" add words "and the Architect".

F. Supplement Paragraph 4.2 "Administration of the Contract", as follows:

4.2.22 Reference in the technical provisions of the Specifications to standard Specifications and test methods, including those of the American Society for Testing and Materials, the American Iron and Steel Institute, the American National Standards Institute, the American Society of Mechanical Engineers, the American Society of Heating, Refrigeration and Air Conditioning Engineers, the Factory Mutual System, the National Fire Protection Association, Federal Specifications, and other similar

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nationally recognized technical societies and agencies shall refer to the editions and revisions current with the date of the Contract Documents.

"Any claim, dispute or other matter in question between the Contractor and the Owner referred to the Architect through the Construction Manager, except those relating to the artistic effects as provided in subparagraph 4.2.20 and those which have been waived by the making or acceptance of final payment as provided in subparagraph 9.10, inclusive, may proceed to litigation, but not before the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered a written decision by that date. No such claim may proceed to arbitration."

4.2.23 The Architect's decision, after consultation with Owner and Construction Manager with respect to proposed substitutions of material or equipment specified by trade name, shall be final. The Architect reserves the right, after consultation with Owner and Construction Manager, to waive Specifications and to accept a proposed substitution which in their opinion is superior to the material or product specified, or to limit the Specification to the product specified.

4.2.24 Where three or more trade names or manufacturers' names are specified, the Contractor shall furnish one of the brands specified or may submit an equivalent or better product(s) to be reviewed by the Architect / Engineer for consideration. Where only one brand or name is specified, the Contractor may submit other brands for consideration; however, it shall be the Contractor's responsibility to prove equality.

4.2.25 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.

4.2.26 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.

4.2.27 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.

1.25 SUBCONTRACTORS AND MATERIALMEN

A. Delete subparagraph 5.2.3 and substitute with the following:

5.2.3 The names of all Subcontractors and material suppliers, in addition to those required to be listed pursuant to N.J.S.A. 18A:18A-18 (if any), shall be submitted with the Contractor’s bid proposal documents. Subcontractors referenced herein, are in

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addition to those required to be listed, along with all necessary paperwork concerning each such Subcontractor's qualifications, licensure, etc., pursuant to N.J.S.A. 18A:18A-18, if any. The list of proposed Subcontractors shall include a description of the materials and equipment each proposes to furnish and install in the work. The description shall be in sufficient detail to allow the Architect to determine general conformance to Contract requirements. Approval of the submittals required under this Article shall not relieve the Contractor from conformance to Contract requirements.

B. Supplement subparagraph 5.2.3, as follows:

.1 Written confirmation of award of each major Subcontract shall be submitted to the Architect, in form subject to their approval, within seven (7) calendar days after receipt of Architect's approval of proposed Subcontractor list as provided under Paragraph 5.2.3 above.

1.26 PARAGRAPH 5.3 - SUBCONTRACTUAL RELATIONS

A. 5.3 At lines 5, 10, 11, and 13, insert "written" before the word "agreement" or "agreements"

B. Supplement Paragraph 5.3, as follows:

5.3.1 The Contractor shall obligate the/each Subcontractor specifically to comply with the New Jersey Plan of Affirmative Action to avoid discriminatory practice in employment.

5.3.2 The Contractor shall obligate the/each Subcontractor to comply with the applicable prevailing wage schedule of the Department of Labor of the State of New Jersey.

5.3.3 The Contractor agrees that all of its Contract with Subcontractor(s) shall have provisions requiring that the Subcontractor(s) comply with the provisions of the New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25 et seq.

1.27 PARAGRAPH 6.1 - OWNER'S RIGHT TO PERFORM CONSTRUCTION WITH OWN FORCES AND TO AWARD OTHER CONTRACTS

A. Delete subparagraph 6.1.2 in its entirety and substitute with the following:

6.1.2 The Prime Contractor shall provide for the coordination of the Work of their own forces and of each of their separate Subcontractors with Work of the other Contractors, who shall cooperate therewith as provided in Paragraph 6.2.

1.28 PARAGRAPH 6.2 - MUTUAL RESPONSIBILITY

A. 6.2.4 In line 1, delete "wrongfully."

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B. Supplement Paragraph 6.2.4, as follows:

.1 Should the (Sub)Contractor cause damage to the Work or property of any separate Subcontractor on the project, the Contractor shall, upon due notice, promptly settle with such other Contractor by agreement or otherwise resolve the dispute. If such separate (Sub)Contractor sues or institutes an arbitration proceeding against the Owner on account of any damage alleged to have been so sustained, the (Sub)Contractor shall defend such proceeding at their own expense, and if any judgment against the Owner arises therefrom, the (Sub)Contractor shall pay or satisfy it and shall reimburse the Owner for any attorney's fees and court costs which the Owner has incurred.

1.29 ARTICLE 7 - CHANGES IN THE WORK

A. Supplement Paragraph 7.1 “General”, as follows:

7.1.2 Add to the end of Subparagraph 7.1.2, "Neither this Contract nor the Work to be performed hereunder can be changed by oral agreement. No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claims that the Owner has been unjustly enriched by any alteration or addition to the Work, whether there is, in fact, any unjust enrichment to the Work, shall be the basis for any alleged implied agreement by the Owner to the change or any increase in any amounts due under the Contract or a change in any time period provided for in the Contract Documents."

7.1.2.1 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor shall have no claim in regard thereto unless it shall, prior to complying with same and in no event no later than 10 business days from the date such direction or order was given, submit to the Owner for the Owner's approval its change proposal.

B. Supplement Paragraph 7.2 “General”, as follows:

7.2.2.2 When submitting its change order, the Contractor shall include and set forth in clear and precise detail breakdowns of labor and materials for all Trades involved and the estimated impact on the construction schedule. The Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets, if requested, of any Subcontractors.

1.30 ALLOWANCE FOR CHANGE ORDER OVERHEAD AND PROFIT

A. Supplement Paragraph 7.2 "Change Orders" as follows:

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

.1 For any extra Work or portion thereof performed by Subcontractor(s), the

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cost to the Owner shall include the cost of the extra work to the Subcontractor plus a maximum allowance of ten percent (10%) for overhead and profit, plus the Contractor's overhead and profit not to exceed five percent (5%) of the Subcontractor's cost.

7.2.5 Change Order shall include all costs, including 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 Contractor shall furnish all necessary documentation to support the additional cost, including but not limited to the following:
  .1 Copy of Subcontractor's proposal.
  .2 Complete breakdown for all costs for labor and material.
  .3 Complete breakdown of related costs.
  .4 Other information as may be requested by the Architect / Construction Manager.

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

7.2.7 No additional time will be granted to the Contractor for minor change orders unless each individual change order totals more than $100,000.

7.2.8 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor shall have no claim in regard thereto unless it shall, prior to complying with same and in no event no later than 10 business days from the date such direction or order was given, submit to the Owner for the Owner's approval its change proposal.

7.2.9 When submitting its change proposal, the Contractor shall include and set forth in clear and precise detail breakdowns of labor and materials for all Trades involved and the estimated impact on the construction schedule. The Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets, if requested, of any Subcontractors.

1.31 PARAGRAPH 8.2 - PROGRESS AND COMPLETION

A. 8.2.2 Delete "knowingly" in line 1.

1.32 TIME OF COMMENCEMENT

A. Supplement Paragraph 8.2 "Progress and Completion", as follows:

8.2.4 Work shall commence within ten (10) business days from the date of the Notice to Proceed (NTP).

1.33 EXTENSION OF TIME

A. Supplement Paragraph 8.3 "Delays and Extensions of Time", as follows:

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8.3.5 Where the cause of 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 (5) years for the month in question, plus 10 percent. In other words, weather is not deemed to be unusually severe unless it is more than 10 percent worse than the average for that month over the last five years.

8.3.6 If the Contractor is delayed in completion of the work by any act or neglect of the Owner, Architect, or of any other Contractor employed by the Owner, or by changes ordered in the Work, or by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties, or any cause beyond the Contractor's control or by any cause which the Architect / Construction Manager shall decide to justify the delay, then for all such delays and suspensions the Contractor shall be allowed one day additional to the time limitations herein stated for each and every day of such delay so caused in the completion of the work, the same to be ascertained solely by the Architect / Construction Manager, and a similar allowance of extra time will be made for such delays as the Architect / Construction Manager may find to have been caused by the Owner.

.1 No such extensions of time shall be made for any one or more delays unless within ten (10) business days after the beginning of such delays a written request for additional time shall be filed with the Architect / Construction Manager. In case of a continuing cause of delay, only one request is necessary.

8.3.7 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 Specification section 01800, for completion of the Work.

1.34 PARAGRAPH 9.2 - SCHEDULE OF VALUES

A. Supplement Paragraph 9.2 "Schedule of Values", as follows:

9.2.1 The Schedule of Values shall include bonds and insurance and shall include copies of invoices and / or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

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

.1 Schedule of Values shall include separate costs for work at the / each School site referenced with Architect's Project Number.

.2 Schedule of Values shall also include each type of Work, materials and installation, in accordance with each Specification section, as listed in the Index and / or as shown on Drawings.

.3 The Contractor shall include separate line items for the following:

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.1 Bonds,
.2 Insurance,
.3 Mobilization,
.4 General Conditions,
.5 Submittals,
.6 As-Built Drawings, as per Section 01700,
.7 Punch list items,
.8 CPM Schedule,
.9 Closeout Documents,
.10 Allowances.

1.35 STORED MATERIALS

A. Supplement Paragraph 9.3.2, as follows:

.1 To encourage early purchase, Owner will 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 Contractor.
  .3 Materials to be stored in warehouse must be inspected by the Construction Manager and Contractor will not receive extra compensation for storage costs.
  .4 Any time and traveling expenses for the Construction Manager 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 Manager 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 existing building(s). Space in new building may be used for storage only if approved in writing by Construction Manager and all Contractors having work in the area.
  .9 The Contractor will be paid for stored 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.

1.36 PARAGRAPH 9.3 - APPLICATIONS FOR PAYMENT

A. Supplement Paragraph 9.3 “Applications for Payment”, as follows:

9.3.4 Applications for payment which include billing for bonds and insurance shall enclose copies of invoices or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

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1.37 PARAGRAPH 9.5 - DECISIONS TO WITHHOLD CERTIFICATION

A. 9.5.1.6 In the first line, delete "and" and substitute "or".

B. 9.5.1.7 Delete "repeated".

C. Supplement Paragraph 9.5.1, as follows:

.8 Deliberate delay in the submission for approval of names of Subcontractors, materialmen, sources of supply, shop drawings and samples.
.9 Failure to maintain the/each site in a safe and satisfactory condition in accordance with good construction practices.
.10 Failure of mechanical trades or electrical trade Subcontractors to comply with mandatory requirements for maintaining record Drawings. The Contractor shall be required to check record Drawings each month. Written confirmation that the record Drawings are up-to-date shall be required by the Architect before approval of the Contractor's monthly payment requisition will be considered.

1.38 PARAGRAPH 9.6 - PROGRESS PAYMENTS

A. Supplement Paragraph 9.6 “Progress Payments”, as follows:

9.6.9 In making progress payments, on Contracts totaling more than $100,000 dollars there shall be retained two percent (2%) of the approved amount when the outstanding balance of the Contract exceeds $500,000, and five percent (5%) of the amount due on each partial payment 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 In making progress payments, on Contracts totaling less than $100,000 dollars there shall be retained ten percent (10%) of the approved amount until seventy-five percent (75%) of the Contract Price has been paid at which time the retainage for that seventy-five percent (75%) will be reduced to five percent (5%) if in the judgment of the Architect the work is progressing satisfactorily, and on progress payments thereafter there shall be retained ten percent (10%) of the approved amounts until final completion and acceptance of all Work covered by the Contract, including the completion of all corrective or punch list items. The Contractor will be required to provide a Consent of Surety to Reduction in or Partial Release of Retainage (AIA Document G707A), before reduction in retainage will be considered.

9.6.11 Final payment will be made provided the Work has been completed, the Contract fully performed and a final certificate for payment has been reviewed and approved by Architect and Construction Manager.

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1.39 PARAGRAPH 9.7 - FAILURE OF PAYMENT

A. In the sixth line, delete “or awarded by binding dispute resolution”.

1.40 PARAGRAPH 9.8 - SUBSTANTIAL COMPLETION

A. 9.8.1 Modify as follows:

Add at the end of the Subparagraph: "The Work will not be considered substantially complete until all project systems included in the Work are operational as designed and scheduled, all designated or required inspections, certifications, permits, approvals, licenses and other documents from any governmental Authority Having Jurisdiction thereof necessary for the beneficial use and occupancy Project are received, designated instruction of Owner's personnel has been completed, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature so that the Owner can occupy the building on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's (or those claiming by, through or under the Owner) normal operations. Contractor recognizes that normal operations require the use and occupancy of the Work by students and faculty without interruption and that any punchlist or corrective work shall be done at times when the Work is not so occupied. As a further condition of substantial completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty (30) consecutive calendar days or otherwise as agreed upon following the date of substantial completion.

B. Supplement Paragraph 9.8.2, as follows:

.1 The Architect's Certificate of Substantial Completion shall be subject to the Owner's final approval.

C. Supplement Paragraph 9.8.3, as follows:

.1 The Contractor shall complete all items attached to the "Certificate of Substantial Completion" within thirty (30) calendar days of issuance of same. If not completed, the Owner may proceed to carry out the Work in accordance with Paragraph 2.4 of the General Conditions. The Owner will suffer financial loss if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sums hereinafter stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is substantially complete.

1.41 PARAGRAPH 9.10 - FINAL COMPLETION AND FINAL PAYMENT

A. 9.10.1 Add the following at the end of the Paragraph:

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All warranties and guarantees required pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner as part of the final application for payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guaranties have been received, appropriately transferred to, and accepted by the Owner.

B. Supplement Paragraph 9.10.1, as follows:

.1 The Architect's Certificate of Final Completion shall be subject to the Owner's final approval.

1.42 CONTRACTOR AS OWNER'S SAFETY REPRESENTATIVE

A. Supplement Paragraph 10.1 "Safety Precautions and Programs", as follows:

10.1.1 The Contractor shall provide all necessary temporary enclosures, guard rails, barricades etc. to adequately protect all workers and public from possible injury.

10.1.2 The Steel Subcontractor shall provide and install 2 rows of ½" diameter steel cable around perimeter of all floors above first floor, mounted and marked in accordance with OSHA safety. Steel columns shall be punched for installation of cable. The Steel Subcontractor shall remove cables after enclosing walls have been installed.

10.1.3 The Contractor shall be responsible for the general safeguarding of the Project, for gaining compliance with the safety requirements from all other (Sub)Contractors and parties engaged in operations at the/each site, and shall act as the Owner's representative with regard to all safety inspections required and shall perform all necessary functions for this purpose. The Contractor shall designate a "Site Safety Officer".

1.43 PARAGRAPH 10.2 - SAFETY OF PERSONS AND PROPERTY

A. Supplement Paragraph 10.2.8, as follows:

.1 The Contractor shall promptly report in writing to the Owner, Architect and Construction Manager all accidents arising out of or in connection with the Work which caused death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injury or serious property damage is caused, the accident shall be reported immediately by telephone or messenger to the Owner, Architect and Construction Manager.

B. Supplement Paragraph 10.2 "Safety of Persons and Property", as follows:

10.2.9 Contractor is required to follow and enforce the work rules set forth below. Failure to comply with or enforce any of these rules will be grounds for suspension

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and / or termination of the Contractor:

.1 No use of alcoholic beverages prior to or during working hours. Anyone found impaired will be escorted from the/each Project site.

.2 No use of illegal drugs or prescription medications which could induce drowsiness or otherwise impair perception or performance. Use of illegal drugs may result in prosecution to the fullest extent of the law. Any warning associated with use of prescription drugs must be complied with, particularly warning against operation of machinery and equipment.

.3 No horseplay or rough-housing will be allowed.

.4 No sexual, racial, ethnic harassment, or similar conduct will be tolerated.

.5 All employees shall use proper sanitation habits, including use of toilet facilities and garbage cans.

.6 All employees shall dress in clothing appropriate for the work they are to perform. All personnel are to wear hardhats, safety shoes, glasses, gloves, masks or respirators, noise protection devices, and other protective clothing and equipment as required by OSHA standards.

.7 All equipment is to be properly stored and / or secured at the end of the work day if it is to remain idle for greater than one hour.

.8 All personnel are to be made aware of the availability of Safety Data Sheets (SDS) for materials used at the Project site. This information is available from the Contractor using the product. The Contractor shall maintain a copy of all SDS forms at the/each construction site office for all personnel to review.

1.44 LOST OR STOLEN ITEMS

A. Supplement Article 10 "Protection of Persons and Property", as follows:

10.5 Lost or Stolen Materials

The Contractor shall protect all materials and equipment for which they are responsible, which is stored at the/each Project Site for incorporation in the Work, or which has been incorporated into the Work. They shall replace all such materials and equipment which may be lost, stolen or damaged at their expense, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

1.45 INSURANCE

A. Supplement Paragraph 11.1.1, as follows:

.1 Certificate of Insurance shall be submitted within ten (10) business days upon notification of award of Contract.

B. Supplement Paragraph 11.1 “Contractor’s Liability Insurance”, 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.

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11.1.6 Insurance specified to be provided by the Contractor under Paragraph 11.1 shall be on an occurrence basis, as follows:

.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, the Construction Manager 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, the Construction Manager 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 and A132 Exhibit A Insurance and Bonds.

.4 Workers' Compensation Insurance of not less than statutory limits.

.5 Completed Operations Insurance written to the limits specified for liability insurance in AIA 132 - 2019, Exhibit A, Article A.3 - Contractor’s insurance and Bonds. Coverage shall be required from the date of the start of Beneficial Occupancy until two years after the issuance date of Final Certificate for Payment.

.6 Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance.

.7 The Contractor shall either:

.1 require each of their 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.

1.46 PARAGRAPH 11.4 - LOSS OF USE, BUSINESS INTERRUPTION, AND DELAY IN COMPLETION INSURANCE

A. 11.4 Delete the second sentence in its entirety.

1.47 PARAGRAPH 11.5 - ADJUSTMENT AND SETTLEMENT OF INSURED LOSS

B. Delete Paragraph 11.5.1 and substitute the following:

11.5.1 Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of the Owner's duties. The Owner shall deposit in a separate account, any money so received, and shall distribute it in accordance with such

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agreement as the parties in interest may reach. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate change order.

C. Delete Paragraph 11.5.2 and substitute the following:

11.5.2 The Owner, as trustee, shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) business days after the occurrence of loss to the Owner's exercise of this power.

1.48 PARAGRAPH 12.1 - UNCOVERING OF WORK

A. 12.1.1 Add "or Contract Sum" at the end of the Paragraph.

1.49 PARAGRAPH 12.2 - CORRECTION OF WORK

A. 12.2.1 Add the following at the end of the Paragraph:

If prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause each such item to be restored to "like new condition" at no expense to the Owner.

B. 12.2.2.1 Add the following to the end of the Paragraph:

“If payments then or thereafter due to the Contractor are not sufficient to cover such amount, the Contractor, or their Surety, shall pay the difference to the Owner. The appropriate reduction shall be an amount equal to the entire cost of replacing the work performed with work originally specified and intended."

1.50 PARAGRAPH 12.3 - ACCEPTANCE OF NONCONFORMING WORK

A. 12.3.1: Add the following sentence to the end of the Paragraph:

“This Subparagraph relates exclusively to the knowing acceptance of nonconforming work by the Owner. It has no applicability to work accepted by the Owner, Architect or Construction Manager without the knowledge that such work fails to conform to the requirements of the Contract Documents.”

1.51 PARAGRAPH 13.1 - GOVERNING LAW

A. In the first line, delete everything after “located”.

B. Supplement Paragraph 13.1 "Governing Law", as follows:

13.1.1 Contractor must comply with codes, ordinances, rules, regulations, orders and

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other legal requirements of public authorities, utility companies, National Board of Fire Underwriters, and others which bear on performance of the Work. Deliver to the Owner certificates and other required legal evidence and proof of compliance with the above.

1.52 PARAGRAPH 13.4 - TESTS AND INSPECTIONS

A. 13.4.1 Delete the last two (2) sentences in their entirety.

B. 13.4.2 In lines 5 and 6, add “and Owner” after the word "Architect".

C. 13.4.3 Add the following at the end of the Paragraph:

The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in their scheduling and performance of the Work and the cost of testing services related to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

1.53 PARAGRAPH 14.1 - TERMINATION BY THE CONTRACTOR

A. Delete Paragraph 14.1.2 in its entirety and substitute the following:

14.1.2 If one of the above reasons exist, the Contractor may, upon fourteen (14) calendar days written notice to the Owner, Construction Manager and Architect, terminate the Contract, unless this reason is cured prior to the expiration of the notice, and recover from the Owner payment of Work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) and for payment for cost directly related to Work thereafter performed by Contractor in terminating such Work, including reasonable demobilization and cancellation charges provided said Work is authorized in advance by Construction Manager, Architect and Owner.

1.54 PARAGRAPH 14.2 - TERMINATION BY THE OWNER FOR CAUSE

A. Delete Paragraph 14.2 in its entirely and substitute the following:

14.2 TERMINATION OF CONTRACT

14.2.1 Owner May Suspend Work:

.1 Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) calendar days by notice in writing to Contractor, Construction Manager and Architect which shall fix the date on which Work shall be resumed. Contractor shall resume the Work on the date so fixed. Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if they make a claim therefor as provided in Articles 11 and 12.

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14.2.2 Owner May Terminate:

.1 Upon the occurrence of any one or more of the following events:

.2 If Contractor is adjudged a bankrupt or insolvent, "subject to the provision of the National Bankruptcy Act and specifically 11 U.S.C., Paragraph 365.

.3 If Contractor makes a general assignment for the benefit of creditors.

.4 If a trustee or receiver is appointed for Contractor or for any of Contractor's property.

.5 If Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws.

.6 If Contractor repeatedly fails to supply sufficient skilled workers or suitable materials or equipment.

.7 If Contractor repeatedly fails to make prompt payments to Subcontractors for labor, materials or equipment.

.8 If Contractor disregards laws, ordinances, rules regulations or orders of any public body having jurisdiction.

.9 If Contractor disregards the authority of the Architect.

.10 If Contractor otherwise violates in any substantial way any provisions of the Contract Documents, Owner may after giving Contractor and their Surety seven days' written notice, terminate the services of Contractor, exclude Contractor from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the/each site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor. If such costs exceed such unpaid balance, Contractor shall pay the difference to Owner. Such costs incurred by Owner shall be verified by Architect and incorporated in a Change Order, but in finishing the Work, Owner shall not be required to obtain the lowest figure for the Work performed.

.11 Where Contractor's services have been so terminated by Owner, the termination shall not affect any rights of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

.12 Upon seven days' written notice to Contractor and Architect, Owner may without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, Contractor shall be paid for all Work executed and any expense sustained plus reasonable termination expenses.

1.55 PARAGRAPH 15.1 - CLAIMS

A. Supplement Paragraph 15.1.5 as follows:

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After the first sentence, add: "Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner, Architect and Construction Manager. No such claim shall be valid unless so made."

At the end of the Subparagraph, add: "Any change in the Contract Sum resulting from such claim shall be authorized only by Change Order or Construction Change Directive, as the case may be."

1.56 RESOLUTION OF CLAIMS AND DISPUTES

A. Delete the last sentence in Paragraph 15.2.5.

B. Delete Paragraph 15.2.6 in its entirety.

C. Delete Paragraph 15.2.6.1 in its entirety.

1.57 PARAGRAPH 15.3 - MEDIATION

A. Delete Paragraph 15.3 “Mediation”, in its entirety.

1.58 PARAGRAPH 15.4 - ARBITRATION

A. Delete Paragraph 15.4 "Arbitration” in its entirety and substitute the following:

15.4 - LITIGATION

15.4.1 The Owner and Contractor agree that all claims, disputes and other matters in question between the parties arising out of or relating to the Project or this Contract or breaches thereof, shall be heard in a Court of competent jurisdiction venued in the project's County, New Jersey, except as otherwise specified in N.J.S.A. 2A:30A-2.

END OF SECTION 00800

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SECTION 00850 - CONTRACT DRAWINGS

1.1 All Drawings listed on Drawing No. G001, "Title Sheet and Drawing Index," dated October 10, 2025, unless otherwise revised or amended (via Addenda, Bulletin, etc.), shall form a part of the Bid Documents.

END OF SECTION 00850

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SECTION 00860 - LAWS GOVERNING PUBLIC WORK

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The paragraphs below supplement the AIA A232 - 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

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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 the Municipal Land Use Law.

3.7.1.4 N.J.S.A. § 52:27d-126e (amended effective July 21, 2017) Waiver of construction permit surcharge or enforcing agency fee for construction, alteration, etc. to promote accessibility by persons with disabilities to existing public or private structures or facilities, or to promote accessibility by veterans with disabilities to their living units.

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

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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 their 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: The Contractor shall pay utility connection fees and shall be reimbursed by Owner within thirty (30) days of presentation and Owner approval of receipt for same.

C. Certificates of Occupancy: Contractor shall be responsible for obtaining all Certificates of Occupancy.

1.4 TIME INCLUDING COMPLETION

A. Supplement Article 8 "Time" as follows:

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

8.1.6 The term "Working Days" as used to compute the time of completion shall mean Mondays through Fridays, exclusive of the thirteen 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:

8.3.5 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:

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13.1.2 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 their 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 in Exhibit B, included with the Bid forms.

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:

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.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 is 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 them in connection with their 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), in accordance with 42 U.S.C. S121.01 et seq. The Owner 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 Act (Act) language form that is included in the bid forms. 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.

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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 Pursuant to N.J.S.A. 18A:18A-18(c), "in every case in which a [single overall Contract is awarded], all payments required to be made under such Contract for Work, goods and services supplied by a Subcontractor may, upon certification of the Contractor of the amount due to the Subcontractor, be paid directly to the Subcontractor."

1.9 ANNUAL 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.

1.10 PROMPT PAYMENT ACT

A. The Owner will issue timely payments, within 30 days after billing date, 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

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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.

1.11 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. The construction Contractors shall complete and submit an Initial Project Workforce Report Form AA-201 after notification of award. Proper completion and submission of this Report shall constitute evidence of the Contractor's compliance with the regulations. Failure to submit this form may result in the Contract being terminated. The Contractor also agrees to submit a copy of the Monthly Project Workforce Report, Form AA-202 once a month thereafter for the duration of the Contract to the Department of Labor and Workforce Development and to the Public Agency Compliance Officer. The EEO/AA evidence must be submitted after notification of award, but prior to signing a construction Contract. All Public Agencies must retain the affirmative action evidence in their files for review by the Division.

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. For more information, visit:

https://www.nj.gov/treasury/contract_compliance/documents/pdf/guidelines/pa.pdf

1.12 OFFICE OF THE STATE COMPTROLLER

A. N.J.A.C. 19:70-1.6 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 Contractor 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. N.J.A.C. 19:70-1.6 .

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B. Contractor/Vendor Requirements-Office of the New Jersey State Comptroller

1. Contractors/Vendors doing business with the Owner is 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 Owner.

1.13 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

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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.

1.14 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

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1.15 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.
   a. 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, attesting to their non-debarment from contracting with federal government agencies.
   b. The contracting firm agrees, by submitting this certification, that it is not included on any federal debarment list or the Workplace Accountability in Labor List (WALL) maintained by NJDOL under N.J.S.A. 34:1A-1.16, the law establishing the WALL.

1.16 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:6-7.1 *et seq.*, 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.

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4. As with any school employee, no person shall be employed 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.

1.17 LABOR-REGISTERED APPRENTICESHIP PROGRAM

1. As of May 1, 2019, N.J.S.A. 34:11-56.50, *et seq*. 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. N.J.S.A. 34:11-56.50.

1.18 NEW JERSEY PREVAILING WAGE ACT

1. An Act concerning certain Contracts for public work and amending and supplementing N.J.S.A. 34:11-56.27.
   a. N.J.S.A. 34:11-56.27a. Payment of prevailing wage rates; certification required of certain Bidders; rules and 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

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the provisions of this section.

2) N.J.S.A. 34:11-56.27. Required Contract provisions; liability of Contractor and Sureties for excess costs; rules and regulations.

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

1) 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).

2) 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.

3) The Contractor must complete and sign the "Prevailing Wage Certification" form included in the bid package and submit with their 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.

4) The prevailing wage rates in effect at the time of award, will be included by Owner as a part of the construction Contract.

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SECTION 00870 - MISCELLANEOUS REQUIREMENTS

PART 1 - GENERAL

1.1 JOB SITE MEETINGS

A. Regularly scheduled job meetings shall be held at a location and time convenient to the Owner's representatives, Construction Manager, Architect and the Contractor. The Contractor shall attend such meetings, or be represented by a person in authority who can speak for and/or make decisions for the Contractor.

B. 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, the failure to attend any regularly scheduled meeting shall constitute a breach of contract entitling the Owner to damages in the amount of $250 per meeting not represented by a person the Contractor has advised the Architect and Construction Manager has authority and who can speak for and/or make decisions for the Contract. Damages shall be deducted from the Contract Sum..

1.2 STRUCTURAL SAFETY STANDARDS AND CODES

A. The standards, codes and design data referred to in the New Jersey "State Uniform Construction Code", apply to the work of the Contract, where applicable.

B. Contractor shall comply with all applicable requirements of the Uniform Fire Safety Act N.J.S.A. 52:27D-192 et seq.

1.3 OWNER'S RIGHT TO OCCUPY

A. The Owner reserves the right to occupy any portion of the Project which is ready for occupancy prior to completion and acceptance of the Project, after Local Municipal Construction Enforcing Agency approval.

B. The occupancy of any portion of the Project does not constitute an acceptance of any work nor does it waive the Owner's right to liquidated damages or constitute an acceptance of any Work as the Project will be accepted as a whole and not in units. Prior to such occupancy, however, the Architect, Construction Manager, a representative of the Owner, and the Contractor shall fully inspect the portions of the Project to be occupied, preparing a complete list of omissions of materials, faulty workmanship, or any items to be repaired, torn out or replaced. The Owner will assume responsibility for damage to premises so occupied of any items not on this list when such damage is due to greater than normal wear and tear, but does not assume responsibility for improper or defective workmanship or materials.

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1.4 OWNER'S GENERAL REQUIREMENTS

A. The Owner requires that the Contractor demonstrate a safety and health program/plan, which includes, but is not limited to first aid, fire protection, housekeeping, illumination, sanitation, personal protective equipment, medical, exit, emergency action plans and all other issues required by governmental Agencies Having Jurisdiction over the work of this project.

B. The following Owner's General Requirements shall be enforced during construction and until final completion of the work:

1. No deliveries of construction materials or equipment is to take place during the arrival and departure of students from the/their respective school(s). Verify and coordinate arrival and departure time with the Principal(s).

2. All construction materials and equipment shall be stored behind the construction fence.

3. No smoking on any of the School's Property.

4. All workers must wear shirts at all time.

5. Use of profanity will not be tolerated.

6. The Contractor shall provide identification cards for their Subcontractors, employees, etc.

7. The Contractor shall comply with the requirements of all local ordinances including for noise.

8. The Contractor and their Subcontractors shall not interact with students or staff, other than those identified by the Owner as a representative of the Owner.

1.5 ENVIRONMENTAL PROTECTION

A. Conform to New Jersey Department of Environmental Protection Regulations N.J.A.C. 7:27, sub-chapters 5 and 7 and all other applicable standards.

B. Conform to New Jersey Statute N.J.S.A. 26:2C-9.2 which requires that no person shall construct, install, alter or operate any equipment capable of causing the emission of air contaminants into the open air or control apparatus which prevents or controls the emission of air contaminants until an application has been filed with and approved by the Department of Environmental Protection.

1.6 SOIL EROSION AND SEDIMENT CONTROL

A. Compliance with soil erosion and sediment control will be strictly enforced. Failure

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to conform to specified sequence of soil erosion and sediment control will result in imposition of penalties as levied by local Soil Conservation District, and withholding of payments for work not performed in accordance with soil erosion sequence.

1.7 RELATIONSHIP OF ARCHITECT AND CONSTRUCTION MANAGER

A. Where reference is made to "Architect" in these Specifications it will in some cases be interpreted as meaning "Construction Manager". Spheres of influence are defined in general as follows:

Architect:

Interpretation of Bid Documents.
Decisions relative to artistic effect.
Review and approval of shop drawings, product data, samples.
Review, recommendation and preparation of change orders.
Receipt of record drawings, operating and maintenance manuals.
Assistance with start-up, adjusting, operating and maintenance.
Review and recommendation of bid breakdown.
Review and approval of applications for progress payments.
Preparation of Punch Lists.
Close-out of Contract and determination of final completion.

Exclusions: Construction means, methods, techniques, sequences or procedures, safety precautions, acts or omissions of Contractor, Subcontractors, or any other persons.

Construction Manager:

Project meetings.
Monitoring of Contractors' work.
Review and approval of bid breakdown (Schedule of Values).
Review and forwarding of applications for progress payments.
Review and recommendations regarding proposed changes.
Administration of Progress Schedule and construction time schedules.
Assist in Preparation of Punch Lists.
Assist in Close-out of contracts and determination of final completion.

Exclusions: Construction means, methods, techniques, sequences or procedures, safety precautions, acts or omissions of Contractor, Subcontractors, or any other persons.

1.8 SEPARATE TRADES COORDINATION

A. The Contractor shall install the access doors, sleeves and inserts furnished to them, in the manner, and in the locations designated by the Contractor furnishing sleeves and inserts.

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B. The Contractor shall provide chases, recesses, and unsleeved openings in new construction work as required to accommodate the work of Subcontractors, provided Subcontractors requiring the chases, recesses, and other openings furnish the necessary information regarding size and location in the construction promptly, and in accordance with the established construction schedule, so that the chases, recesses, and other openings can be built-in by the Contractor as the Construction Work progresses.

C. The Contractor shall set anchor bolts and other accessories furnished to them, in the manner, and in the locations directed by the Subcontractor furnishing the anchor bolts and other accessories.

D. The Contractor shall provide foundations and supports for equipment furnished under the Contract, and foundations and supports shown on the Contract Drawings for equipment furnished by Subcontractors. All other foundations and supports shall be provided by the Subcontractor requiring the foundations and supports to accommodate the work.

1.9 CERTIFIED PAYROLLS

A. Pursuant to N.J.A.C. 12:60-5.1(c)(1)(i), the Contractor shall furnish to the Owner certified payroll records each payroll period within ten (10) days of the payment of wages, indicating name, craft, social security number and actual hourly rate of wages paid to each worker employed on the project. A certified payroll record is defined as "a payroll record which is attested to by the employer, or a corporate officer of such company, or an authorized agent of the employer."

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SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Work of this Section applies to all Construction Bid 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 Additions and Renovations to Littlebrook Elementary School for the Princeton Public Schools, Board of Education, Mercer County, New Jersey.

B. Bid Documents prepared by Fraytak Veisz Hopkins Duthie, P.C. Architects / Planners, (Project Number: FVHD-5516D) and their Consulting Engineer(s):

1. Consulting Civil Engineer: Edwards Engineering Group, an L2A Company, Somerville, NJ.

2. Consulting Structural Engineer: Harrison-Hamnett, P.C., Pennington, NJ.

3. Consulting Mechanical/Electrical Engineer: French & Parrello Associates, P.A., Wall, NJ.

1.4 CONTRACT SCOPE DESCRIPTION

A. The Work consists of but is not limited to the following:

1. All Site Work including indicated parking lot expansion, concrete curbs, 6' high chain link fence, playground pavement, mulch playground w/ timber border, concrete sidewalks, concrete ramp w/ concrete wall & aluminum handrails.

2. New Building Additions:
   a. Four Classrooms,
   b. Two Flex Classrooms with Self-Contained Toilet Rooms,

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c. Two Mechanical Rooms and Janitor's Closet,
d. Girl's and Boy's Multi-User Toilet Rooms,
e. Two Single User Toilet Rooms,
f. Vocal Music Room,
g. Corridors.

3. Alterations:
   a. Two Kindergarten Classrooms,
   b. Library and Staff Offices,
   c. Vocal Music Room and Gymnasium Storage Rooms.

4. Renovations:
   a. Cafeteria & Food Service Line,
   b. Instrumental Music Room.

5. Alterations to existing building at the connection of the new addition(s).

5. All plumbing, mechanical and electrical systems.

6. All indicated casework and equipment.

7. All other indicated Work.

B. Alternate Bids:

1. Alternate Bid No. LB1: Classroom Addition and all Related Work including Site Work

2. Alternate Bid No. LB2: Courtyard Improvements

4. Alternate Bid No. LB3: Renovation Work at Existing Music Room

5. Alternate Bid No. LB4: Serving Line Improvements

6. Alternate Bid No. LB5: Quartz Tile Flooring In Lieu of LVT at Cafeteria/Serving Area

7. Alternate Bid No. LB6: Parking Lot Expansion

C. Contract No. 2: This Contract includes:

1. All Work in accordance with Drawings, Parts 2, 3, 4, 5 and 6 Specification Sections and in accordance with Bid Documents.

2. General Construction Work includes:
   a. Work that is primarily architectural and civil 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:

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1) Also includes both administrative and coordination responsibilities.
    a) The Contractor is responsible for all coordination between their Work and Work of all of their Subcontractors.
2) All initial excavation and the preparation of the subbase under the concrete slab.
3) All earthwork, site utility Work outside the building (storm drainage, water service, and sanitary sewer), as specified in Part 2 Specification sections.
    a) **Site utility Work shall be from 5' outside the building line, unless indicated otherwise in the Bid Documents, and include final utility connections and obtaining permits from all Authorities Having Jurisdiction.**
4) All concrete Work in accordance with Part 2 Specification sections excluding concrete pads shown on mechanical and electrical Drawings for mechanical and electrical Work.
5) Provide and install the metal fabrications, aluminum handrails and railings and in accordance with Division 2 Sections.
6) All site lighting fixtures, poles and bases, where applicable.
7) Perform all existing roof cutting, alterations, repair, replacement and flashing Work associated with General Construction Work, where indicated or required.
    a) Roofing repair Work shall be performed in accordance with requirements of existing roofing system warranty and in accordance with the Bid Documents.
    b) Coordination of all required structural framing and supports for mechanical and electrical Work whether shown or not.
8) Furnish stainless steel sinks, fixtures, accessories and all items supplied by the casework and equipment Subcontractor in accordance with Drawings and Specification sections in Division 11, for installation by the Plumbing Work Subcontractor.
9) Furnish all electrical devices and items supplied by the casework and equipment Subcontractor in accordance with Drawings and Specification sections in Division 11 for installation by the Electrical Work Subcontractor.

2. Structural and Miscellaneous Steel Work includes:
    a. Fabrication and erection of structural steel, framing, metal deck, steel stairs, steel handrails, guardrails and railings and miscellaneous metal fabrications in accordance with Part-3 Specification sections.

3. Plumbing, Drainage Work includes:
    a. Piping servicing domestic water piping, gas piping, drainage systems and connection of equipment tied into the above types of systems and including all Work in accordance with Drawings and Part-4 Specification sections.
        1) Work shall include demolition and removals, as indicated or required, to allow for new construction.
        2) Work shall include reinstallation, cutting, patching, finishing and repair Work associated with Plumbing, Drainage System Work, as indicated or

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required, including Work at existing roofs; cutting, alterations, replacement and flashing Work, where indicated or required.

a) Roofing Work shall be performed in accordance with requirements of existing roofing system's warranty and the Bid Documents.

b. Subsequent excavation, backfill and compaction of trenches after the Work of the General Construction Work, as required by the installation of plumbing utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.

c. Concrete pads shown on mechanical Drawings for mechanical Work. Work shall be performed in accordance with requirements of Section 03300.

d. **Work shall be up to 5' outside the building line, unless indicated otherwise in the Bid Documents, and include final utility connections and obtaining permits from all Authorities Having Jurisdiction.**

4. Heating, Ventilating, Air Conditioning and Refrigeration Work includes:

a. Heating, ventilating, and air conditioning systems as well as the temperature control systems and including all Work in accordance with Drawings and Part-5 Specification sections.

1) Work shall include demolition and removals, as indicated or required, to allow for new construction.

2) Work shall include reinstallation, cutting, patching, finishing and repair Work associated with HVACR Work, as indicated or required, including performing Work at existing roofs; cutting existing roof decking, provide and install structural steel support, and all other roof flashing Work where indicated or required.

a) Furnishing and installing all required structural framing and supports for roof top mechanical equipment at existing building whether shown or not.

b) Structural framing shall be as per typical roof framing conditions as shown on Structural Drawings and/or as per approved shop drawings by the Architect / Structural Engineer.

c) Roofing Work shall be performed in accordance with requirements of existing roofing system's warranty and the Bid Documents.

b. Subsequent excavation, backfill and compaction of trenches after the Work of the General Construction above, as required by the installation of mechanical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.

c. Concrete pads shown on mechanical Drawings for mechanical Work. Work shall be performed in accordance with requirements of Section 03300.

5. Electrical Work includes:

a. The Work necessary for 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.

1) **Work shall include power distribution and wiring for all indicated electrically operated equipment and fixtures, (in Parts 2, 4, 5 and 6), whether shown or not on Drawings.**

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2) Work shall include demolition and removals, as indicated or required, to allow for new construction.
3) Work shall include reinstallation, cutting, patching, finishing and repair Work associate with Electrical Work, as indicated or required, including performing Work at existing roof(s); cutting existing roof decking, and all other roof flashing Work:
a) Roofing Work shall be performed in accordance with requirements of existing roofing system's warranty and the Bid Documents.

b. Subsequent excavation, backfill and compaction of trenches after the Work of the General Construction, above, as required by the installation of electrical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
c. Concrete pads shown on electrical Drawings for electrical Work. Work shall be performed in accordance with requirements of Section 03300.

1.5 WORK BY OTHERS

A. OWNER-FURNISHED PRODUCTS

1. Where indicated or shown that Owner will furnish products the Work of the Contract shall includes providing support systems to receive Owner's equipment, items and assemblies.

2. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.

3. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.

4. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.

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

6. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.

7. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.

8. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect / Construction Manager noting discrepancies or anticipated problems in use of product.

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9. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.

10. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.

11. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.6 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 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 (Sub)Contractor(s) shall be coordinated with the Owner's Representative / Construction Manager, prior to the delivery date.

1.7 PRECONSTRUCTION MEETING

A. A preconstruction meeting will be held at a time and place designated by the Architect/ Construction Manager for the purpose of identifying responsibilities of the

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Owner's / Architect's / Construction Manager's personnel and explanation of administrative procedures.

B. The (Sub)Contractor(s) 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. Construction Manager.
4. The Contractor and the superintendent.
5. Major Subcontractors, suppliers, and fabricators.
6. Others interested in the Work.

1.8 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

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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 Bid 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 in accordance with N.J.A.C. 6A:23A-21.1 and N.J.A.C. 5:30-11.

B. The types of allowances scheduled herein for the Work include the following:

1. Unit cost allowances.
2. 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.

1. For unit cost type allowances, submit (and revise where necessary) a substantiated survey of quantities of materials.

E. Unit Cost Allowances: Each change order amount for unit cost type allowance shall be based solely upon the difference between the unit purchase amount and the unit allowance; multiplied by the final measure or count of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins. Include installation costs in purchase amount only where indicated as included in the allowance. When requested, prepare explanations and documentation to substantiate margins as claimed. Prepare and submit separate substantiation of change in scope of Work (if any) claimed in the change orders related to unit cost type allowance.

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1. The Owner reserves the right to establish the actual quantity of work-in-place, by independent quantity survey, measure or count.

F. 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 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.

G. Change Order Mark-Up: Except as otherwise indicated, comply with the provisions of the General Conditions and the Supplementary General Conditions.

H. 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 amounts are included in the Contract Sum, for the corresponding units of Work as described.

1. Construction Work
   a. A sum of **$175,000.00** for Work not specifically shown on the Drawings, the Work shall be performed as directed in the field.
   b. A sum of **$10,000.00** for abatement of hazardous materials that may be uncovered during the work.
   c. A Unit cost allowance for brick delivered and stored at project site, as follows:
      1) Modular Face Brick - Running Bond, including special shapes - **$1,050.00 per 1,000**
   d. A sum of **$25,000.00** for receiving, unloading, handling and installing Owner furnished items, whether or not indicated on drawings

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2. Structural and Miscellaneous Steel Work
   a. A sum of **$12,000.00** (2 tons of steel @ $6,000.00 per ton) for additional fabricated and erected steel as defined by and specified in Section 05120, Structural Steel.

3. Electrical Work
   a. Additional outlets:
      1) Allow a sum of money in the Base Bid for **5** additional outlets, location to be selected by the Architect. Work will include the following:
         a) Conduit from closest panelboard, outlet box of size and type required, wire and connection to branch circuit protective device in panelboards.
         b) An outlet shall be as defined in the National Electric Code or American Standard with the addition of a local light control switch for lighting fixtures, which shall also be defined as an outlet.
         c) Include a unit price for one outlet, reflecting all of the above, in the proposal to be used in computing additions to or deductions from the Contract price.
   b. Moving outlets:
      1) The Owner, through the Architect, reserves the right to move any outlet a distance of 10 feet before roughing in without additional expense to the Owner.

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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 their 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 A232 and Section 00800 - Supplementary General Conditions.

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J. The following Alternate Bids shall apply to Contract No. 2 (FVHD-5516D) and Contract No. 3 (FVHD-5516C / 5516D) - single overall bid, and must be included in the Bidder's Proposal(s).

1.2 ALTERNATE BIDS - CONSTRUCTION WORK

A. **Alternate Bid No. LB1: Classroom Addition and all Related Work including Site Work**

State the amount to be added to the base bid to provide and install the Classroom Addition, all related Site Work and all other associated Work, as shown on various Drawings and as indicated in various Specification sections.

B. **Alternate Bid No. LB2: Courtyard Improvements**

State the amount to be added to the base bid to provide and install the Courtyard Improvements and all associated Work, as shown on various Drawings and as indicated in various Specification sections.

D. Alternate Bid No. LB3: Renovation Work at Existing Music Room

State the amount to be added to the base bid to provide and install Renovation Work at the existing Music Room and all associated Work, as shown on various Drawings and as indicated in various Specification sections.

E. **Alternate Bid No. LB4: Serving Line Improvements**

State the amount to be added to the base bid to provide and install the Serving Line Improvements and all associated Work, as shown on various Drawings and as indicated in various Specification sections.

F. **Alternate Bid No. LB5: Quartz Tile Flooring In-Lieu of LVT at Cafeteria/Serving Area**

State the amount to be added to the base bid to provide and install the Quartz Tile Flooring in-lieu of the Luxury Vinyl Tile (LVT) at the Cafeteria / Serving Area and all associated Work, as shown on various Drawings and as indicated in various Specification sections.

G. **Alternate Bid No. LB6: Parking Lot Expansion**

State the amount to be added to the base bid to provide and install the Parking Lot Expansion and all associated Work, as shown on various Drawings and as indicated in various Specification sections.

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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 Subcontractors.

G. Coordination of space.

H. Coordination of field measurements and field conditions.

1.3 GENERAL REQUIREMENTS

A. The Contractor shall coordinate their activities with the activities of their 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 their 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 Bid Documents.

B. Prepare and submit special coordination drawings where close and careful coordination of information is required for proper fabrication or installation of

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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.

3. (See also the requirements for the general coordination drawings under paragraph 1.7 below).

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.

D. Comply with requirements for requests for submittal of substitution indicated in AIA A232 and Section 00800.

1.5 COORDINATION MEETINGS

A. The Contractor shall hold additional coordination meetings and conferences with Subcontractors and others involved in the Work as needed to ensure coordination of work.

1. Notify the Architect and Construction Manager 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.

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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 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. In preparing the coordination drawings, large scale details as well as cross and longitudinal sections shall be developed as required to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features.

2. In preparing the coordination drawings, minor changes in duct, pipe or conduit routing that do not affect the intended functions may be made as required to avoid space conflicts, when mutually agreed, but items may not be resized or exposed items relocated or other features affecting the function or aesthetic effect of the building changed without the Architect's prior review and acceptance. It should be assumed that no changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, or window or other openings. If conflicts or interferences cannot be satisfactorily resolved, then the Architect shall be notified and their determinations obtained. Any conflicts or design deviations shall be specifically identified on drawings submitted to them.

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3. The coordination drawings shall be submitted, in all cases, in ample time to avoid construction delay. The coordination drawings submitted may lack complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items missing, as evidenced by the sign-off of the party responsible for the missing items. When the missing information is available, it shall be promptly incorporated in the composite drawings.

4. Cost and time impacts of relocating any duct, pipe, conduit, or other material that has been installed without proper coordination between all Trades involved will be charged to the responsible party. If any improperly coordinated work or work installed that is not in conformance with the approved coordination composites necessitates additional work, the cost and time impacts of all such additional work shall likewise be the responsibility of the affective party. The Architect shall be the sole judge in determining all responsibilities.

5. All changes in the scope of work due to revisions formally issued and approved shall be shown on the composite drawings.

6. All work on the coordination drawings shall be performed by a competent draftsperson and shall be clear and fully legible. The Architect shall be the judge of the legibility of the composite drawings.

7. In particular, prepare the following coordination drawings:
   a. Drawings showing all piping, duct, cabletrays, electrical ductbanks, and similar items, but not electrical conduit less than 4 inches in diameter.
   b. Complete architectural, mechanical and electrical reflected ceiling layouts, (including ductwork, conduits, piping, lighting, etc.).
   c. Special coordination drawings are to be provided for the following:
      1) Where space is limited, show plan and cross-section dimensions of space available, including structural obstructions and ceilings, as applicable.

B. The Contractor shall prepare the coordination drawings required for their work.

C. Layout Drawings: As soon as practical, but in no case starting later than thirty (30) days after the Contractor has received the notice to proceed, the HVACR Work Subcontractor shall prepare layout drawings of all duct work and piping at not less than 3/8" scale.

1. These drawings shall show registers, grilles, diffusers and similar features, as well as locations of all units, valves, dampers and other items requiring access for service and maintenance.

2. The drawings shall also show roof, floor and wall openings, reflected ceiling layouts, structural beams, framing and miscellaneous structural steel supports, ceiling heights, walls, floor to floor dimensions, structural columns, doors and

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other major architectural and structural features as shown on the Architectural and Structural Drawings and as per approved shop drawings.

D. Composite Drawings:

1. The HVACR Work Subcontractor shall, as scheduled by the Contractor, produce a mylar, two (2) prints and one (1) sepia of each layout drawing as described.

2. The sepia will be retained for their records while the mylar and two (2) prints will be formally transmitted to the Plumbing Subcontractor, with copies of the transmittal to the Architect.

3. These drawings must be hand delivered or sent via a reliable mailing service that provides receipts and guarantees 24-48 hour delivery.
   a. Common carrier mailing will not be acceptable.

4. The Plumbing Work Subcontractor, upon receipt of these mylars, will transfer the work from their shop drawings to the mylars, at the same time indicating where conflicts exist between their work and the work already shown on the mylars.
   a. The Plumbing Work Subcontractor will utilize a green colored pencil for the layout of their work.
   b. After completion, the Plumbing Subcontractor will forward the mylars and two (2) prints to the Electrical Subcontractor while retaining a sepia for their records.
   c. The same mailing procedures will pertain.

5. The Electrical Work Subcontractor will duplicate the procedure outlined above, utilizing orange colored pencil for their layout.
   a. After completion the Electrical Subcontractor will forward the drawings as specified above to the Fire Protection Work Subcontractor, (Plumbing Work Subcontractor), if applicable, who will layout their work with a red pencil and, after completion, forward the drawings to the Contractor, retaining a sepia for their records.

6. The Contractor shall then have the HVACR's instrumentation (ATC) Work Subcontractor review the completed composite drawings and attest to their concurrence that their work can be installed without conflict.

7. The Contractor will schedule coordination meetings on the job site to review the coordination drawings.
   a. These meetings will be attended by a representative from each of the Subcontractors involved in the coordination process.
   b. At these meetings, these Subcontractors will indicate where conflicts exist and resolve the conflicts through mutual agreement.
   c. Should an impasse occur, the Architect will determine the resolution.

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8. When all conflicts are resolved, the Subcontractors will indicate their agreement by signing these final composite drawings.

9. The drawings shall be signed-off by each of the involved Subcontractors, indicating their awareness of and agreement with the indicated routings and layouts and their interrelationship with the adjoining or contiguous work. The Contractor shall then sign these final composite drawings.

10. The final composite drawings shall be completed and signed-off by all parties no later than ninety (90) calendar days after the Contractor has received the Notice to Proceed.
    a. After the final composite drawings have been agreed upon and signed by the Subcontractors and by the Contractor, the Contractor shall provide and distribute prints to each of the Subcontractors, and four (4) sets of prints to the Architect and Construction Manager for reference and record purposes.
    b. The record copies of the signed-off final composite drawings shall be retained by the Contractor and each Subcontractor as working reference documents.
    c. All shop drawings, prior to their submittal to the Architect / Construction Manager, shall be compared with these composite drawings and developed accordingly.
        1) Any revisions to the composite drawings which may become necessary during the progress of the work shall be noted by the Contractor and by each affected Subcontractor and shall be neatly and accurately recorded on their record copies.

11. The Contractor and each Subcontractor shall be responsible for the up-to-date maintenance of their record copies of the composite drawings and for having one up-to-date copy available at the site.

12. The composite drawings, incorporating any subsequent changes thereto, shall be utilized by the Contractor or each Subcontractor in the development of their record drawings.

13. Following sign-off of the final composite drawings, no deviations will be permitted without prior review and acceptance by the Architect.
    a. Unauthorized deviations will be subject to removal and correction at no additional cost to the Owner.

14. In areas where no HVAC work occurs, but where other mechanical and electrical installations are required, each involved Subcontractor shall be responsible for their own work and shall cooperate, as directed by the Contractor, in preparing similar layout and composite drawings.

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1.8 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 Bid Documents to minimize disruption of Owner's activities.

C. Assemble and coordinate closeout submittals specified in Section 01700.

1.9 REQUIRED ADMINISTRATIVE / SUPERVISORY PERSONNEL

A. General: In addition to the other administrative and supervisory personnel required for the performance of the Work, the 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 shall provide a full-time staff member, (Project Manager / Superintendent), experienced in coordination of mechanical and electrical work on projects of this type and scale, including administration and supervision.
    a. Responsibilities:
        1) Coordinate all mechanical, plumbing, and electrical work, and coordinate that work with the other work of the project.
        2) Where space is limited, coordinate arrangement of mechanical, electrical, and other work to fit.
        3) Coordinate cutting and patching activities and sequencing.
        4) Coordinate use of temporary facilities.
    b. Prepare coordination drawings where required and where indicated.
    c. Provide information to the entity preparing the progress schedule.
    d. Participate in progress meetings; report progress, changes required in schedules, and unresolved problems.
    e. Review submittals for compliance with the Bid Documents and for coordination with other work.
    f. Check field dimensions, clearances, relationships to available space, and anchors.
    g. Check compatibility with equipment, other work, electrical characteristics, and operational control requirements.
    h. Check motor voltages and control characteristics.
    i. Coordinate controls, interlocks, wiring of switches, and relays.
    j. Coordinate wiring and control diagrams.
    k. Review the effect of changes on other work.
    l. Obtain and distribute installation data on each item of equipment requiring mechanical or electrical connections; include:

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1) Electrical power characteristics.
2) Control wiring requirements.

m. Observe and maintain record of tests and inspections.
n. Observe work for compliance with Bid Documents and notify the applicable Subcontractor in writing of observed defects in the work.
o. Coordinate and observe startup and demonstration of equipment and systems.
p. Coordinate maintenance of record documents.
q. Assist the Architect / Construction Manager with final inspections.

2. Subcontractor(s) shall provide staff for coordination between Trades. Staff requirements noted above represent the minimum full-time on site staff required.

3. Staffing is subject to Owner / Architect / Construction Manager's approvals.

4. Staff members may not be removed or replaced without Owner / Architect / Construction Manager's approvals.

5. Staff name(s), duties and resumes are to be submitted to the Architect / Construction Manger for approval within fifteen (15) days of the Notice to Proceed.

1.10 COORDINATION OF SUBCONTRACTORS

A. Coordinate work with Subcontractors 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 Bid Documents of the Subcontractors in the same location, coordinate and adjust items to fit within designated location(s).

C. Provide and install necessary offsets, bends, turns and modifications in piping, ductwork, conduit and devices required to install the work without interference with that of other Trades or structure, without additional cost to the Owner.

D. For products specified to be furnished by one (Sub)Contractor and installed by another (Sub)Contractor:

1. (Sub)Contractor specified to furnish (or remove) product shall be responsible for delivery to (or return from) the project site, and shall pay transportation costs.

2. (Sub)Contractor specified to install product shall be responsible for coordinating product delivery, loading or unloading, storing, protecting and installing product, as required.

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1.11 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.

B. Detailed Drawings of proposed departures from spatial arrangements or locations indicated in the Bid 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.

C. Where required for coordination, the Architect will have the authority to order, as changes in the Work, changes in locations and sizes of piping, ductwork conduit, raceways and ducts. Such changes shall be made without adjustment to the Contract Sum or Contract Time.

D. Field verify measurements of existing items and work which precedes each sequence. Ensure proper fit and location.

E. In finished areas, conceal pipes, ducts and wiring in the construction.

F. Coordinate locations of fixtures and outlets with finish elements.

1.12 COORDINATION OF FIELD MEASUREMENTS AND FIELD CONDITIONS

A. Prior to ordering materials or equipment or performing work, the Contractor and/or Subcontractors shall verify Bid Documents and submittal of dimensions and weights affecting their work and other (Sub)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 Bid 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 (Sub)Contractor.

D. No Change Order will be issued in cases where discrepancies in dimensions are discovered after work has been commenced or where the (Sub)Contractor has failed to properly investigate and take into account field measurements and existing field conditions.

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E. Inspection of Conditions: Require the Installer of each major component to inspect both substrate and conditions under which their work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

F. Recheck measurements and dimensions, before starting each installation.

1. Submit to the Architect for review any change in dimensions shown on the Bid Documents or submittals affecting physical size, shape or location of any part of the work, whether due to field conditions or other causes.

G. 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 (Sub)Contractor 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 Bid Documents.

H. Verify the size of shafts and chases, the adequacy of partition thickness and the clearance in double partitions and hung ceilings for proper installation of work.

1. (Sub)Contractors shall cooperate in arranging their work with other (Sub)Contractors whose work is in the same spaces.

2. The amount of space occupied by each Trade's work shall be kept to the minimum required.

3. Arrange for chases, slots and openings in other building components during progress of construction, to allow for timely installation of work.

I. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

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J. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

K. 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 Bid Documents whether or not indicated by a reference in Specification or as may be in detail shown on Drawings and schedules.

L. 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.

M. 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.

N. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.

O. 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

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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 Bid 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 building 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**

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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. 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

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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 16 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 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

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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

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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 Subcontractors. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

F. Mock-Ups: Provide mock-ups for Architect / Construction Manager approval for each proposed patching method. Do not proceed with patching Work until obtaining of approvals from the Architect / Construction Manager.

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.

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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 Contractor shall verify all existing work area conditions; building lines, lengths, corners and all other dimensions.
   a. The Contractor shall engage a Licensed Professional Land Surveyor (PLS) to perform layout of the building and site elements. In addition, for building additions, the PLS shall verify all existing wall dimensions, angles, center lines, alignment points and other information which affect building closure. They shall also confirm floor to floor heights where applicable as well as any other vertical dimensions required for the execution of the work. 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.
   b. All survey Work must be done immediately in order to facilitate preparation of steel shop drawings by Steel Work Subcontractor.

2. The Contractor shall submit information and survey to Subcontractor(s), the Architect / Construction Manager for all required coordination of new construction and all other related site work.

3. The Structural Steel Work Subcontractor shall verify and confirm floor to floor elevations and building dimensions with the Contractor prior to start of preparation of shop drawings for steel Work.

4. Prior to work of this section, verify information and survey submitted by the 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 and the Construction Manager.

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.

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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 their 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 Contractor shall provide all required and necessary pockets in concrete and masonry walls and in roof assemblies including all required cutting, and preparation Work to allow for installation of new structural steel framing, supports, lintels, bearing plates, dunnage, etc. The Contractor shall subsequently patch, as required, to restore and prepare surfaces to receive new finishes.
   a. Cutting roof decking, roof flashing, patching and associated roofing Work in new addition shall be performed by the Contractor.
   b. Cutting roof decking, roof flashing, patching and associated roofing Work in existing building, where no roofing replacement is indicated or required, shall be performed by the Subcontractor for Work included under their Contract.

3. All repairing, patching, piecing out, filling in, restoring and refinishing shall be neatly done by craftsworkers 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 (Sub)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

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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. Mechanical and Electrical Services:
   a. Cut off pipe or conduit in walls or partitions to be removed shall be performed by respective Trade.
   b. Cap, valve, or plug and seal remaining portion of pipe or 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.

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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 and/or built-in cabinets 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.

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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 their 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 (Sub)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 <u>will not</u> 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/ Construction Manager 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 them to their 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.

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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 Contractor shall be responsible for performing their 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 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 / Construction Manager’s approval prior to proceeding with Work.

B. Contractor shall acquaint themself with the general character of the Owner's operations prior to commencing Work and shall schedule their 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, Construction Manager and the Owner.The Contractor shall not perform Work in occupied areas without giving the Owner 72 hours written notice of their 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

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equipment with adequate time allowed to complete the installations to conform to the project completion date.

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SECTION 01151 - UNIT PRICES

PART 1 GENERAL

1.1 PROCEDURE

A. Bidder shall insert on the Proposal Form, all Unit Prices applicable to the work under their bid. Unit Prices will be used as the basis for computing "additions to" or "deductions from" the Contract Price for extra work and for work countermanded, reduced or omitted.

B. Except as otherwise provided in the General Conditions, the Unit Prices when accepted, adjusted or established by the Contract shall remain binding and irrevocable for the entire period of the Contract, regardless of the quantities of work ordered or required under such Unit Prices.

C. The acceptance of the Unit Price is on condition that the general character of the material and workmanship required for any work related thereto shall be equivalent to corresponding work as shown and specified, and that all costs, overhead and profit, as well as all incidental work required in connection therewith, has been included in the Unit Price.

1.2 RULES OF MEASUREMENT: EARTHWORK

A. Except as provision is made hereinafter for arbitrary measurement, the quantity of excavation shall be its in-place volume before removal.

B. The reference point for computing changes in depth shall be the plan grade at which the change starts.

C. No allowance will be made for excavating additional material of any nature taken out for the convenience of the Contractor beyond the quantity computed under these Rules of Measurement.

D. General excavation for building addition shall arbitrarily be assumed to extend to vertical planes 2 feet outside of the outside wall lines and to the elevation of the plan subgrade.

E. Excavations shall be in accordance with OSHA requirements and that excavations should be shored and braced, as needed, to avoid encroaching into existing site improvements that are noted to remain undisturbed.

F. Excavation for a footing (the pad) under a wall shall be measured as the neat plan width and depth of the footing

G. Rock excavation shall arbitrarily be assumed to extend to vertical planes one foot beyond wall lines, pipe, etc., and to 6 inches below the established elevations.

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H. Excavation for footings for columns or piers shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the bottom of the footing.

I. Excavation for sump and other pits shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the plan of the bottom of the construction installed (out to out of pit walls).

J. The volume of backfill shall be the volume of excavation computed under these Rules of Measurement, less the volume of actual displacement by walls, beams, columns, piers, footings or other construction installed.

K. Concrete quantities shall be computed from plan size, or if there are no Drawings, from actual measurement of the work ordered and placed.

1.3 UNIT PRICES - GENERAL CONSTRUCTION, PLUMBING AND DRAINAGE, HEATING, VENTILATING AND AIR CONDITIONING, AND ELECTRICAL: EARTHWORK

A. Bulk Rock and Trench or Pit Rock Excavation requiring jackhammering - Per Cubic Yard. Price shall include the breaking up of the rock by other means as directed by the Architect and its removal from the site, specified for other excavated material, and shall be the price over and above the price for earth excavation.

Unit Price for bulk rock shall be $ **300.00** per cu. yd.

Unit Price for trench or pit rock excavation shall be $ **400.00** per cu. yd.

If the Contractor cannot perform the work at the given unit price, they shall accept for consideration Subcontractor's price suggested by the Owner and/or the Architect.

1.4 UNIT PRICES - GENERAL CONSTRUCTION: Materials in Place.

Excavation (unsuitable soil) $_____per cu. yd.

Certified, clean compacted fill $_____per cu. yd.

Bituminous Paving (including subbase) $_____per sq. yd.

Concrete Curb $_____per lin. ft.

Concrete Walk (including subbase) $_____per sq. ft.

Cement Based Self Leveling Underlayment per Section 03452 $_____per sq. ft.

Labor to receive, unload, and handle Owner provided item from truck and install in location directed by Owner $_____laborer/hour

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Replacement of existing damaged or deteriorated metal decking $_____per sq. ft.

Replacement of existing wet or deteriorated roof insulation board $_____per sq. ft.

Replacement of existing damaged or deteriorated wood nailers/blocking or framing, including removal of existing deteriorated wood, furnishing and installing new galvanized anchor bolts, expansion bolts at 4'-0" o.c. or nails through existing construction to remain: $_____per board ft.

a. 2x4 for the above work $_____per lin. ft.
b. 2x6 for the above work $_____per lin. ft.
c. 2x8 for the above work $_____per lin. ft.
d. 2x10 for the above work $_____per lin. ft.
e. 2x12 for the above work $_____per lin. ft.

UNIT PRICES - PLUMBING & DRAINAGE: Materials in Place.

Plumbing Item / Unit

3″ cast iron pipe below grade $_____per lin. ft.

4″ cast iron pipe below grade $_____per lin. ft.

6″ cast iron pipe below grade $_____per lin. ft.

2" cast iron above grade $_____per lin. ft.

3" cast iron above grade $_____per lin. ft.

4" cast iron above grade $_____per lin. ft.

2-1/2″ Type ‘L’ copper tubing $_____per lin. ft.

3″ Type ‘L’ copper tubing $_____per lin. ft.

2" piping insulation $_____per lin. ft.

4" piping insulation $_____per lin. ft.

1" black steel schedule 40 pipe $_____per lin. ft.

1-1/2" black steel schedule 40 pipe $_____per lin. ft.

2" black steel schedule 40 pipe $_____per lin. ft.

1" Ball valve $_____per unit

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1-1/2" Ball valve $_____per unit

2" Ball valve $_____per unit

3″ Ball valve $_____per unit

Thermostatic mixing valve MV-1 $_____per unit

Floor drain FD-1 $_____per unit

Fire Protection Item / Unit
Sprinkler head with associated 1″ branch piping
(approx. 5′-0″ length) $_____per unit

1.5 UNIT PRICES - HEATING AND VENTILATING: Materials in Place.

7/8″ Type 'L' Copper with brazed joints (refrigerant piping) $_____per lin. ft.

1/2″ Type 'L' Copper with brazed joints (refrigerant piping) $_____per lin. ft.

7/8″ Piping insulation (refrigerant piping) $_____per lin. ft.

1/2″ Piping insulation (refrigerant piping) $_____per lin. ft.

3/4″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe,
Class 150 w/ Threaded Joints (ground source water piping) $_____per lin. ft.

3/4" Ground source piping insulation $_____per lin. ft.

1″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe,
Class 150 w/ Threaded Joints (ground source water piping) $_____per lin. ft.

1" Ground source piping insulation $_____per lin. ft.

1-1/2″ Type 'L' copper with brazed joints or Sch 40 Steel pipe,
Class 150 w/ Threaded Joints (ground source water piping) $_____per lin. ft.

1-1/2" Ground source piping insulation $_____per lin. ft.

2″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe,
Class 150 w/ Threaded Joints (ground source water piping) $_____per lin. ft.

2" Ground source piping insulation $_____per lin. ft.

2-1/2″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe,
Class 150 w/ Threaded Joints (ground source water piping) $_____per lin. ft.

2-1/2" Ground source piping insulation $_____per lin. ft.

3″ Type 'L' Copper with brazed joints or Sch 40 Steel pipe,

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Class 150 w/ Threaded Joints (ground source water piping)	$_____per lin. ft.
3" Ground source piping insulation	$_____per lin. ft.
Condensate Pump	$_____per unit
12" x 8" Volume Damper	$_____per unit
24″ x 24″ Ceiling Diffuser	$_____per unit
24″ x 24″ Ceiling Register	$_____per unit
24″ x 12″ Ceiling Registers	$_____per unit
24″ x 14″ Supply Grilles	$_____per unit
46″ x 46″ Return Grilles	$_____per unit
Unitary Controller	$_____per unit
Thermostat	$_____per unit
Ball Valve, under 1″	$_____per unit
Ball Valve, 1″	$_____per unit
Ball Valve, 1-1/2″	$_____per unit
Ball Valve, 2″	$_____per unit
Ball Valve, 2-1/2″	$_____per unit
Ball Valve, 3″	$_____per unit
Balancing Valve, 1″	$_____per unit
Balancing Valve, 1 ½"	$_____per unit
Balancing Valve, 2″	$_____per unit
Balancing Valve, 2 ½″	$_____per unit
Balancing Valve, 3″	$_____per unit
Galvanized Steel Ductwork (Rectangular) 20" x 12"	$_____per lb.
Single-Wall Round Ductwork 12" diameter	$_____per lb.
Double-Wall Round Ductwork 12" diameter	$_____per lb.
1-1/2" Mineral-Fiber Board Duct Insulation (Indoors)	$_____per sq. ft.

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2" Mineral-Fiber Blanket Duct wrap Insulation (Indoors) $_____per sq. ft.

2" Mineral-Fiber Board Duct Insulation (Outdoors) $_____per sq. ft.

1.6 UNIT PRICES - ELECTRICAL WORK: Materials in Place.

20A-1 Pole branch circuit installation 600V, including MC cable and termination. $_____per lin. ft.

20A-1 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

30A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

50A-3 Pole branch circuit installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

60A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

70A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

80A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

90A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

100A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

150A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

200A-3 Pole feeder installation 600V, including EMT conduit, THHN wire and termination. $_____per lin. ft.

20A Tamper-resistant receptacle including back box, plate, conduit and wiring to the nearest device(20') $_____per unit

20A Tamper-resistant GFCI receptacle including back box, plate, conduit and wiring to the nearest device(20') $_____per unit

20A Single pole light switch including back box, plate, conduit and wiring to the nearest device(20') $_____per unit

20A Single pole three way light switch including back box,

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plate, conduit and wiring to the nearest device(20') $_____per unit

Fire Alarm smoke/heat detector including wiring, programming and testing. $_____per unit

Fire Alarm duct smoke detector including wiring, programming and testing. $_____per unit

Fire Alarm Horn/strobe including wiring, programming and testing. $_____per unit

Fire Alarm monitor/control module including wiring, programming and testing. $_____per unit

Fire Alarm door holder including wiring, programming and testing. $_____per unit

Fire Alarm Pull station including wiring, programming and testing. $_____per unit

Fire Alarm Device Wire mesh device guard. $_____per unit

Junction Box and 3/4" Empty conduit with drag line and bushing at each end. $_____per lin. ft.

Junction Box and 1" Empty conduit with drag line and bushing at each end. $_____per lin. ft.

Junction Box and 2" Empty conduit with drag line and bushing at each end. $_____per lin. ft.

(1) Ceiling mounted occupancy sensor as indicated on Contract Drawings. $_____per unit

(1) Wall switch occupancy sensor as indicated on Contract Drawings. $_____per unit

Combination Voice & Data communication outlet including backbox, wall plate, conduit and Cat6 cable to IDF room. $_____per unit

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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, Construction Manager and their consultants, the Contractor and their 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 Bid 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

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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 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 and Construction Manager 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. Bid 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, the Architect and the Construction Manager.

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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 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 Construction Manager / Architect will schedule and conduct regular progress meetings as follows:

1. Weekly meetings with the Contractor and Subcontractors.

2. 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 the field office of 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 Construction Manager, 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.

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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 and the Construction Manager.

1. Unless given prior approval by the Construction Manager / Architect in writing not to attend meetings, Contractor will be fined **$250.00** for each regularly scheduled meeting for which they are 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.

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SECTION 01325 - CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: To assure adequate planning and execution of the work so that the completion of the work is within the time proposed and allowed in Section 01800 and other documents in the Contract, and to assist the Owner in appraising the reasonableness of the proposed schedule and in evaluating progress of the work, prepare and maintain the schedules and reports described in this section.

B. Preliminary Construction Schedule ("Construction Summary by Phase") and Phasing Plan:

1. The preliminary project schedule provided herein is intended to be used as a guide by the Contractor during the Bidding and the Construction Phases.

2. The Construction Manager, the Architect and the Owner will not be held liable for the scheduled activity durations identified in the schedule.

3. The Phasing Plan provided with Bid Documents is intended to provide the Contractor with a basis for scheduling construction to satisfy Owner's requirements.

1.2 QUALITY ASSURANCE

A. Qualifications of Scheduling Personnel: Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule data, in analyzing by use of Critical Path Method or PERT, and in preparation and issue of periodic reports as required below.

B. Reference Standards: Perform all data preparation, analysis, charting, and updating in accordance with all recommendations contained in the current edition of "CPM in Construction" Manual of Associated General Contractors, (or in accordance with other standards approved).

C. Reliance upon Approved Schedule:

1. The Contractor's CPM construction schedule shall be an integral part of the Contract, shall incorporate the milestone Contract Completion dates specified elsewhere in the Bid Documents (Section 01800), for each Building/Phase, and shall establish interim completion dates for all construction activities related to each Phase.

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2. It is the responsibility of the Contractor to obtain all necessary information from Prime Subcontractors, Suppliers, the Owner, Architect, Engineers, Owner's Representative, and any other entities with whom the schedule must be coordinated.

3. Should any activity not be completed within 7 calendar days after its scheduled completion date, the Owner shall have the right to order the Contractor to expedite completion of the activity by whatever means the Owner deems appropriate and necessary, without additional compensation to the Contractor.

4. Should any activity be 15 or more calendar days behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.

5. The Contractor shall reimburse any costs incurred by the Owner in connection with expediting construction activity under this Article to the Owner.

6. It is expressly understood and agreed that failure by the Owner to exercise the option to either order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered precedent setting for any other activities, nor shall it relieve the Contractor of the obligation to complete the Work of each Phase by the Contract milestone date.

1.3 SUBMITTALS

A. General: Comply with the provisions set forth herein.

B. Coordination: The Contractor shall be responsible for preparation/submission of all scheduling documents. The Prime Subcontractors shall provide the Contractor information required to prepare the Preliminary Analysis, Construction Schedule and Periodic Reports. Failure of any one or more Prime Subcontractors to provide information requested in a timely manner shall result in the Owner withholding payments until such information is provided.

C. Preliminary Analysis: Within ten (10) calendar days after issuance of Notice to Proceed, submit one electronic copy, one reproducible copy and four prints of a preliminary construction schedule prepared in accordance with Part 3 of this Section.

Note: No initial Application for Payment will be approved for payment prior to submission of these items.

D. Construction Schedule: Within fifteen (15) calendar days after issuance of Notice to Proceed, submit one electronic copy, one reproducible copy and four prints of construction schedule prepared in accordance with Part 3 of this Section.

Note: No second Application for Payment will be approved for payment prior to submission of and approval of the Contractor's Construction Schedule.

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E. Periodic Report:

1. On the first working day of each month following submittal described in Paragraph D. above, submit one electronic copy and four prints of the construction schedule updated as described in this Section.

2. On a weekly basis, on the day determined at the Pre-Construction Meeting, submit the Weekly Status Report updated and described in this Section.

F. Processing of future Applications for Payment shall be conditioned upon timely submission of Periodic Reports.

PART 2 - PRODUCTS

2.1 CONSTRUCTION ANALYSIS

A. The Contractor's Construction Schedule shall be prepared using Primavera Project Planner (latest version) software by Primavera Systems, Inc. or other scheduling software approved in advance by the Construction Manager. The Contractor shall provide copies of all required items on paper media as well as on hard disk.

1. In the event the Contractor receives approval to utilize a scheduling software other than Primavera Project Planner latest Version, the Contractor shall provide, at no additional cost to the Owner, one licensed copy of such software, in the unopened original packaging with all documentation, original software and manuals.

B. Logic Diagram: Graphically show the order and interdependence of all activities necessary to complete work, and the sequence in which each activity is to be accomplished as planned by the Contractor and the project field superintendent in coordination with all Prime Subcontractors whose work is shown on the diagram. Activities shown on the diagram shall include, but are not necessarily limited to:

1. Project mobilization;

2. Project Phasing and Milestones;

3. Submittals and approvals of Shop/ Coordination Drawings, Color Selections and Samples;

4. Procurement of equipment and critical materials (required for any item with a lead time exceeding 20 calendar days);

5. Fabrication of special material and equipment and their installation and testing;

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6. Activities corresponding to entries on the Schedule of Values in accordance with E. below;

7. Inspections by the Local Construction Office and Testing and Inspection by the Contractor's consultant;

8. Required Pre-Installation Meetings;

9. Building Enclosure (temporary and permanent) and required heat/ climate control;

10. Completion and occupancy of individual phasing areas per Phasing Plan;

11. Final clean-up;

12. Final inspection and testing;

13. All activities by the Owner's or Owner's separate Contractor(s) that effect progress, required dates for completion, or both, for all and for each part of the work.

C. The detail of information shall be such that duration times of activities shall normally range from one to twenty days (except for long lead fabrication and delivery activities as required herein). The selection and number of activities shall be subject to the Owner's approval.

1. Show on the diagram, as a minimum for each activity, preceding and following activity numbers, description of each activity, cost, and activity duration in calendar days. Submit diagram on a sheets 24-30 inches high by 36-42 inches wide required.

2. Mathematical Analysis: Furnish a mathematical analysis of the diagram by computer-aided means, including a tabulation of each activity. Show the following information as a minimum of each activity:
   a. Preceding and following activity number(s);
   b. Activity descriptions;
   c. Earliest start date (by calendar date);
   d. Latest start date (by calendar date);
   e. Earliest finish date (by calendar date);
   f. Latest finish date (by calendar date);
   g. Total float (by calendar days);
   h. Monetary value of the activity;
   i. Percentage of activity completed;
   j. Contractor's earning based on portion of activity completed.

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D. The means used in making the mathematical analysis shall be capable of compiling the total value of completed and partially completed activities, and be capable of accepting modifications approved for time and logic adjustments.

E. Cost Loading of Schedule: The Contractor's Construction Schedule shall be "cost-loaded" such that the schedule shall reflect the planned sequence of work and billing of the Contract and shall be coordinated with the schedule of values as otherwise required. On a monthly basis, the value of any monthly Application for Payment shall conform to the value of work completed as reflected on the Monthly Project Schedule Updates.

F. Periodic Reports: List all activities in computer printouts, sorted as follows:

1. By the activity identification number (overall and by phase/area).
2. By the amount of total float.
3. By early start, then by early finish and then by total float.
4. Provide a hard disk copy of the Periodic Reports required.
5. Other sorts requested by the Owner.

2.2 WEEKLY STATUS REPORTS

A. Format: The Contractor shall submit weekly status reports in the form supplied at the Pre-Construction Meeting to provide sufficient pertinent data to determine that work and materials procurement flow is adequate for all needs of the work.

B. Content: Show at least the following information:

1. For Work:
   a. All activities commenced in the preceding two (2) weeks (by area and activity number from the approved Project Schedule).
   b. All activities completed in the preceding two (2) weeks (by area and activity number from the approved Project Schedule).
   c. All activities upon which work was performed in the preceding two (2) weeks (by area and new percentage complete conforming to Project schedule information).

2. For Materials: Maintain a database of major items of material to provide weekly update of the buy-out and delivery status showing:
   a. Item Description, listed in accordance with Specifications Section Number in which the item is called for (Note Project Schedule Activity number for all applicable items).
   b. Purchase Order No. and Date of Issue.
   c. Vendor Name.
   d. Date Shipped and Shipping Means Utilized.
   e. Estimated Date of Arrival at Job Site.
   f. Actual Date of Arrival at Job Site and Receiving Report Number.

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C. Data Processing: Process the data by computer-aided methods to a degree of promptness and accuracy assuring complete display of all pertinent current information at date of each periodic report. Provide a hard disk copy of each Weekly Status Report.

PART 3 - EXECUTION

3.1 PRELIMINARY ANALYSIS

A. Contents:

1. Show all activities of the Contractor under this work for the period between receipt of Notice to Proceed and Submittal of Construction Schedule required as noted above.

2. Show the Contractor's general approach to remainder of the work.

3. Show cost of all activities scheduled for performance before submittal and approval of the construction schedule.

B. Submittals shall be in accordance with other Division 1 provisions.

3.2 CONSTRUCTION SCHEDULE

A. As soon as practicable after Contract award, and not later than fifteen (15) calendar days after the issuance of the Notice to Proceed, the Contractor must gather scheduling data from all Prime Subcontractors and complete the Construction Analysis described in Article 2.01 above, in preliminary form. The Contractor must then conduct a Scheduling conference attended by all Prime Subcontractors, the Architect and the Construction Manager, review contents of proposed construction schedule, and make all revisions agreed upon at the Scheduling Conference. Submit in accordance with Article 1.03 above.

B. All Prime Subcontractors must submit required scheduling data to the Contractor within ten (10) calendar days after Contract award.

3.3 WEEKLY STATUS REPORT

A. Prepare, update and review with Prime Subcontractors and Suppliers weekly in accordance with Articles 1.03 and 2.02 above.

3.4 PERIODIC REPORTS

A. Construction Schedule, Contents:

1. Report actual progress by updating the mathematical analysis.

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2. Note on the summary report, or clearly show on a revised issue of affected portions of the detailed diagram, all revisions causing changes in the detailed program.

3. Revise the summary report as necessary for clarity.

4. Show activities or portions of activities completed during the reporting period and their actual value.

5. State the percentage of work actually completed, the schedule as of the report date, and the progress along the critical path in terms of days ahead of or behind the allowable dates.

6. If the work is behind schedule, also report progress along other paths with negative float.

7. Include a narrative report which shows, but is not necessarily limited to:
   a. A description of the problem areas, current and anticipated;
   b. Delaying factors and their impact;
   c. An explanation of corrective actions taken or proposed.

8. Show the date of latest revision. Submit in accordance with the provisions above.

B. Weekly Status Reports

1. On the letter of transmittal accompanying periodic reports, on an accompanying summary sheet, or by other means acceptable to the Construction Manager and Architect, clearly indicate those items of construction which, or materials the delivery of which are critically overdue or otherwise hazardous to maintenance of the approved schedule.

2. Submit in accordance with the provisions above.

C. Revisions: Make only those revisions to the approved Construction Schedule as are approved by the Architect/Owner.

END OF SECTION 01325

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SECTION 01380 - CPM SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall prepare and submit a construction schedule based upon input from the Prime Subcontractors as set forth in Section 00800.

B. The schedule shall include line items for the following information broken down by trade:

1. Contractual milestone dates as set forth in Section 01800.
2. Critical and long-lead item delivery dates
3. Owner activities including move-in/occupancy time
4. Critical inspections or testing
5. Other critical activities appropriate to project
6. Separate activity lines for new additions and renovation areas
7 Punch list and final completion period

C. The Construction Schedule shall be completed within thirty(30) days of the notice to proceed. The Contractor shall distribute copies to the Owner, Architect, Construction Manager and Subcontractors. The Contractor shall provide a sign-off block for signature by all Prime Subcontractors indicating their acceptance of the schedule. All Subcontractors shall sign off on the schedule at the job meeting closest to the date of distribution. Failure to submit a monthly schedule update will be grounds for the withholding of payments.

D. Schedule updates shall be provided at least monthly but more often if requested by the Owner or Architect. The monthly update shall be distributed by the Contractor to all Subcontractors for purposes of providing input. Each monthly update shall include a progress bar for each activity. The monthly update shall be submitted to the Architect, Construction Manager and Owner each month prior to the requisition cut-off date. Failure to submit a monthly schedule update will be grounds for the withholding of payments.

E. The project will be scheduled and monitored using a construction schedule; Critical Path method (CPM) techniques. The Contractor will prepare all schedules and all periodic updates based upon information furnished by the Prime Subcontractors and observations of the work in progress. Revisions of the schedule to reflect changes in the Contractors' plan of performance or modifications of the Bid Documents will be prepared by the Contractor.

F. This section describes the CPM Progress Schedule requirements. Each Prime Subcontractor shall provide all necessary information in connection with their Work to enable the Contractor to comply with these requirements. Further, each Prime Subcontractor shall provide such information in a timely manner to permit the

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Contractor to comply with the time requirements stated herein.

G. Monthly update conferences will be held with all concerned. At these update conferences, the attendees will review actual progress, planned progress, planned progress for the next period, change orders, job issues, and any schedule changes since the previous update. Attendance in mandatory. Contractor current estimate payments are contingent upon attendance and the provision of satisfactory CPM base schedule and update information. The monthly update conference may be scheduled more frequently when required, at the direction of the Contractor.

H. The Contractor shall prepare, based upon information obtained from the Subcontractors, and maintain a detailed Progress Schedule as described below. The schedule shall reflect the Contractor's working schedule and be used to plan, organize and execute the work, record and report actual performance and progress, and show how the Contractor plans to complete all remaining work. The schedule shall be in the form of an activity oriented network diagram (Critical Path Method) I-J format. The principles and definition of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication "The Use of CPM in Construction", Copyright 1976. In the event of discrepancies, this section shall govern the development and utilization of the Progress Schedule.

I. The completed schedule shall be distributed to all Prime Subcontractors. When the schedule is approved by each Prime Subcontractor, the Owner, Architect, Construction Manager or their agents will review the schedule for conformance with the Contract requirements, and it shall become one of the Bid Documents.

1. This schedule may be revised to show changes in the Contractors' method of their agreement that the Progress Schedule represents their intentions and interpretations of the requirements of the Contract.

1.2 PRE-BID SCHEDULE

A. The Pre-bid Schedule outlined in Section 01800 indicates a general sequence of activities leading towards the completion of the Contract work within the milestones noted.

B. The sequence of operations and the time estimated for activities on the Pre-bid Schedule are shown for information only and are not to be considered binding. Means, Methods, and Procedures are at the discretion of each Prime (Sub)Contractor. Specific interfaces between Subcontractors will be planned in the Progress Schedule process described below. However, the Contract completion date and any milestone dates for substantial completion are binding. The actual date when written Notice to Proceed is issued will be used in the CPM Logic Diagrams to calculate the milestone dates for those dates contingent on the Notice to Proceed date and will be used to prepare the Official Construction Schedule, using the (Sub)Contractor's proposed sequence of work and duration of activities.

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1.3 PRELIMINARY SCHEDULE

A. Within (10) working days of Notice to Proceed (NTP), all Prime Subcontractors shall participate in an initial scheduling conference. Attendance is mandatory for all Subcontractors. Each Subcontractor will submit as a minimum, a detailed ninety (90) day work plan in arrow/activity format for approval together with a generalized project schedule network, in summary form, meeting the contractual milestone dates. During this meeting the schedule will be developed from input furnished by each Prime Subcontractor. Until the formal schedule has been developed and is approved by the Architect and Construction Manager, the ninety (90) day work plan will serve as the official construction schedule after the review and coordination with each Prime Subcontractor.

B. Where such coordinated work is required, (Single Overall Contract), the Contractor shall schedule reasonable durations and provide proper advance notice for the work of the Prime Subcontractors to the extent that normal time work is accommodated without the need for overtime or shift work.

C. The Contractor shall develop a 90-day Schedule within ten (10) working days after the initial scheduling conference, utilizing input from Prime Subcontractors. This schedule will be in arrow network form, with each node calendar date based on "early start, early finish" of each work activity. The 90-day Schedule will contain work activities over the first ninety (90) days, estimated duration for each work activity will be fifteen (15) work days or will show the key procurement items which will occur during the first ninety (90) days of the project in addition to the field work.

1.4 DETAILED SCHEDULE

A. Within thirty (30) calendar days of Notice to Proceed (NTP), all Prime Subcontractors shall participate in a detailed scheduling conference. Attendance is mandatory. Each Prime Subcontractor shall submit network based coordinated CPM Schedule information to the Contractor for review. Each Subcontractor shall work with the Contractor to prepare the CPM network in a sketch format and, unless otherwise approved by the Owner's Representative, shall meet each consecutive day for eight (8) hours minimum until a useable, logical CPM schedule network, responsive to the project requirements, has been developed as determined by the Owner's Representative. Non-critical path activities shall be scheduled to reflect the float status shown on the Preliminary Construction Schedule unless otherwise approved by the Construction Manager and the Architect.

B. Where coordinated work is required, the Contractor shall schedule reasonable durations and proper advance notice for the work of the Prime Subcontractors to the extent that normal time work is accommodated without the need for overtime or shift work.

C. Based upon CPM Schedule information submitted, the Contractor will draft and computerize the schedule and issue it for review an comment. In the event the

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milestone dates indicated by the Progress Scheduled exceed the contractual dated, each Subcontractor shall review and revise the logic and time estimates and resubmit to the Contractor for review within one (1) week of notification. This procedure shall be followed for all schedule revisions. After changes in the logic and/or time estimated have been agreed upon, another computerized schedule will be generated and referred to the Contractor.

D. The Detailed Network Diagram shall provide sufficient detail and clarity of form and technique so that the Contractor can plan, schedule and control their work properly and the Construction Manager can readily monitor and follow the progress for all portions of work. The Detailed Network Diagram shall comply with the various limits imposed by the Scope of Work and by any contractually specified intermediate milestone dates and completion dates included in the Contract. The degree of detail shall be to the satisfaction of the Construction Manager, but the following factors shall have a bearing on the required depth of activity detail:

1. The structural breakdown of the project.
2. The type of work to be performed and the labor trades involved.
3. All purchase, manufacture and delivery activities for all manor materials and equipment.
4. Deliveries of Owner furnished equipment.
5. Submittal and approval of shop drawings and material samples.
6. Plans for all key Trades and Subcontract work.
7. Assignment or responsibility for performing all activities.
8. Access and availability to work areas.
9. Identification of interfaces and dependencies with preceding, concurrent and follow-on Subcontractors.
10. Testing of systems.
11. Planning for phased or total takeover by Owner.

E. The Progress Schedule will not include every item of work necessary to complete the project. However, each Subcontractor shall accept responsibility to schedule and complete all items of work within the contractual limits.

F. The durations as outlined in the Progress Schedule shall be analyzed in detail to determine activity time durations in units of whole working days. Activities shown will have maximum duration of twenty (20) working days, except in the case of the non-construction activities such as procurement of materials and delivery of equipment. All durations shall be the result of definitive manpower and resource planning by the Prime Subcontractors.

1.5 AUTOMATED DATA PROCESSING (ADP)

A. The mathematical analysis of the Detailed Network Diagram shall be made by computer and a tabulation for each activity shall include as a minimum, the following:

1. Preceding and following event numbers.

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2. Activity description.
3. Durations in work days for each activity.
4. Earliest start date (by calendar date).
5. Earliest finish date (by calendar date).
6. Latest start date (by calendar date).
7. Latest finish date (by calendar date).

1.6 SUMMARY SCHEDULE

A. The Contractor shall also prepare and submit on the Initial and all updated schedules, a time-scaled Summary Schedule on a single sheet showing the total project in approximately fifty to one hundred (50) - (100) activities. This schedule will accurately summarize the Detailed Schedule. Each activity will indicate and I and J note that corresponds to the Detailed Schedule. The Summary Schedule shall be updated monthly showing the original as-planned schedule denoted and the current update information denoted.

1.7 COMPLETION REQUIREMENT

A. The Preliminary Schedule will be completed within thirty (30) calendar days of the Notice to Proceed.

B. The Progress Schedule (logic diagrams and computer computations) and the Summary Schedule shall be prepared for review within sixty (60) calendar days after Notice to Proceed. The Prime Subcontractor(s) shall review the schedule and note any corrections required as a condition of approval within ten (10) days of the receipt of the schedule. The Contractor will prepare a final Progress Schedule for approval of the Prime Subcontractors within twelve (12) calendar days following receipt of the Prime Subcontractor's comments.

C. When the Progress Schedule is completed and is within contractual limits, each Prime Subcontractor shall certify in writing on the face of the computer printout and submit it to the Architect and Construction Manger for approval no later than seventy-five (75) calendar days after Notice to Proceed, unless otherwise approved by the Architect and Construction Manager.

D. The Contractor will furnish the Prime Subcontractors two (2) copies of Computer Printouts (computations).

E. If the Contractor fails to submit the required monthly update material as indicated in this section within ten (10) calendar days, or revisions thereof within the requested time, the Architect may withhold approval of progress payment estimates until such time as the Contractor submits the required information.

F. Notwithstanding the implementation of the CPM, it shall be the sole responsibility of the Prime Subcontractors to complete the Work within the time of completion and milestone required by the Contract.

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1.8 UPDATINGS

A. The first update shall take place thirty (30) calendar days after the Notice to Proceed with subsequent updates performed monthly at the job site for the duration of the Contract.

B. The Preliminary Schedule will be updated until the Progress Schedule is reviewed and approved by the (Sub)Contractors.

C. All update information contained on the 90-day Schedule will be incorporated into the Progress Schedule once the Progress Schedule is accepted.

D. Each Prime Subcontractor is required to attend and participate in update meetings with the Contractor and present data prepared in advance, updated as of the end of the updating period, a complete and accurate report of updated procurement items, and construction progress. Each Prime Subcontractor shall show how it will make up the time list due to non-excused Contractor delays. The following will also be presented and made part of the CPM update:

1. Actual start dates.
2. Actual completion dates.
3. Revised logic and changes in activity durations.

E. Should the projected completion time for any significant work activity as determined by the latest CPM printout of the Progress Schedule indicate more than a critical ten (10) day delay to the project, the Subcontractor shall submit a revised plan to the Contractor, within five (5) calendar days, to recover all lost time and maintain the project schedule. This revised plan is to include a re-sequencing of work activities and/or revisions to the performance time for the affected activities so that remaining milestone completion dates are met.

F. Each Prime Subcontractor shall be responsible to coordinate its work with the work of other Prime Subcontractors. Each Prime Subcontractor shall not delay and/or interfere with the work of others. Each Prime Subcontractor shall pay all costs for damages and/or delays to other Subcontractors caused by lack of coordination and/or interference with their work which could not be reasonably avoided.

1.9 CHANGE ORDERS, DELAYS AND EXTENSIONS OF TIME

A. Extensions of time will only be considered for justifiable delays that are on the critical path and impact milestone dates by exceeding the amount of positive float shown on the approved CPM Schedule. A justifiable delay is delay due to a cause that the Architect, in their discretion, determines is unforeseeable, beyond the Subcontractor's control, and not due to any fault, negligence, act, or omission on the part of the Subcontractor. Positive float is the number of calendar days an activity can be delayed without causing a delay to the critical path or milestone completion dates.

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The Contractor shall plan construction activities to start on "early start dates" to maintain positive float and shall be responsible for any delays which could have been avoided by starting work on the "early start dates" by lack of continuous effort, and/or by inadequate planning, and coordination of the work. Such delays will not be the basis of an extension of time to any milestone date or additional costs.

B. When change orders or delays are experienced, the Contractor shall submit to the Architect, a written Time Impact Analysis illustrating the influence of each change or delay on the current Progress Schedule completion date. Each Time Impact Analysis shall include a network analysis demonstrating how the Contractor proposed to incorporate the change order or delay into the Progress Schedule. Additionally, the analysis shall demonstrate the time impact based on the date the change is given to the Contractor, the status of construction at that point in time, and the event time computation of all effected activities. The event times used in the analysis shall be those included in the latest updated copy of the Progress Schedule, closest to the time of delay or as adjusted by mutual agreement. Each time Impact Analysis shall be submitted within seven (7) calendar days after a delay occurs or notice of direction for a change is given to the Contractor. In cases where the Contractor does not submit a time Impact Analysis for a specific change order of delay within the specified period of time, then it is mutually agreed that the particular change order or delay has no time impact on the Contract completion date and no time extension is required. Approval or rejection of each Time Impact Analysis by the Construction Manager and the Architect shall be made within fourteen (14) calendar days after receipt of each Time Impact Analysis unless subsequent meetings and negotiations are necessary.

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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. International Construction Code (ICC) requires Special Inspections - Material Testing shall be engaged and performed through Owner's Testing Inspection Agency which will be paid for by the Owner.

2. Testing and inspecting services other than the Special Inspections - Material Testing 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 Bid 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 Bid 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 A232 and Section 01200.

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2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.

3. Division 2 through 16 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 Bid 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.

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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 preforming 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 Bid 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.

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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.

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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 Bid 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.

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4. Testing and inspecting requested by Contractor and not required by the Bid Documents are Contractor's responsibility.
    a. Submit additional copies of each written report directly to Authorities Having Jurisdiction, when they so direct.

B. Owner Responsibilities: Owner will engage a qualified testing agency to perform the Special Inspections - Material Testing services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Bid Documents will be charged to Contractor, and **the Contract Sum will be adjusted by Change Order Credit to the Owner.**

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspecting requested by Contractor and not required by the Bid Documents are Contractor's responsibility.
    a. Submit additional copies of each written report directly to Authorities Having Jurisdiction, when they so direct.

C. 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.

D. 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 Bid 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, Construction Manager 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.

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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 Bid 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 Bid 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 ACCEPTABLE TESTING AGENCIES

A. For **Class I Buildings** (only), Testing Agencies / Special Inspector shall be established and recognized agency or design professional acting as the approved agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved. Special Inspectors shall be certified in accordance with administrative provisions of the Uniform Construction Code (NJ UCC), N.J.A.C. 5:23-

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1.1 (2013), N.J.A.C. 5:23-3.14, N.J.A.C. 5:23-2.20(b), NJ DCA Bulletin No. 03-5 (Rev. November 2008) and applicable requirements of International Building Code (ICC)/2021, NJ ed., Chapter 17, Section 1704 / 1705, as indicated below:

1. Steel Construction (ICC/2021, NJ ed., Section 1705.2 and Table 1705.2.3),

2. Concrete (ICC/2021, NJ ed., Section 1705.3 and Table 1705.3),

3. Soils (ICC/2021, NJ ed., Section 1705.6 and Table 1705.6),

B. Statement of Special Inspections: Where special inspection(s) or testing is required as indicated in ICC/2021 NJ ed., Section 17, the registered design professional shall prepare a Statement of Special Inspections in accordance with ICC/2021, NJ ed., Section 1704.3 for submittal by the applicant.

C. Records of each inspection must be submitted to the building official so as to compile legal record of the project. These records must include all inspections made, violations and discrepancies.

1. Before a certificate of occupancy is issued, a final report must be submitted indicating that all special inspections have been made and all discrepancies have been resolved or removed in order to show compliance with the applicable code requirements.

3.2 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 Bid 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

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SECTION 01410 - REFERENCES AND INDUSTRY STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Work of this Section applies to all Construction Bid 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 Bid 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.

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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 Bid Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Bid Documents to the extent referenced. Such standards are made a part of the Bid Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Bid 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 Bid 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.

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E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Bid 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

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SECTION 01455 - CONCRETE IN-SITU RELATIVE HUMIDITY AND pH TESTING

PART 1 – GENERAL REQUIREMENTS

1.1 SUMMARY

A. The Contractor shall engage and pay for a testing service to provide in-situ concrete relative humidity and surface pH testing to all new and existing concrete specified to be covered with floor coverings or resinous coatings. Includes concrete placed below, on and above grade.

B. Testing shall take place after allowing concrete to dry for a minimum of 28 days.

C. Testing to be scheduled no less than 1 nor more than 3 weeks prior to scheduled flooring installation.

1.2 RELATED SECTIONS:

A. Section 03300 - Cast in Place Concrete slabs.

B. Section 09650 - Resilient Flooring.

C. Section 09682 - Carpet Entry Mat.

D. Section 09685 - Carpet Tile.

1.3 REFERENCES

A. ASTM F-2170-02– Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes

B. ASTM F-710-03 – Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

1.4 SUBMITTALS

A. Report all test results in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.

B. List test locations on floor plans and show same on 8½ x 11 Table and Location maps.

C. Deliver results in duplicate for distribution to Architect and Contractor.

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1.5 QUALITY ASSURANCE

A. Flooring Installers

1. Certified and /or approved by Test Apparatus Manufacturer for product use.

B. Disposable, one time use, calibrated probe with temperature and relative humidity reading.

1. NIST certifiable factory calibration

C. Wide range pH paper, and distilled or de-ionized water.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. Disposable humidity and temperature probe kit as manufactured by Wagner Electronics, or equal.

B. pH test paper as manufactured by Micro Essential Laboratory, or equal.

PART 3 – EXECUTION

3.1 QUANTIFYING OF RELATIVE HUMIDITY AT 40% OF CONCRETE THICKNESS

A. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75± 10°F and 50± 10% relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.

B. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 sq.ft. and 1 per each additional 1,000 square feet.

C. Determine the thickness of the concrete slab, typically from Bid Documents.

D. Utilizing a roto-hammer drill test holes to a depth equal to 40% of the concrete thickness*. i.e. 2" deep for a 5" thick slab, or 1½" deep for a 4" thick slab. Hole diameter shall not exceed outside diameter of the probe by more than 0.04". Drilling operation must be dry.

E. Vacuum and brush all concrete dust from test hole.

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F. Insert a probe to the full depth of test hole. Place cap over probe.

G. Permit the test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.

H. Remove the cap and press button on the probe to obtain reading.

I. Read and record temperature and relative humidity at the test site.

3.2 QUANTIFYING pH LEVEL

A. At or near the relative humidity test site perform pH test.

1. Place several drops of water onto the concrete surface to form a puddle approximately 1" in diameter.

2. Allow the water to set for approximately 60 seconds.

3. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.

B. Record and report results to the Architect, Construction Manager and the Contractor.

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SECTION 01505 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 DEFINITIONS

A. The Contractor for the school project shall be 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 their own activities.

3. Their own field office, complete with necessary furniture, utilities and telephone service.

4. Their own storage and fabrication sheds.

5. All hoisting requirements for their work.

6. Collection and disposal of their own debris, hazardous, unsanitary or other harmful waste material from their operations, on a daily basis to trash receptacles, hoppers, containers, etc. provided by the Contractor. Do not allow waste to accumulate inside building or on site.

7. The secure lockup of their own tools, materials and equipment.

8. Construction aids and miscellaneous services and facilities necessary exclusively for their own construction activities.

9. Temporary storage provisions for their work, including offsite provisions, if required.

10. Containerized bottled drinking water units for their personnel.

11. Fire protection provisions related to their work.

12. All personnel safety equipment and provisions for their personnel.

B. The Contractor shall provide complete temporary safety programs for review and approval by the Construction Manager, the Architect and the Owner.

C. The General Construction Work Contractor shall be responsible for the following temporary facilities:

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1. Administrative Facilities set forth in this Section for the exclusive use of the Owner, the Architect and the Construction Manager.

2. Temporary access roads and paths to building, including access ways for cranes and trucks.

3. Temporary toilets in sufficient quantity to suit project needs and including disposable supplies.

4. Temporary insulated enclosure of the building, if required.

5. Project identification signs.

6. Rodent and pest control services.

7. Barricades, warning lights, safety signage.

8. Site enclosure fence, including maintenance and any gates needed. Provide fence relocations as needed during construction.

9. Temporary grading to facilitate drainage from site.

10. Environmental protections and erosion control, except for the truck wheel wash station.

11. Snow and ice removal.

12. Dewatering facilities.

13. Dust and fume control

14. Temporary storm sewer, if required.

15. Tree and plant protection.

16. Temporary partitions whether or not shown on Drawings.

17. Temporary covering for all openings in roof deck upon completion of erection of metal deck work.

18. Temporary egress precautions routes for use when building is partially occupied, include but not limited to the following:
    a. Temporary doors and hardware.
    b. Sidewalks.
    c. Fencing.
    d. Signage whether shown or not on Drawings.

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C. The Structural Steel Subcontractor is responsible for the following temporary facilities and services:

1. Perimeter protection of elevated areas as set forth in this Section.

2. Other temporary facilities and services stated as their responsibility elsewhere in the Bid Documents.

D. The Plumbing Work Subcontractor shall be responsible for the following temporary facilities and services:

1. Temporary facilities and services stated as their responsibility elsewhere in the Bid Documents.

E. The Heating Ventilation and Air Conditioning (HVAC) Subcontractor shall be responsible for the following temporary facilities and services:

1. Temporary HVAC system after enclosure of the building addition(s), in accordance with the requirements of the activity milestone schedule.

2. Other temporary facilities and services stated as their responsibility elsewhere in the Bid Documents.

F. The Electrical Subcontractor shall be responsible for the following temporary facilities and services:

1. Temporary power service to the Administrative Facilities for the Owner, Architect and Construction Manager.

2. Electric service for security lighting, if required.

3. Other temporary facilities and services stated as his/her responsibility elsewhere in the Project Documents.

1.2 OFFICE AND STORAGE FACILITIES

A. The Subcontractors shall provide temporary office and storage facilities for their own use.

B. In addition to the field office requirements set forth in this section for each Subcontractor, the Contractor will provide administrative facilities for the exclusive use by the Owner, Architect and Construction Manager.

1. Provide a new or reconditioned trailer, minimum size of 14' x 50', by Williams Inc, or approved equal with toilet, two offices and conference room.

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2. Provide electric heating and insulated wall/roof/floor construction sufficient to maintain a minimum of 70F interior temperature during the winter. Provide air conditioning sufficient to maintain a maximum of 70F interior temperature during the summer.

3. Provide hot and cold water cooler/refrigerator combination with bottled water service for length of the project.

4. Include weekly cleaning service of entire trailer unit, and trash removal.

5. Provide set up/knock down of trailer, steps, and insulating skirts around trailer.

6. Provide Built-in private toilet facilities chemical water closet within the trailer and weekly cleaning.

7. Secure and pay for trailer permit. Reimbursement by Owner to be paid out of the project Allowance.

8. Provide the following furnishings:
   a. (2) new desks 36" x 72", and (2) new or reconditioned cushioned rolling desk chairs.
   b. (1) Drawing table (48" x 96") and stool
   c. (1) plan racks with minimum capacity for (12) sets of Drawings (with clamps, 42")
   d. (2) new - legal size, four drawer file cabinets with cylinder locks, manufactured by Steelcase or equivalent.
   e. (6) linear feet of bookshelving
   f. (2) 36" x 72" folding table
   g. (20) steel folding chairs
   h. Grates/Blinds on all windows, and locking bar across door.

9. Provide exterior lighting at doors of trailer.

10. Provide the following equipment:
    a. Software:
       Microsoft MS Office XP Professional w/licensing, Primavera Expedition 8.5 w/licensing, Primavera P3 e/c w/licensing.
    b. Multi-Function Laser Printer/Scanner and Fax Machine: HP Laser Jet 3390 or equal.
    c. 5.6 GHz (1) line cordless telephone and (1) line corded speaker phones.
    d. Internet service will be required from an independent provider and must be maintained through the completion of the punch list process.
    e. Office supplies: The Contractor shall provide, as part of this Contract, an allowance for the supply of office supplies for the Construction Manager. (Refer to Allowances in Section 01020).

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11. All facilities, equipment and furnishings are to be provided to the Construction Manager not more that fourteen (14) days after Notice to Proceed and are to remain on site until thirty days after punch list completion or sooner, if directed by the Construction Manager. At that time, all equipment and items as listed will be returned to the Owner.

1.3 TEMPORARY RAILINGS AND PERIMETER PROTECTION

A. For all areas, the Contractor shall furnish, install, maintain and remove all initial safety protection work in full compliance with OSHA standards.

1. This work shall include but not be limited to, the protection of stair openings, shaft openings, safety railings and blocking at metal pan stairs prior to concrete fill, except the portion of the work which is included in the scope of the Structural Steel Subcontractor stated below.
    a. For all areas the Structural Steel Subcontractor shall furnish, install, maintain and remove all perimeter protection cable in full compliance with OSHA standards at all elevated areas, including the roof level.

B. Each (Sub)Contractor is responsible for the removal and immediate replacement, at the conclusion of their work, of all temporary protection measures as required in order to facilitate their work.

C. No fall or opening protection shall be removed until the progress of the permanent work is installed in a manner that results in no hazard to any party.

D. The installation of all barricades, enclosure, temporary partitions and other protective measures shall be performed in full compliance with the requirements of the New Jersey State Department of Labor, OSHA regulations and all other applicable Federal, State and Local laws.

1.4 TEMPORARY CONSTRUCTION FENCE

A. Site Fence: Chain link fence.

1. Contractor shall design and install to prevent easy access to site by people and animals.

2. The entire construction site shall be enclosed with a 6' high chain link fence modesty slats as indicated on Drawings and as directed by the Construction Manager.
    a. Provide gates as required for access.
    b. Do not remove until other security facilities, either temporary or permanent, are in place and in operation.
    c. Relocate as needed.
    d. Furnish padlocks with keys for all personal.

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1.5 COMPRESSED AIR

A. Each (Sub)Contractor shall furnish their own equipment and energy source to provide compressed air required for the completion of work under this Contract.

1.6 TEMPORARY HEAT

A. Prior to the building being enclosed by walls and roof, if the outside temperature shall fall below 40 degrees F at any time during the day or night, and the work in progress requires heat for execution and protection, the Contractor shall furnish acceptable means to provide sufficient heat to maintain a temperature of 40 degrees F for that portion of the work for all areas requiring heat.

1. Heating of field office, storage spaces, concrete and masonry shall be provided by each (Sub)Contractor under respective Specification headings affected.

B. As soon as the addition(s) are generally enclosed by walls and roof, the responsibility for supplying working area heat shall rest with the Contractor. The Contractor shall furnish sufficient heat by the use and maintenance of LP gas heaters to maintain a minimum temperature of 40 degrees F within the enclosed area of the addition(s) at all times, and remove same when no longer required. The Contractor will be held responsible for freeze-ups for the duration of the forty (40) working day period following enclosure of the building. He shall remove soot smudges and other deposits from walls, ceilings, and all exposed surfaces, which are the result of the use of heating equipment. He shall not do any finish work until the areas are properly cleaned. The Contractor shall provide or arrange at their expense supervision of the LP gas heaters at all times prior to start of the permanent heating Subcontractor's obligation, which shall be forty (40) working days after the acknowledged enclosure of the addition(s). The Contractor shall furnish and pay for all fuel.

1. All heating equipment shall be NBFU approved and connected to approved flues to the atmosphere. Gas cylinders within the building shall not exceed 100 lb. capacity, shall have Interstate Commerce Commission approval and shall be fitted with a permanent cap to protect the valve when not in use. Heaters shall be approved by a recognized testing laboratory and must be equipped with a positive shut-off safety valve. Cylinders and heaters shall stand at least six feet (6'-0") apart and be connected with two braid neoprene hoses that will withstand 400 psi test pressure.

2. When cylinders and heaters are on the same floor, not more than one cylinder shall feed 400 sq.ft. of heated floor space. If cylinders feed heaters installed on a floor above, the area of heated floor may be increased to 600 sq. ft. Storage of cylinders within the building will not be permitted at any time. Fire extinguishers shall be provided on each floor where heaters are used, and the area must be ventilated.

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3. Contractors shall train at least two dependable persons to supervise heating installation at construction site.

D. If the Heating and Ventilating Contractor does not provide operation of the permanent heating system within the 40 working day period, they will be liable for liquidated damages.

1. In like manner, if the Electrical and Plumbing Subcontractors do not provide the necessary electrical and plumbing work for operation of the permanent heating system, in sufficient time so that the 40 working day date can be met, they will be liable for the same Liquidated Damages.

E. The Contractor shall continue to provide acceptable means of heat until the obligation of the permanent Heating Subcontractor shall become effective as herein stated. If the permanent heating system is not acceptable to the Construction Manager for providing temporary heat, the Contractor shall continue to provide temporary heat as described above, at the expense of the HVAC or Electrical Subcontractor(s) responsible for the delay in operating the permanent heating system.

F. At the termination of the 40 working day interval after notice has been given that the building is enclosed, the HVAC Subcontractor shall operate and maintain the heating system throughout the period that heat is required. The permanent heating system shall provide such heat to a minimum temperature of 55 degrees F, or to such higher temperature not exceeding 75 degrees F, as may be directed by the Architect, for the proper conduct and protection of the work until such time as work is completed and accepted. Accepting Heating system for use during the construction period shall not constitute acceptance of the complete system but merely acceptance of those components listed hereafter, which components will be covered by a one-year guarantee, unless otherwise indicated in Part -5 specification sections. Warranty shall be starting on the date of take-over.

G. When the permanent heating system is used for temporary heat, the cost of electric power and fuel will be paid for by the Contractor. At the time of substantial completion for the entire project, Heating and Ventilating Contractor will clean or change all filters.

H. Valves, traps and other parts of the heating system which are permanently installed by the Heating Subcontractor and used for supplying heat during the construction period need not be replaced, providing the system was in acceptable condition prior to its use, and further, that the system is properly cleaned and adjusted to operate after the permanent system is in use and to the satisfaction of the Construction Manager.

I. If plastering or parging or finishing of any surfaces is necessary to enable the Heating Subcontractor to install the heating system in manner to permit its use for supplying heat during the construction period, the finishing, plastering and parging of such

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surfaces shall be done by the Contractor so as not to delay the installation of the permanent system. In the event this plastering or parging work is not completed in ample time to make possible the installation of permanent piping and heating units in a particular area, the permanent Heating Subcontractor shall install temporary piping and the heating units and cost of such temporary installation shall be paid by the Contractor.

J. If additional heat is required beyond that specified herein, the (Sub)Contractor requiring such additional heat shall pay for additional costs at no expense to the Owner.

1.7 TEMPORARY WATER

A. The Plumbing Subcontractor shall provide, protect and maintain an adequate water supply for the use of all (Sub)Contractors on the project during the period of construction, either by means of the permanent water supply line, or by the installation of a temporary water supply line. This water supply line shall be made available within fifteen (15) days after written request has been made to the Plumbing Subcontractor by any (Sub)Contractor requiring this service, with copies to the Architect/Engineer.

1. If the Plumbing Subcontractor fails to carry out their responsibility in the supplying of the water, as set forth herein, they shall be held responsible for such failure and the Construction Manger/Architect shall have the right to take such action as they deem proper for the protection and conduct of the work and shall deduct the cost involved from the amount due the Contractor.

1.8 TEMPORARY LIGHT AND POWER

A. Electrical Subcontractor shall extend electrical service to the addition(s), including temporary field offices, at locations approved by the Construction Manager. Initial temporary service shall be three phase or single phase, depending upon which phase is closest to the project. This service shall be installed within fifteen (15) days after written request has been made to the Electrical Subcontractor by any (Sub)Contractor requiring such service with copies to the Architect/Engineer. When the Contract calls for 3-phase permanent service, the Electrical Subcontractor shall install same within six (6) months to permit use by (Sub)Contractors. Electrical characteristics shall be provided to meet all temporary light and power requirements as herein and hereinafter specified or as included under Supplementary General Conditions. The Electrical Subcontractor shall provide the necessary distributing facilities and meter.

B. The Electrical Subcontractor shall extend the service into the addition(s) and shall provide receptacles and lighting as described herein and one (1) 5 H.P. 208 V. or 220 or 230 volts power outlet and one separate power outlet for each (Sub)Contractor for the proper conduct of their work. Power outlets shall be fed independently of the temporary lighting system. Where service of a type other than herein mentioned is

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required, the (Sub)Contractor requiring same shall install and pay all costs of such special services. The size and the incoming service and main distribution switch and panel shall be sized as any service by NEC requirements.

C. The Electrical Subcontractor shall provide double sockets at a maximum of thirty feet (30') on centers in large areas. One socket shall contain a 150 watt lamp and the other socket shall be a grounding type to accept a receptacle plug for small single phase loads to be used for short periods of time. The Electrical Subcontractor shall provide double sockets of the type described above in all individual rooms, one double socket for each 500 sq. ft. or fraction thereof of room area (for example: a room 30' x 30' - 900 sq. ft. would require two double sockets).

D. Temporary power and lighting services and maintenance shall be provided by the Electrical Subcontractor, including power required for temporary construction trailers, security and protection specified under other sections.

1. The Contractor shall be responsible and pay all costs for electrical consumption.

2. On the date when the heating system is taken over by the Owner, the Electrical Work Subcontractor shall have the permanent service and distribution system in operation; this shall include service entrance and distribution equipment and power circuits to heating equipment. This will not, however, constitute acceptance of the electrical system.

E. When the temporary electrical lines are no longer required they shall be removed by the Electrical Work Subcontractor and they shall restore to their original condition any part, or parts, of the ground or building, disturbed or damaged.

F. Any (Sub)Contractor who fails to carry out their responsibility in the supplying of uninterrupted light and power, as set forth in this Contract, shall be held responsible for such failure and the Architect shall have the right to take such action as they deem proper for the protection and conduct of the work and shall deduct the costs involved from the amount due the Contractor.

G. There shall be no additional cost to the Owner or other (Sub)Contractors because of standby requirements due to conflict in the normal working hours of the various Trades.

1. Electrical Subcontractor shall provide temporary light and power required to meet all working days and hours of all Trades and such light and power shall be available fifteen (15) minutes before the start of the earliest scheduled work and will continue until fifteen (15) minutes after the end of the latest scheduled work on each and every day.

2. Any additional cost associated with any temporary light and power required during additional shifts, weekends or holidays shall be the responsibility of each (Sub)Contractor, and shall be paid directly to the Electrical Subcontractor.

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3. (Sub)Contractor(s) causing delay shall be liable for same Liquidated Damages amount per day in accordance with the Bid Documents.

H. The Electrical Subcontractor shall observe the requirements of the Federal Occupational Safety and Health Act of 1970 with regard to temporary light and power.

I. Electric Welding Equipment, Terrazzo Grinders, Pipe Threading Equipment, Floor Sanders: The Electrical Work Subcontractor shall provide at locations acceptable to (Sub)Contractors involved two (2) outlets - 208, 220, 230 volts 60 cycle - three phase (single phase if 3-phase not available), 7-1/2 H.P. maximum capacity for each of the (Sub)Contractors using the referenced equipment. Should any (Sub)Contractor desire additional outlets or service of this type beyond the specified two outlets or service of a greater capacity or of different characteristics or for any other power equipment, they shall arrange with the Electrical Work Subcontractor for the installation and pay all costs involved.

1. Each (Sub)Contractor who is obligated to employ standby personnel by Trade agreement to which they are a party shall determine and include all such costs thereof in their bid proposal.

2. Any conflict arising between the (Sub)Contractors with regard to financial obligations for standby personnel or standby supervisory employees when the maximum number of units are provided, shall be resolved between the parties involved in direct proportion to the number of units on the site by the respective (Sub)Contractors.

3. No (Sub)Contractor shall at any time set up claim for an extra relating to costs of standby maintenance or standby supervision for electric motor driven equipment. The Owner under no conditions will entertain or consider an extra in this regard.
   a. (Sub)Contractor(s) causing delay shall be liable for same Liquidated Damages amount per day in accordance with the Bid Documents.

1.9 TOILET FACILITIES

A. The Contractor(s) shall provide and maintain in a neat and sanitary condition temporary toilet facilities for the use of all (Sub)Contractors and persons employed on the work or connected therewith.

1. Such facilities shall comply with the regulations of the local Department of Health and other Agencies Having Jurisdiction.

2. Such facilities shall be in sufficient quantity to suit manpower working on site.

3. Place units in a flat and easily accessible location.

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4. Provide servicing for units once per week as a minimum requirements.

1.10 TEMPORARY ROADWAYS

A. The Contractor shall provide and maintain temporary roads, parking areas and paths as may be necessary for the work. The Contractor shall construct temporary roads and ramps as may be required by other Subcontractors for crane and truck access. The roadways shall be suitable for large trucks to deliver items to the addition(s) / school building. Other Subcontractors shall be allowed to use the temporary roadways. In location, the temporary roads and parking areas may coincide with the permanent roadways and parking areas. Stone used in the construction of temporary roadways and parking areas may be left in place only if it occurs below the subgrade elevation for the permanent work.

1.11 PROJECT IDENTIFICATION AND TEMPORARY SIGNS

A. The Contractor shall prepare Project Identification Sign in sizes indicated. Provide signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details and colors as indicated or as directed by the Architect / Owner.

B. Prepare temporary signs to provide directional information to construction personnel and visitors.

C. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.

D. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

E. No other signs will be allowed without Architect's approval.

1.12 REMOVAL AND RESTORATION

A. Prior to acceptance of the Project, each (Sub)Contractor shall remove the temporary work for which they have been responsible.

B. Each (Sub)Contractor shall restore all areas affected by temporary facilities which they have been responsible.

END OF SECTION 01505

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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.

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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

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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 and Construction Manager. 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.

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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.

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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

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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.

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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 Bid 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 Bid Documents.

C. Where the Specification is silent on whether substitutions will be considered, substitutions will be considered only when submitted in accordance with AIA A232 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 Bid 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 and as determined by the Architect.

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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 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 A232 and Section 00800.

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.

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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 (if used with prior approval): 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

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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

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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 Bid 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.

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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.

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SECTION 01700 - PROJECT CLOSEOUT DOCUMENTS AND PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The work of this Section applies to all Construction Bid 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) USB drives.

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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 Bid 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 their 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 prints of the Contract Drawings, marked to show changes which occur due to their Work.

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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 Trades 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 USB drives containing scanned As-Built drawings (pdf format) 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. Structural Steel Work
3. Plumbing and Drainage Work
4. HVACR Work
5. Electrical Work

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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 their 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.

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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. Contractors shall submit electronic version of the MEP/FP O&M manuals for review by the MEP/FP Consultant. *Paper copies should not be submitted as part of the MEP/FP 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.

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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 USB drives 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 and Construction Manager 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.

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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 Bid 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. Submit pest-control final inspection report and warranty.

5. 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 and Construction Manager 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. <u>The cost of additional inspections required by the Architect or their consultants or the Construction Manager 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.</u>

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 such final releases from governmental and regulatory Agencies are required on the Project at some point.

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1.10 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list to the Architect and Construction Manager. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, **starting with exterior areas first and proceeding from lowest floor to highest floor**, as 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 and Construction Manager.
   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 and Construction Manager'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.

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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.

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1. Provide instructors with relevant experience 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 and Construction Manager, 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,

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even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove snow and ice to provide safe access to building.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, manholes and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. 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.

m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to unusual operating conditions.

o. Plumbing Work Subcontractor shall clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. 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.

q. 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 fixtures to comply with requirements for new fixtures.

r. Leave Project clean and ready for occupancy.

s. The Contractor, prior to Owner's occupancy, shall engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report and submit to the Owner. The Contractor shall also perform or have performed the following immediately prior to the Architect / Construction Manager's inspection for Substantial Completion:

   1) Removal of all manufacturer's temporary labels from materials,

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equipment and fixtures.

2) Removal of all stains from glass and mirrors; wash, polish, inside and outside.
3) Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
4) Removal of spots, paint, soil from resilient flooring.
5) Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.
6) Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.
7) Final site clean-up shall extend beyond the Contract Limit Lines as reasonable required to insure the complete removal of all construction debris from the entire site, including staging areas and shall be in accordance with requirements of the Bid Documents.

t. 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. Field offices, trailers, job telephone, temporary toilets, temporary enclosures, dust barriers and other temporary protection devices.

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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 they are 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% two 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 two-year guarantee covered by the Maintenance Bond and in addition to the Contractor's two-year guarantee.
   a. Guarantee shall be signed and sealed by Officer of the Contracting Firm and shall be notarized.
   b. Roofing Warranty: Manufacturer's Roofing Warranty must be accompanied by Contractor's proof of all payments to the Roofing System Manufacturer.

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.

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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 their file.

13. **Roofing Projects**: The Contractor must submit the following documents:
    a. Copy of the paid statement from the roofing manufacturer for all materials including cost of the roofing warranty.
    b. Original signed and notarized letter from the roofing manufacturer (on their letterhead) which certifies that the Contractor has paid the roofing manufacturer in full including cost of the roofing warranty.

14. All approvals and final releases from governmental and regulatory Agencies Having Jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.

END OF SECTION 01700

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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	Final Payment Application w/Board Voucher/Invoice	
2	Letter on Contractor's letterhead stating date of substantial completion and requesting punch list review to Architect & Engineer	
3	Completed Operations Insurance Certificate - ACORD Form	
4	Completed Operation Insurance Statement	
5	AIA Document G704 Certificate of Substantial Completion	
6	Final Punch list signed and dated indicating completion of all work	
7	AIA Document G706 Affidavit of Payment of Debts & Claims	
8	AIA Document G706A Affidavit of Release of Liens	
9	AIA Document G707 Consent of Surety to Final Payment	
10	Certification that all wages have been paid - NJ Prevailing Wage Act, N.J.S.A. 34:11-56.25	
11	On contractor letterhead state all outstanding certified payroll and manning reports have been sent to the Owner.	
12	10% 2-year Maintenance Bond - must be on form provided in spec book.	
13	2-Year Contractor's Guarantee Covered by Maintenance Bond	
14	Submit accurate list of all subcontractors and suppliers and provide a certification that all proofs of business registration for all subcontractors and suppliers are maintained on his/her file.	
15	Certificate of Approval/Acceptance	
16	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.	
17	Record Project Manual (spec book) indicating changes or company letter stating no changes.	
18	Operation Instructions & Maintenance Manuals (1 in 3-ring binder with table of contents and divider tabs and provide thumb drive with same)	
19	Record Drawings - Indicate all changes label As-Built drawings with company name, address, date and any changes	
20	Balancing & Testing Reports (HVAC)	
21	Fire Alarm Certification (ELECTRICAL)	
22	All project submittals/shop drawing on a flash drive	
	Warranties - submit warranites in separate tab in binder organized and labeled into sequence based on specification section.	

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 Bid 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 a responsibility to complete its Work in sequence with the Work of their Subcontractor(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 except as otherwise previously accounted for in the bid submission.

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) <u>after March 23, 2026 until August 25, 2028</u>; however, the Contractor is required to review and coordinate all Work activities with the Architect, Construction Manager and School Facilities Director prior to commencing with the Work.**
   a. Contractor to review permitted Work hours to comply with the local "Noise Ordinance".

3. **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.**

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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 BUILDING ENCLOSURE

A. The building shall be considered "enclosed" when:

1. The exterior walls have been constructed;

2. A permanent roofing and flashing is installed and in watertight condition;

3. Temporary or permanent doors are hung and window openings are closed with either permanent or temporary weather-tight enclosures; any impervious transparent material is acceptable.

1.4 SEQUENCE OF CONSTRUCTION

A. In order to allow the Contractor and Subcontractor(s) to understand the requirements of the Project, the following general sequence of construction Work will be followed:

1. Generally, the 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 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 Contractor is to perform selective demolition of existing general building construction, layout and coordinate the proposed new addition / construction with existing construction to remain, as noted on the Contract 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. Progress the Work of all Trades to achieve completion of underground utilities and preparation of subgrades for construction of new footings and foundations. After completion of Structural Steel Work, Plumbing, Drainage & Gas Fittings, HVAC and Electrical Subcontractors will commence with interior “rough-ins” and related Work in sequence to the steel erection completion.

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5. Sequentially Work to achieve **weather-tight building enclosure** with completed roof construction and utilizing temporary partitions and barriers, as required, to facilitate interior Work including, but not limited to, interior partitions, insulation and building finishes.

6. All (Sub)Contractors are mutually responsible to coordinate their Work with the general construction for installation of Plumbing, Drainage & Gas Fittings, HVAC and Electrical **rough-in construction Work below and in floor slabs, interior and exterior walls**.

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, testing and balancing of the HVAC, Automatic Temperature Controls, Plumbing and Electrical Work to obtain the Certificate of Occupancy.

8. Provide written formal notification of **Substantial Completion** to the Architect / Engineer(s) and request Punch-List Observations.

9. Complete proper preparation, review and approval by the 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 **twenty (20)** calendar days, Sundays and Holiday's excepted, from **Notice of Award;** on or about **March 17, 2026.**
   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 **April 3, 2026.**

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 **sixty (60) calendar days from Notice to Proceed.**

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4. **Milestone No. 4A**
   a. Physical Work at the site on the Phase 1 - New Construction - Additions: Base Bid Vocal Music Rm. and Alternate Bid Classroom Wing (if awarded) shall commence on or about **April 27, 2026.**

5. **Milestone No. 4B**
   a. Physical Work at the site on the Phase 1A - Renovations shall commence on or about **June 21, 2027.**

6. **Milestone No. 4C**
   a. Physical Work at the site on the Phase 2 - Renovations shall commence on or about **December 6, 2027.**

7. **Milestone No. 5A**
   a. Substantial Completion of the Phase 1 - New Construction - Additions shall be on or before **660 Calendar Days from the Notice to Proceed, December 31, 2027.**
   b. Liquidated Damages - $2,000.00 / Calendar day of delay.

8. **Milestone No. 5B**
   a. Substantial Completion of the Phase 1A - Renovations shall be on or before **534 Calendar Days from the Notice to Proceed, August 27, 2027.**
   b. Liquidated Damages - $2,000.00 / Calendar day of delay.

9. **Milestone No. 5C**
   a. Substantial Completion of the Phase 2 - Renovations shall be on or before **898 Calendar Days from the Notice to Proceed, August 25, 2028.**
   b. Liquidated Damages - $2,000.00 / Calendar day of delay.

10. **Milestone No. 6A**
    a. Final Completion of the Phase 1 & 1A - New Construction Additions and Renovations shall be on or before **898 Calendar Days from the Notice to Proceed, January 28, 2028.**
    b. Liquidated Damages - $2,000.00 / Calendar day of delay.

11. **Milestone No. 6B**
    a. Final Completion of Phase 2 - Renovations including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion, September 25, 2028.**
    b. 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 the Contractor. 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

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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 (Sub)Contractor(s) 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 (Sub)Contractor(s) to recover the defaulting (Sub)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 Bid 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. . . .**Two (2) Yr.**

1. The Maintenance Bond shall represent a continuing obligation of the Contractor and their Subcontractor(s) to repair/replace defective materials and/or labor of products installed in the project for **two (2) years** 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. Landscaping as specified in Section 02750.

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 Bid Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Bid Documents.

2. Remove and replace dead planting materials immediately unless required to plant in the **two (2) succeeding planting seasons**.

3. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

4. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

B. Cement Based Self-Leveling Underlayment as specified in Section 03452. (Pour)

1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
   a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
      1) Warranty period: **Two (2) years** after date of substantial completion.

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C. 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.

2. Multi-flash Stainless Steel Fabric Flashing:
   a. Manufacturer shall warrant the flexible 2 mil type 304 stainless steel laminated to a polymer fabric flashing material for **life of the wall**.
   b. Begin warranty from the Date of Substantial Completion.

D. Metal Fabrications as specified in Section 05500.

1. Access Ladder Roof Support:
   a. Provide manufacturer's standard **twenty (20) year warranty** against leaks, condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.

2. Stack Jack Flashings (Vent Pipe and Roof Guard Railing):
   a. Provide manufacturer's standard **twenty (20) year warranty** against leaks, condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.

E. Solid Polymer Fabrications as specified in Section 06650.

1. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.
   a. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.

F. Direct Applied Finish System (DEFS) as specified in Section 07242.

1. Provide manufacturer's standard labor and material warranty.

G. Fluid Applied Air / Vapor Barriers as specified in Section 07270.

1. Manufacturer's Single Source Warranty:

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a. Fluid Applied Air and Vapor Barrier:
   1) Product Warranty: Manufacturer warrants the material against product defect for a period of **five (5) years** from date of purchase.

H. Fiber Cement Siding as specified in Section 07461.

1. Product Warranty: Limited, non-pro-rated product warranty.
   a. HardiePlank HZ5; or approved equal, lap siding for **thirty (30) years**.

2. Product Warranty: Limited, product warranty.
   a. HardieTrim HZ and HZ5; or approved equal, boards for **fifteen (15) years**.

3. Finish Warranty: Limited product warranty against manufacturing finish defects.
   a. When used for its intended purpose, properly installed and maintained according to the published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology; or approved equal, for a period of **fifteen (15) years** from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

4. Workmanship Warranty: Application limited warranty for **two (2) years**.

I. 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.

J. Single Ply EPDM Roofing Membrane System as specified in Section 07530.

1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.

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2. Provide manufacturers' guarantee on the Work for indicated period of the **thirty (30) years**, extending to flashings, metal edge copings, insulation and including all other materials for a single source warranty, (i.e.: Total System Warranty) signed by an authorized representative of the sheet manufacturer, guaranteeing the roofing materials against failures resulting from normal roof exposure.

3 Special Manufacturer's Warranty Wind Speed.
   a. Warranty Wind Speed, (Maximum Peak Gusts), for this project for fully adhered roofing system shall be a minimum of 90 mph (With 1/2" Securerock Gypsum-Fiber Roof Board); or approved equal.

K. 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 **thirty (30) years** which starts on the approved date of Substantial Completion.

L. Roof Specialties and Accessories as specified in Section 07800.

1. Thermally Broken Roof Hatch
   a. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of **five (5) years** from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

2. Prefabricated Self-flashing Plastic Skylight Units (Fall Protection).
   a. Provide written warranty signed by the manufacturer, agreeing to repair or replace Work which exhibits defects in materials or workmanship, and guaranteeing weather tight and leak free performance, as indicated below. "Defects" is defined as uncontrolled leakage of water and abnormal aging or deterioration.
      1) Skylight Warranty: Warranty period: **Ten (10) years** commencing on the date of Substantial Completion.
      2) Special Finish Warranty: Warranty period for Anodized Finish: **Two (2) years** from date of Substantial Completion.

M. 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.

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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.

N. 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.

O. Overhead Rolling Grilles as specified in Section 08340.

1. Standard Warranty: **Two (2) years** from date of shipment against defects in material and workmanship, on mechanical components, operator and control panel.

P. Alum./FRP Doors and Fiberglass Frame(s) as specified in Section 08410.

1. Provide a written warranty, signed by Manufacturer, Installer and Contractor, agreeing to replace, at no cost to the Owner, any doors that fail in materials or workmanship, within the time period of acceptance, as indicated below.
   a. 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.

2. Warranty Period: **Ten (10) years** from date of shipment.

3. Limited Lifetime:
   a. Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.

4. Finish:
   a. SpecLite3® face sheets: **Ten (10) years** from the date of shipment.

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b. Painted FR frames: **Three (3) years**.

Q. Aluminum Storefronts as specified in Section 08415.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum storefronts that fail in materials or workmanship within specified warranty period.
   a. Failures include, but are not limited to, the following:
      1) Failure to meet performance requirements.
      2) Structural failures including excessive deflection, water leakage, or air infiltration.
      3) Deterioration of metals or other materials beyond that which is normal.
      4) Failure of insulating glass.
   b. Warranty Period(s):
      1) Storefront: **Three (3) years** from date of Substantial Completion.
      2) Insulated Glazing: **Ten (10) years** from the date of Substantial Completion.

R. Aluminum Windows as specified in Section 08520.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Structural failures including excessive deflection, water leakage, or air infiltration.
      c. Faulty operation of movable sash and hardware.
      d. Deterioration of metals or other materials beyond that which is normal.
      e. Failure of insulating glass.
   2. Warranty Period:
      a. Window: **Five (5) years** from date of Substantial Completion.
      b. Balances: Class 6, **Ten (10) years** from date of Substantial Completion.
      c. Insulated Glazing: **Ten (10) years** from date of Substantial Completion.
      d. Painted Metal Finishes (Match existing aluminum window / storefront color):
         1) **Twenty (20) years** from date of Substantial Completion for AAMA 2605 Superior Performance Finishes.

S. Finish Hardware as specified in Section 08700.

1. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of **two (2) years** after substantial completion.

2. Provide **five (5) year** minimum factory warranty on manual surface door closers against defects in material and workmanship from date of occupancy of project.

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3. Provide **five (5) year** minimum factory warranty on exit devices against defects in material and workmanship from date of occupancy of project.

4. Provide **three (3) year** minimum factory warranty on locksets and cylinders against defects in material and workmanship from date of occupancy of project.

T. 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.

3. Manufacturer's Limited Warranty on Fire-Rated / Impact Glazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of **five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.
   a. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.

U. 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.

2. 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.

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3. Additional warranty and limited remedy terms are contained in the Warranty, Limited Remedy, and Disclaimer and the Limitation of Liability.

V. Gypsum Board as specified in Section 09250.

1. Gypsum Core Sheathing System:
   a. Joint Sealant: **Twenty (20) years** manufacturer's standard warranty.
   b. Manufacturer's standard warranty against material defects.
      a. **Five (5) years**, start at approved date for substantial completion.
   c. Silicone Emulsion Sealant: **Twenty (20) years** manufacturer's standard warranty.

W. Architectural Column Covers as specified in Section 09290.

1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the Contractor and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
   a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
      1) Warranty period: **Two (2) years** after date of substantial completion.

X. Acoustical Ceilings and Suspension System as specified in Section 09510.

1. Special Manufacturer's Warranty: Written warranty, signed by the ceiling manufacturer agreeing to furnish ceiling materials and replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

2. Warranty Period: **Thirty (30) year** System Performance Guarantee against visible sag, Mold/Mildew and Bacteria Growth.

Y. Resilient Flooring as specified in Section 09650.

1. Vinyl Composition Tile:
   a. Special Warranty - Manufacturer warrants its regular (first quality) commercial floor products to be free from manufacturing defects for **five (5) years** from date of purchase.
      1) **Within One Year**: If a defect covered by this warranty is reported to the manufacturer in writing within one year of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay reasonable labor costs.
      2) **Within Two Years**: If a defect covered by this warranty is reported to the manufacturer in writing after one year but within two years of purchase,

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Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay fifty (50%) percent of reasonable labor costs.

3) **After Two Years**: If a defect covered by this warranty is reported to the manufacturer in writing after two years but within five years of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will not pay for labor costs.
4) Manufacturer does not warrant the installers' workmanship. Workmanship errors should be addressed to the contractor who installed the floor.

2. Luxury Vinyl Tile Flooring (LVT)
   a. Warranty: Manufacturer's standard for material and labor:
      1) A **fifteen (15) year Limited Commercial Warranty** for labor and material. Warranty period shall start from approved date of substantial completion.

3. Static Dissipative Vinyl Composition Tile Flooring (VCT-NC)
   a. Special Warranty: Manufacturer's standard for material and labor:
      1) A minimum of **Two (2) years** for labor and material. Warranty period shall start from approved date of substantial completion.

4. Wall Base: **Five (5) year** Limited Commercial warranty.

Z. Commercial Smooth Sheet Vinyl as specified in Section 09657.

1. Warranty period shall be **ten (10) years** commencing on date of substantial completion. Refer to conditions of the Contract for project warranty provisions.

AA. Resilient Quartz Tile Flooring (Alternate Bid) as specified in Section 09661.

1. Manufacturer offers a **Two (2) year** warranty on product defects, from the date of purchase.

2. Manufacturer offers a **twenty (20) year** limited warranty stating properly installed and maintained quartz flooring tiles are guaranteed to be free from wear through due to normal use in commercial applications. Please contact manufacturer for a complete copy of the warranty.

BB. Carpet Entry Mats as specified in Section 09682.

1. Warranty Performance Requirements:
   a. **Ten (10) year** Commercial Limited Warranty:
      1) Fiber - Abrasive Wear – Manufacturer warrants that, under normal use, carpet using Solution Q SD Nylon will lose no more than 10% of the pile face fiber, by weight, during the warranty period. This warranty does not cover appearance retention, matting and crushing and normal appearance changes in high traffic areas.

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2) Fiber - Static Protection - Manufacturer warrants that, under normal use, carpet using Solution Q SD Nylon will not generate static build-up in excess of 3.5 kv, during the warranty period as tested by AATCC Test Method 134.
3) Fiber - Colorfastness to Light and Atmospheric Contaminants Warranty - Manufacturer warrants that, under normal use, carpet utilizing Solution Q® SD Nylon, when installed and maintained as recommended by Manufacturer for indoor use only, will not display a significant change in color due to exposure to light or exposure to atmospheric contaminants (Ozone or Oxides of Nitrogen) during the warranty period.

CC. Carpet Tile as specified in Section 09685

1. **Twenty (20) year** excessive surface wear (loss of more than 10% by weight of face fiber), edge ravel, backing separation, shrinking, stretching and static electricity Warranty from the date of invoice.

2. **Twenty (20) year** - Antimicrobial Preservative Protection Warranty.

3. **Special Project Warranty:**
   a. In addition, a written special project warranty, executed by the Contractor and the Installer, agreeing to repair or replace carpet which fails in material or workmanship within a period of **two (2) years**, which starts at the date of substantial completion, without any cost to the Owner, and agreeing to repair or replace other defects beyond Contractor's / Installer's / Manufacturer's controls, as judged by the Architect, at Owner's expense at prevailing rates.
   b. TacTiles® carpet tile will not be adversely affected by defects in their materials or workmanship for a period of **two (2) year** from the date of invoice when used to install the appropriate Interface® carpet products.

DD. Hygenic Wall Coverings as specified in Section 09720.

1. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

2. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Bid Documents.

3. Warranty Period shall be **twenty (20) years** commencing on Date of Substantial Completion.

EE. Sound-Absorbing Ceiling Units as specified in Section 09843.

1. Special Warranty: Manufacturer agrees to repair or replace the defective parts of the panel(s).

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2. Warranty does not include:
   a. Deterioration or failure of panel due to moisture, dust stains, or other contaminants from daily use.
   b. Any condition resulting from a use for which the product was not designed.
   c. Differential shading from direct sunlight exposure.
   d. Tears, burns, pulls, cuts, or damage resulting from improper maintenance and installation.

3. Warranty Period: **Twenty (20) years** from date of product manufacture.

FF. Wallcoverings as specified in Section 09950.

1. **Special Project Warranty**: Submit a written warranty, executed by the Installer and Manufacturer, agreeing to repair or replace wallcovering materials which fail in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Bid Documents.
   a. Warranty period is **two (2) years** after the date of substantial completion.

2. Digital Wallcovering Manufacturer is not responsible for labor charges, improper installation, installation of incorrect goods (those not approved or confirmed by the customer), removal of goods, or problems arising from defects in the construction, surface, or preparation of the wall.

GG. Dry Marker Boards / Exhibition Boards as specified in Section 10100.

1. Submit a "**Life of Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboard and chalkboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.

2. Submit a standard warranty, stating that when installed in accordance with manufacturer's instructions and recommendations, exhibition boards are guaranteed for **two (2) years** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.

3. Writing Surface Warranty Period: **Lifetime** of the building commencing on the Date of Substantial Completion.

HH. Solid Plastic Toilet and Bath Partitions as specified in Section 10161.

1. Submit manufacturer's written guarantee to the Architect and the Owner which guarantees its plastic against breakage, corrosion and delamination under normal

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conditions for **twenty-five (25) years** from date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge (labor not included in warranty).

II. Dimensional Letters - LTV Series as specified in Section 10430.

1. Project Warranty: Comply with requirements of Section 01900.

2. Manufacturer's Warranty: Submit manufacturer's special warranty executed by authorized company official.
   a. Special Warranty Period: **Two (2) years** from product ship date. Warranty specifically excludes letter mounting substrate.

JJ. Fire Extinguishers, Cabinets, and Accessories as specified in Section 10522.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   a. Failures include, but are not limited to, the following:
      1) Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
      2) Faulty operation of valves or release levers.
   b. Warranty Period: **Six (6) years** from date of Substantial Completion.

KK. Operable Partition as specified in Section 10650.

1. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.

2. Warranty period: **Two (2) years**.

3. Suspension System Warranty: **Two (2) years**.

4. **Lifetime** warranty on hinges.

LL. Toilet and Bath Accessories as specified in Section 10800.

1. Washroom Accessories: Warranty is limited to replacing or repairing, at the manufacturer’s option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:
   a. Complete unit (except mirrors) - **Two (2) years**.
   b. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.
   c. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.
   d. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **Two (2) years** against corrosion.

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e. Bright Annealed Finish on 430 Series Stainless Steel - **Two (2) years** against corrosion.

* Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.

MM. Casework (Solid Wood) as specified in Section 11011.

1. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.
   a. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

1.4 PLUMBING & DRAINAGE WORK

A. Fuel-Fired, Domestic-Water Heaters as specified in Section 15486.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.
   a. Failures include, but are not limited to, the following:
      1) Structural failures including storage tank and supports.
      2) Faulty operation of controls.
      3) Deterioration of metals, metal finishes, and other materials beyond normal use.
   b. Warranty Periods: From date of Substantial Completion.
      1) Commercial, Gas-Fired, Storage, Domestic-Water Heaters:
         a) Storage Tank: **Five (5) years**.
         b) Controls and Other Components: **Two (2) years**.

1.5 HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION WORK

A. Condensing Boilers as specified in Section 15513.

1. Standard Warranty: Boilers shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
   a. Warranty Period for Fire-Tube Condensing Boilers
      1) The pressure vessel/heat exchanger shall carry a **fifteen (15) year** from shipment, non-prorated, limited warranty against any failure due to condensate corrosion, thermal stress, mechanical defects or workmanship.
      2) The burner shall be conditionally guaranteed against any failure for **five (5) years** from shipment.
      3) Manufacturer labeled control panels are conditionally warranted against failure for **three (3) years** from shipment.

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d. All other components, with the exception of the igniter, flame detector and 0^2 sensor, are conditionally guaranteed against any failure for **two (2) years** from shipment.

B. Breeching, Chimneys, and Stacks as specified in Section15550.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of venting system that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, structural failures caused by expansion and contraction.
   a. Warranty Period: **Ten (10) years** from date of Substantial Completion.

C. Packaged, Outdoor, Rooftop Units as specified in Section 15732.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTU's that fail in materials or workmanship within specified warranty period.
   a. Warranty Period for Compressors: Manufacturer's standard, but not less than **five (5) years** from date of Substantial Completion.
   b. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than **fifteen (15) years** from date of Substantial Completion.
   c. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.
   d. Warranty Period for Control Boards: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.

D. Packaged, Outdoor Energy Recovery Units as specified in Section 15733

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTU's that fail in materials or workmanship within specified warranty period.
   a. Warranty Period for Compressors: Manufacturer's standard, but not less than **five (5) years** from date of Substantial Completion.
   b. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than **fifteen (15) years** from date of Substantial Completion.
   c. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.
   d. Warranty Period for Control Boards: Manufacturer's standard, but not less than **three (3) years** from date of Substantial Completion.

E. Self-Contained Unit Ventilators as specified in Section 15768.

1. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Bid Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Bid Documents.

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2. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of compressor that fail in materials or workmanship within specified warranty period.

3. Warranty Period: **Five (5) years** from date of Substantial Completion.

F. HVAC Instrumentation and Controls as specified in Section 15900.

1. Warranty Period: Labor and materials for control systems shall be warranted for a period as specified under Warranty in General Conditions. Provide a **two (2) year** labor and material warranty on the BMS. If within twenty four (24) months from the date of acceptance of product, upon written notice from the owner, it is found to be defective in operation, workmanship, or materials, it shall be replaced, repaired, or adjusted at the option of the BMSC at the cost of the BMSC. THE BMSC shall maintain an adequate supply of repair devices within 50 miles of the Project site such that replacement of key parts and labor support, including programming. Warranty work shall be done during BMSC's normal business hours.

2. Start of Warranty Date: After the Engineer determines that equipment and systems operate satisfactorily at the end of final start-up, testing, and commissioning phase, the Engineer shall certify in writing that control system operation has been tested and accepted in accordance with the terms of this specification. The BMSC shall provide the owner in writing the Date of acceptance and the beginning of the warranty period.

3. Software Warranty: The BMSC shall provide updates to operator workstation software, project-specific software, graphic software, database software, and firmware that resolve identified software deficiencies at no charge during warranty period. Do not install updates or upgrades without Owner's written authorization.

4. Warranty - Remote Service Support: As part of the warranty response, the BMSC shall be required to remotely connect to the facility's BMS during the warranty period. This remote connection to the facility shall be within two (2) hours of the time that the problem is reported to the BMSC. This coverage shall include normal or after business hours, weekends, and holidays. If the problem cannot be resolved with remote support services, the BMSC shall dispatch the qualified personnel to the project site to resolve the problem within 24 hours.

1.6 ELECTRICAL WORK

A. Digital, Addressable Fire-Alarm System as specified in Section 13852.

1. Warranty: System provider agrees to repair or replace fire-alarm system equipment and components including but not limited to the fire alarm control panel, detection devices, and notification devices that fail in materials or workmanship within specified warranty period.
   a. Warranty Period: **Five (5) years** from date of Substantial Completion.

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B. Lighting Control Devices as specified in Section 16145.

1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
   a. Failures include, but are not limited to, the following:
      1) Faulty operation of lighting control software.
      2) Faulty operation of lighting control devices.
   b. Warranty Period: **Two (2) years** from date of Substantial Completion.

C. Enclosed Switches and Circuit Breakers as specified in Section 16410.

1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
   a. Warranty Period: **Two (2) years** from date of Substantial Completion.

D. Panelboards as specified in Section 16442.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace devices that fails in materials or workmanship within specified warranty period.
   a. Warranty Period: **Three (3) years** from date of Substantial Completion.

E. Lighting as specified in Section 16511.

1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

2. Warranty Period: **Five (5) years** from date of Substantial Completion.

F. Lighting Controls as specified in Section 16526.

1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship or from transient voltage surges within specified warranty period.
   a. Failures include, but are not limited to, the following:
      1) Failure of software input/output to execute switching or dimming commands.
      2) Failure of modular relays to operate under manual or software commands.
      3) Damage of electronic components due to transient voltage surges.
   b. Warranty Period: **Five (5) years** from date of Substantial Completion.
   c. Extended Warranty Period Failure Due to Transient Voltage Surges: **Eight (8) years**.

END OF SECTION 01900

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SECTION 01950 - SUBSOIL

1. GENERAL

A. The attached subsurface investigation was developed by Professional Engineers at the request of the Owner.

B. Additional surveys, test borings and other exploratory operations may be made by Contractor at no cost to Owner.

C. The Architect and Owner assume no liability or responsibility for the accuracy of this report and for conclusions drawn therefrom.

D. See Report for Test Boring Location Plan.

END OF SECTION 01950

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GEOTECHNICAL INVESTIGATION REPORT

PROPOSED ADDITIONS
PRINCETON LITTLEBROOK SCHOOL
39 MAGNOLIA LANE,
PRINCETON, NJ 08540

PREPARED FOR
L2A LAND DESIGN
92 EAST MAIN STREET, SUITE 204
SOMERVILLE, NJ 08876

MAY 2025



Chadd W. Ingram, P.E.
President
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EXECUTIVE SUMMARY

IES has been retained by the Client to perform a geotechnical investigation. Given the proposed land development plans and coordination with the Client, IES understand that the proposed construction will consist of:

- Proposed building additions to the rear of the existing building structure

This geotechnical investigation was performed throughout the site via exploratory boring investigation. Soil Stratums/classification were generally consistent and consisted of three (3) predominant soil strata:

- **Asphalt and stone subbase: Surface to 0' – 0.5'**
  Basketball court asphalt extending to a depth of six inches (6") below ground surface elevation for B-1

- **Topsoil: Surface to 0' – 0.50**
  Topsoil extending to an average depth of four (6") inches BGS for B-2, B-3, and B-4.

- **Stratum I: 0.5'- 4.5': SILT and Sandy SILT with trace to some gravel (MH)**
  Medium dense brown to light brown, Silty SAND encompassed this stratum. An estimated allowable bearing value for this stratum is designated at 2,000 to 2,500 PSF.

- **Stratum II: 4.0'- 13.0': Silt with gravel and some decomposed shale, Silty SAND(ML-SM)**
  Medium dense to dense Silty Sand and weathered schist encompassed this stratum. An estimated allowable bearing value for this stratum is designated at 2,500 - 3,000 PSF.

- **Stratum III: 13.0'- 25.0': Weathered Shale/Refusal (SM/Shale)**
  Dense to very dense shale and weathered shale in colors of brown, light brown, and reddish brown. An estimated allowable bearing value for this stratum is designated at 3,000 – 3,500 PSF.

Given the soil classification, SPT results, and the laboratory analysis, IES has drawn the following conclusions/provides the following recommendations:

- It is anticipated that the proposed addition will be supported by shallow foundations. The anticipated foundation system consisting of shallow footings will be sufficient without substantial remediation of the immediate subgrade.
- IES recommends the foundation system bear into Stratum II soils
- Stratum I & II can be used as onsite structural fill

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May 22nd, 2025

Beth E. Kenderdine, P.E.
Edwards Engineering Group
92 East Main Street, Suite 204
Somerville, NJ 08876

RE: Geotechnical Engineering Report
Princeton Littlebrook School
39 Magnolia Lane,
Princeton, NJ 08540

Mrs. Kenderdine,

Submitted herewith is the *Geotechnical Engineering Report* for the above reference project. Edwards Enigneering Group – an L2A Company (Client) has retained Ingram Engineering Services, Inc. (IES) to perform a geotechnical investigation and analysis in order to make recommendations for foundation design and construction considerations for the existing soils beneath the proposed building addition. This investigation is to assist the Design Engineer in relation to proposed earthwork, foundation bearing capacity, etc. Any environmentally related services are beyond this investigation's scope of work. Presented herewith is the required information. IES appreciates the opportunity to be of service to you on this project. If we may be of further assistance, please do not hesitate to contact our office.

PURPOSE AND SCOPE OF WORK

The purpose of this investigation was to assess the general subsurface soil profiles and groundwater conditions to determine the existing subsurface characteristics and the engineering properties to support the proposed building addition and associated infrastructure. A geotechnical investigation has been completed and subsurface conditions evaluated. The following report was furnished to provide construction recommendations related to the proposed foundation system, general earthwork, and construction recommendations.

The scope of the investigation and evaluation involved the advancement of four (4) soil borings, soil sampling and recording of the onsite soils encountered, completing index laboratory analyses on representative soil samples, a geotechnical analysis of the field findings and field logs, and the preparation of a written engineering report. A proposed site plan entitled *"Princeton Public School – Princeton Littlebrook School –proposed site plan"* by FVHD Architects Planners (hereafter referred to as the "Plan") was provided to IES which depicted the proposed location of the proposed building additions. IES utilized the plans to locate the

proposed soil boring locations within the footprint of the proposed buildings addition. This report is limited to the data reviewed, collected, and analyzed by IES and addressed the current site conditions investigated as they relate to bearing for the proposed addition and associated infrastructure.

SITE AND PROJECT DESCRIPTION

The proposed construction site is currently situated at 39 Magnolia Lane, Princeton, NJ. The site is bound by Magnolia Lane to the West, Littlebrook Rd to the South and East, and Broadtripple Drive to the North. Residential houses are situated along all of these roads and surround the above project location. Princeton Littlebrook school has a one-way road leading to the school that loops back to Magnolia Lane with a parking lot in the back of the site. The majority of the site is relatively open with medium vegetation surrounding the boarders of the site. Playground area can be found to the South of the site.

Historical aerial photography available for review indicates that the site was used for agriculture purposes up until 1956s (earliest available Historic Aerial photograph is from 1931). In 1956 the current building structure that stands today can be seen being erected. A few residential homes were erected around the same time in 1956, but it's not until 1987 where a majority of the current residential houses were constructed. The site and surrounding area has remained relatively unchanged since 1987. Historic aerials can be found in **Appendix A** and site photos can be found in **Appendix F**.

INTRODUCTION

On Friday, May 2nd, 2025, Nick Dobson of IES completed a geotechnical field investigation involving the advancement of four (4) soil test borings at the project site within the vicinity of the proposed building addition. Test Borings included split spoon sampling and standard penetration testing. The borings were located in the field by IES personnel based on GPS coordinates of the proposed testing locations with a 15' radius of accuracy. Accurate Drilling utilized a Truck Mounted drill rig to advance the exploratory borings under the supervision of IES. Borings were advanced to a planned depth of twenty-five (20'-25') feet BGS or to refusal. Test drilling and soil sampling was completed in accordance with ASTM D-1586, "Standard Test Method for Penetration and Split-Barrel Sampling of Soils, (SPT)." Standard penetration test (SPT) N-values were recorded for each sample. SPT N-values are the number of blows required to advance a 2-inch outside diameter split-spoon sample one-foot using a 140-pound hammer with a 30-inch drop. This value gives a direct relation to the relative density of the existing in-situ soils present at the boring location.

Soil samples recovered during the investigation were visually classified in the field and logged by IES. Representative soil samples were placed in recovery jars and brought to the IES

soil laboratory for further analysis. The boring and test pit locations and logs are shown in **Appendices B and C**, Geotechnical Exploration Map and Soil Boring Logs, respectively.

FIELD INVESTIGATION AND SUBSURFACE CONDITIONS

The soil samples obtained from the split spoon sampling were examined and visually classified in the field on the attached boring logs. Laboratory samples were also collected and analyzed via USCS Full Classification. Laboratory testing was performed in accordance with applicable ASTM standard test methods. The laboratory results can be found in **Appendix D** and are incorporated into the findings, recommendations and conclusions discussed throughout this *Geotechnical Engineering Report.* Final exploration boring logs represent the interpretation of individual samples and the field logs. Stratification lines on the logs represent an approximate boundary between soil types, although these transitions may be gradual and vary across the site.

Within the depths explored, the subsurface soil profiles within all test investigation locations were, in general, similar, and consisted primarily of the following soil profile:

- **Asphalt and Stone subbase: Surface to 0.5':**
  Parking lot asphalt and stone subbase was found to a depth of six inches (6") BGS and found only found at B-1.

- **Topsoil: Surface to - 0.5':**
  Topsoil with little root matting in colors of brown to dark brown extending to a range of depth of six inches below ground surface elevation. Topsoil stratum was found at boring locations B-2, B-3, and B-4.

- **Stratum I: 0.5' – 4.5': SILT to Sandy SILT (MH)**
  Medium dense to dense SILT to Sandy SILT with trace to some gravel in colors of light brown to brown. This stratum was encountered directly below the topsoil and asphalt layer to an average depth of four feet (4.5') below ground surface elevation. An estimated allowable bearing value for this stratum is designated at 2,000 PSF to 2,500 PSF.

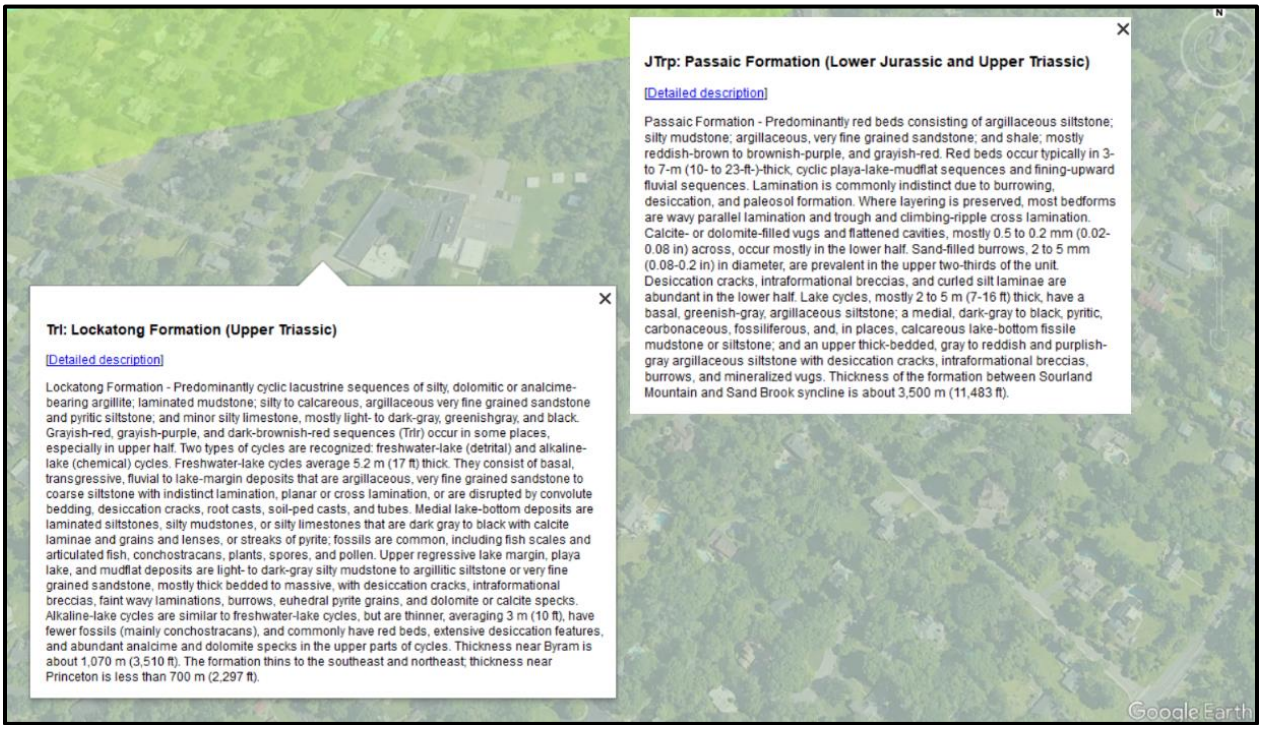
- **Stratum II: 4.0' – 13.0': Silt with gravel and some decomposed shale, Silty SAND(ML-SM)**
  Medium dense to dense Silty SAND, Silt with some gravel and weathered decomposed shale mix in colors of brown, light brown, reddish brown and black. This stratum was encountered directly below Stratum I and extended to approximately 13' BGS. The shale is highly weathered and has the consistency of a Sandy Silt to Silt. B-2 and B-4 were the borings that had refusal in this stratum. An estimated allowable bearing value for this stratum is designated at 2,500 – 3,000 PSF.

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- **Stratum III: 13.0' – 20.0': Decomposed Shale/Refusal**
  Very dense weathered shale in colors of brown, light brown, and grayish brown, reddish brown, and black. This stratum is encountered directly below Stratum II. Only boring three (B-3) reached the proposed depth of 20' BGS while B-1 reach a depth of 16' BGS, B-2 reached a depth of 10' BGS, and B-4 reached a depth of 12' BGS. An estimated allowable bearing value for this stratum is designated at 3,000 – 3,500 PSF.

Groundwater was encountered within Boring three (B-3) at the time of the investigation at 11.5' BGS. It should be noted that the ground water data presented on the boring log may not be representative of daily or seasonal variations in the ground water level. It is not anticipated that groundwater will be encountered within the anticipated depths of the proposed excavation, however, should perched water be encountered, dewatering techniques will need to be implemented such as the installation of a sump with filter bag at the time of excavation.



According to the USGS Geologic Map of New Jersey, the site Geology belongs to the Lockatong Formation (Upper Triassic). This site also borders the Passaic Formation (Lower Jurassic and Upper Triassic) which is located directly north. The Lockatong Formation is described as "*Predominantly cyclic lacustrine sequences of silty, dolomitic or analcime-bearing argillite; laminated mudstone; silty to calcareous, argillaceous very fine grained sandstone and pyritic siltstone; and minor silty limestone, mostly light- to dark-gray, greenish gray, and black. Grayish-red, grayish-purple, and dark-brownish-red sequences (Trlr) occur in some places,*

especially in upper half". The Passaic Formation is described as "*Predominantly red beds consisting of argillaceous siltstone; silty mudstone; argillaceous, very fine grained sandstone; and shale; mostly reddish-brown to brownish purple, and grayish-red"*

According to the *Natural Resources Conservation Service Web Soil Survey* site soils are that of Chalfont silt loam, 2 to 6 percent slopes (Hydric Rating of 5%), and Udorthents, bedrock substratum, 0 to 8 percent slopes (Hydric Rating of 4%). Chalfont silt loam, 2 to 6 percent slopes, has a hydrologic soil rating C (Slow infiltration rate when thoroughly wet), and udorthents, bedrock substratum, 0 to 8 percent slopes, (Very slow infiltration rate when thoroughly wet). Refer to **Appendix E** for USDA Natural Resources Conservation Services Hydric Soils Map.

CONCLUSIONS/RECOMMENDATIONS

The following conclusions and recommendations are based on the data collected during this investigation, our understanding of the proposed construction, our experience with similar site and subsurface conditions and generally accepted principles and practices of geotechnical engineering. Should the proposed construction change significantly from that described in this report, we request that we be advised so that we may amend these recommendations accordingly. This report, and the conclusions and recommendation provided herein, are provided exclusively for the use of the Client and is intended solely for the design of the reference project. Based on the information obtained at the boring locations and design details provided to IES, recommendations related to the important aspects of design and construction are provided below.

General Site Preparation and Fill Placement

Initially, prior to construction, the construction area should be cleared of any surface concrete. Any topsoil, deleterious materials, vegetation, asphalt, concrete, fill and/or unforeseen demolition encountered are to be removed from the proposed construction area to stable natural ground in order to properly address any loose condition encountered within the boring investigation. The exact depth of excavations for load-bearing infrastructure is to be determined by the Geotechnical Engineer of Record or a representative thereof at the time that the proposed foundation excavation, i.e. - Geotechnical oversight is required.

Frost: No fill or infrastructure shall be placed on frost. Removal of the frost is mandatory in all load-bearing areas. Depth of excavation and confirmation of sufficient soil removal is to be performed under the oversight of the Geotechnical/Soil Engineer or a representative thereof.

The exposed subgrade is to be densified with a vibratory compactor or similar equipment in the presence of the Geotechnical/Soil Engineer to detect and repair any unsuitable soil conditions and to attain a uniform firm & stable subgrade throughout. Proofroll evaluations

utilizing a fully loaded tandem axle dump truck (20 tons) should be performed under the supervision of the Geotechnical/Soil Engineer during a period of dry weather. Any loose/soft soils encountered are to be densified by proofrolling and further compaction by additional passes if necessary. Areas identified with excessive pumping or heaving are to be excavated and replaced with compacted structural fill materials imported or suitable site materials at the direction of the Geotechnical/Soil Engineer. Major remediation is not anticipated for this project; however, light redensification of the immediate subgrade of structural load bearing area is anticipated due to some fine grained soils encountered within Strata I and II. Climatic conditions and site drainage will have an effect on the amount of reworking and undercutting required at the site. Areas to receive structural fill are to be stripped of all unsuitable and/or organic material prior to the placement of structural fill.

Subgrades may be brought up to desired elevation with on-site soils from Strata I or II or approved structural fill * in lifts no greater than eight (8") loose thickness and compacted to 95% of the material's maximum dry density per ASTM D-698. Stratum II soils are considered suitable, on-site structural fill soils. Recommended frequency of in-field compaction testing is 1 test per 1,000 SF. The upper foot of fill which will support structures should be compacted to at least 98% of the soil's standard Proctor maximum dry density for improved support. Structural fill lifts must be at or near their optimum moisture content. Structural fill should be free of organic material, have a plasticity index (PI) of less than 15, and contain particle sizes no larger than four inches (4"). Approved structural fill soils qualify under the following criteria:

- Free of demolition debris, organic matter, ash, cinders, slag, and frost.
- At or near optimum moisture content
- Plasticity Index (PI) less than 15
- Unsuitable soils for import are those classified as SC, CL, CL-ML, ML, MH, CH, OH, OL, and PT.
- Particle size distribution that is well-graded (for import soils)
  100% passing the (2") sieve
  100% - 70% passing the (3/4") sieve
  80% - 30% passing the (#4) sieve
  35% - 10% passing the (#50) sieve
  35% - 5% passing the (#200) sieve

* Structural fill criteria may be field adjusted by the Geotechnical Engineer of Record

Any bulk samples of all materials to be used as structural load-bearing fill must be taken and tested prior to the commencement of work and placement of select fill so that moisture/density relationships (compaction) can be determined via standard or modified proctor. Approved on site soils may be used for backfilling under the strict oversight/control of the Soils Engineer. Organic and miscellaneous uncontrolled fill materials are considered

to have no bearing value. All exposed footing subgrades are to be compacted by two passes with a jumping jack compactor or similar compaction equipment immediately prior to the placement of the footing concrete.

Excavations are anticipated to be generally 'moderate' digging thus, conventional earth moving equipment will be adequate for the construction. Some difficult excavations may require additional rock removing equipment such as peckers or ripper teeth in area where shallow refusal was found. If conditions are wet at the time of construction, proper dewatering and drying measures should be implemented for the soil to dry within optimum moisture content ranges. This is extremely important in order to properly compact the soil as specified herein. Soils encountered during the investigation are anticipated to be that of Type C soils. Excavations should be performed safely including benching and other applicable methods in accordance with OSHA 1926 Subpart P App B.

Surface run-off shall be diverted from all open excavations. The ponding of water due to rainfall shall be minimized. In the event surface run-off or groundwater is encountered within an excavation, it can likely be removed utilizing a pump equipped with a filtered sump, possibly in the combination with the placement of ballast or coarse aggregate at the discretion of the onsite Geotechnical/Soil Engineer. Perched water may be encountered within the proposed excavations potentially after rainfall events. To minimize the deterioration of subgrade soils, appropriate sequencing of earthwork activities and concrete placement is recommended.

Foundation Design Criteria & Alternatives

- It is anticipated that the proposed building additions will be supported by conventional shallow foundations. All isolated column footings shall be at a minimum three-feet wide and all continuous wall footings shall be at a minimum two-feet wide regardless of the provided allowable bearing values (ABV).
- The anticipated foundation system consisting of shallow footings will be sufficient without any substantial remediation. Foundation system designed for a maximum allowable bearing value of **3,000 PSF** based on the following recommendations:
    - Footings are to bear in Stratum II soils confirmed by Geotechnical Engineer to achieve minimum ABV. Anticipated depth of 4.0+' BGS.
    - Subgrades may be brought up to proposed footing elevations from stratum II with approved structural fill that is placed accordance with this report.
- Footing subgrades may require light remediation to achieve the designated ABV including additional passes with a trench roller or minor remove/replace with approved structural fill or 2A modified stone.
- It is paramount and industry practice that the Geotechnical/Soil Engineer representative is present during the foundation excavation activities to observe the subgrade preparation.

- The bottom of the foundation system shall be placed at a minimum below the frost line for the region (36" below finished grade).
- Footings shall not be founded partially on intact rock. In this instance, a rock cushion that of AASHTO #57s or equivalent clean stone of 12" in thickness would be required over top of the rock. This would require some rock removal to achieve this effect where present at the footing bottoms.

Slab-On-Grade Design Criteria

IES has assigned a modulus of subgrade reaction on the order of 125 psi/in be used for design of slabs. It is anticipated that the slab subgrade will consist of fine-grained soils encountered at the site. All subgrades shall pass a proof roll prior to the placement of the slab subbase stone material. Remediation of the immediate subgrade is anticipated required remove and redensification and/or chocking with ballast/ crushed stone. IES recommends slabs to be poured on a minimum of 4-inches of clean AASHTO #57 Stone.

- ***Inspections***

  It is imperative that all earthwork operations, within load-bearing areas, be inspected by the Geotechnical/Soil Engineer or a qualified representative thereof, especially the footing subgrades immediately prior to placing the footing concrete. Foundation excavation evaluations/inspections should be performed to confirm that the design allowable bearing pressure is adhered to (consistent to this report of findings and logs) and that subgrades are stable and free of deleterious material. Footing subgrade evaluations should be performed through a combination of visual observation, geoprobing, and field compaction density tests with comparison to the boring logs.

- ***Seismic Site Class***
  - Seismic Site Class: D (Stiff Soil Profile)
  - Soil shear wave velocity - v_s (ft/s): $600 < v_s < 1{,}200$
  - Standard penetration resistance – N: $15 \leq N \leq 50$
  - Soil undrained shear strength - s_u (psf): $1{,}000 \leq s_u < 2{,}000$

- ***Lateral Earth Pressures***

  The following earth pressure coefficients are recommended for the in-place soils against foundations or retaining walls. The parameters given assume that the primary backfill soils around the walls will be material from Stratum I and II. Soils within the backfill zone and retained zone shall be compacted to a minimum density equal to 95% of the maximum dry density determined by the moisture-density relationship, ASTM D698

Friction Angle:	28°
Maximum Dry Unit Weight:	105-115 pcf
Cohesion	0 psf

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Active Earth Pressure Coefficient, Ka:	0.36
Passive Earth Pressure Coefficient, Kp:	2.76
At Rest Earth Pressure Coefficient, Ko:	0.53

Based on an assumed angle of internal friction, these coefficient estimates were calculated from available data compared to the standard penetration test resistance values in conjunction with our experience with similar projects with similar soil conditions. If more precise values are required, it is recommended to complete triaxial shear testing of the existing site soils prior to construction to verify these estimates.

During backfill operations, loads imposed by construction equipment should be taken into consideration during design and construction. Until the concrete is properly cured, all large earthwork equipment is restricted to approximately five feet (5') offset from all foundations to prevent excessive lateral pressure.

LIMITATIONS AND QUALIFICATIONS

This is a geotechnical investigation report requested by the Client. The conclusions and recommendations included in this report are based on the subsurface data and conditions collected during the field investigations in conjunction with the site plans, data and history provided. This report is for geotechnical study only. This report does not include any geoenvironmental findings such as buried underground storage tanks or regulated contaminants. The general subsurface conditions used in our evaluation were based on interpolation of the subsurface data at the exploratory boring locations.

It should be noted that soil conditions across the site can vary significantly from the conditions found at the individual boring locations. This is particularly true in areas that have been disturbed by prior construction and it is not uncommon to find buried construction debris in these areas. IES will not be responsible for the presence of buried fill materials or unexpected conditions that may be delineated or encountered at the site. IES should be informed immediately of such conditions so that we may modify our conclusions and recommendations.

The recommendations outlined in this geotechnical report are based on the assumption that the provisions for strict field inspection will be followed as specified and directed, either by a representative of IES or other qualified personnel, to include oversight and inspection of compaction, backfill placement, and/or other significant earthwork or structural fill construction activities.

These professional services have been performed, the findings derived, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all warranties either expressed or implied. This company is not responsible for the conclusions, opinions or recommendations of others based on this data.

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Should you have any questions, kindly contact the undersigned.

Very Truly Yours,

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APPENDIX A:

Historic Aerials

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1931 Historic Aerial



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1956 Historic Aerial



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1987 Historic Aerial



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2022 Historic Aerial



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APPENDIX B:

Exploration Map

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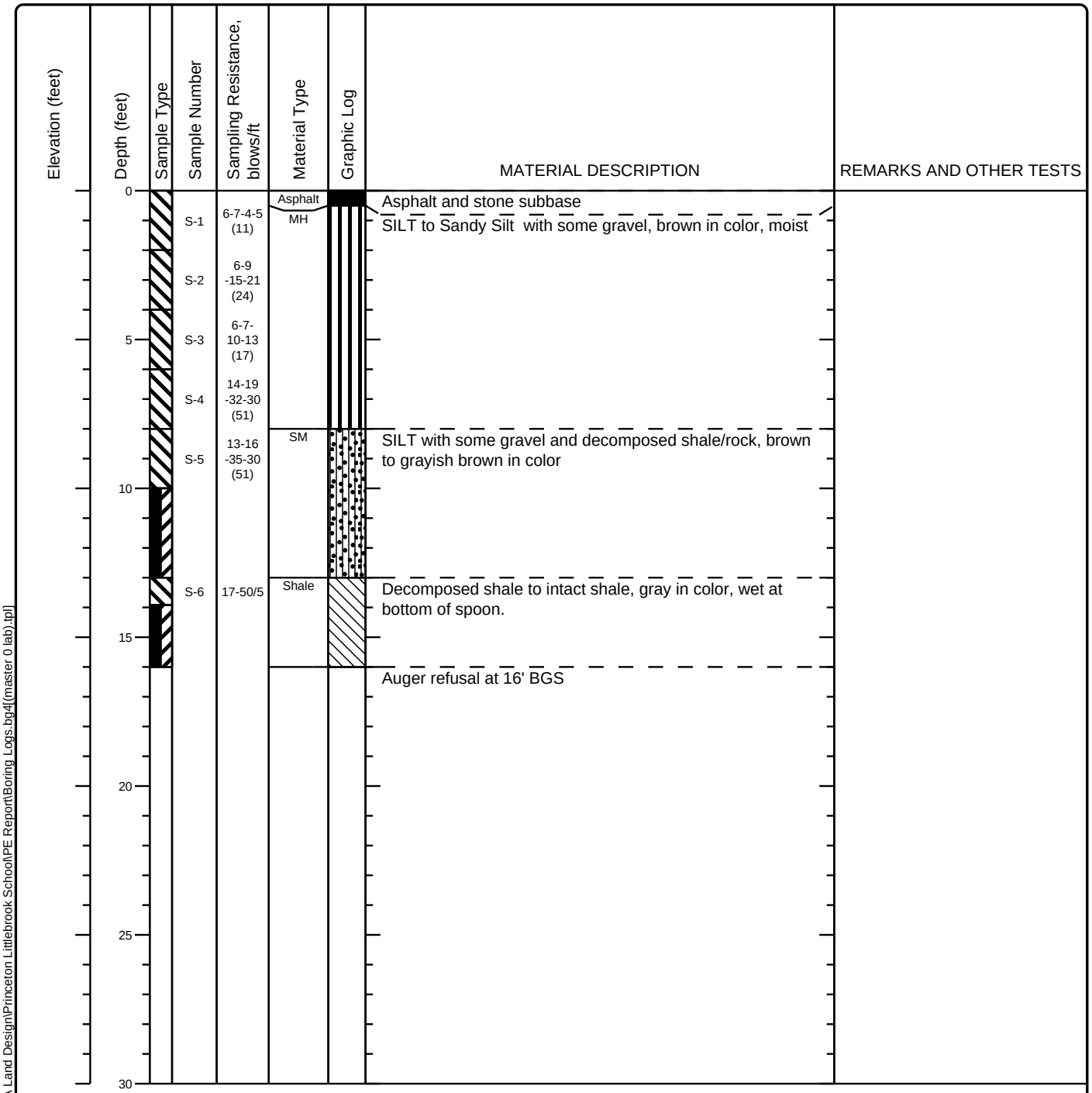
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APPENDIX C:

Boring logs

Project: **Princeton Littlebrook School** Project Location: **39 Magnolia Lane, Princeton, NJ 08540** Project Number: **L2A Land Design**	Log of Boring B-1 **Sheet 1 of 1**

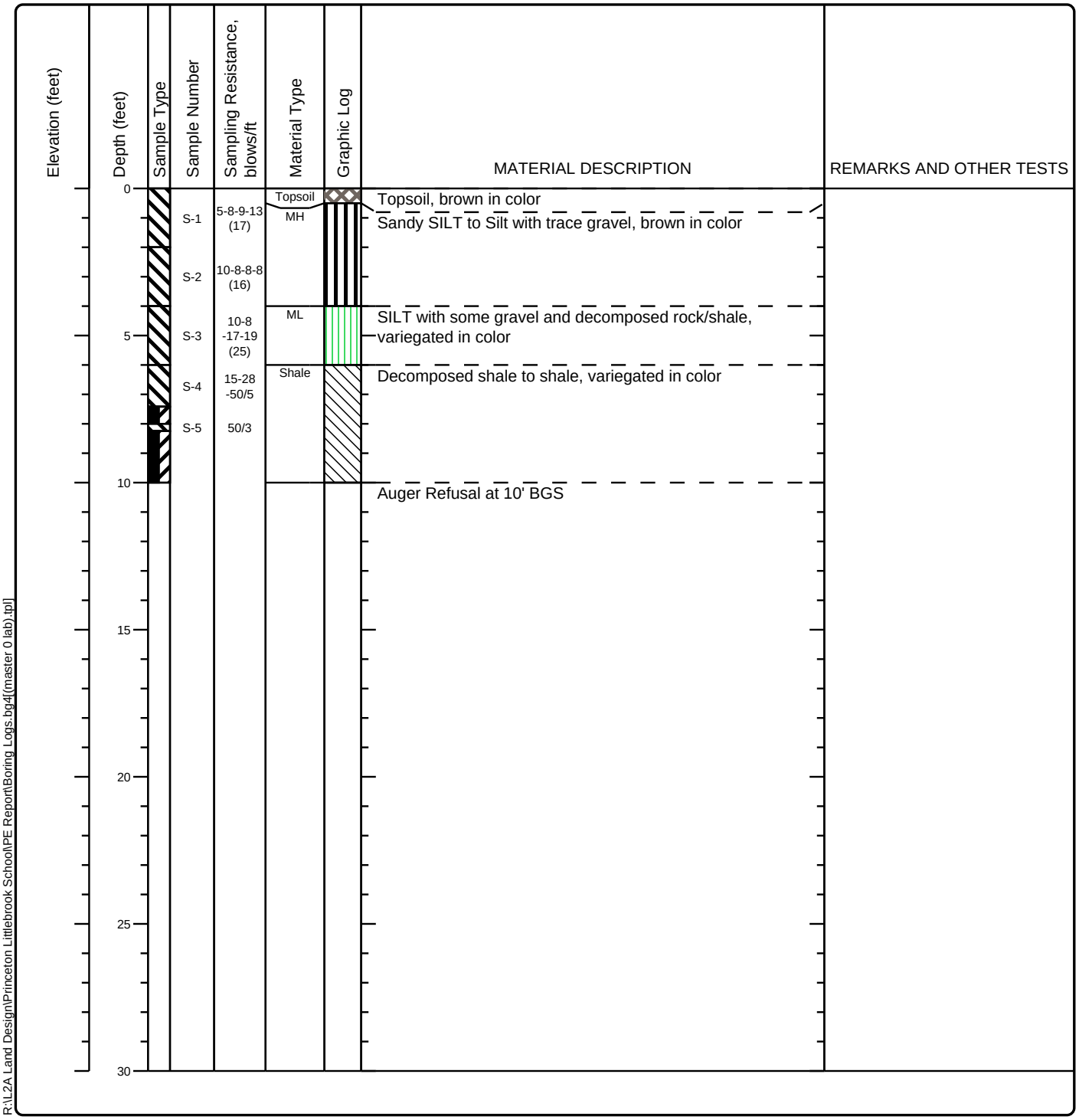
Date(s) Drilled **5/2/25**	Logged By **N. Dobson**	Checked By **C. Ingram**
Drilling Method **ASTM D1586-11**	Drill Bit Size/Type **6" Diameter HSA**	Total Depth of Borehole **16 feet bgs**
Drill Rig Type **Truck Mounted Drill Rig**	Drilling Contractor **Accurate Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **NA**	Sampling Method(s) **Auger, SPT**	Hammer Data **140lb-30" drop**
Borehole Backfill **Spoils**	Location **40°21'49.23"N 74°38'16.09"W**	



R:\L2A Land Design\Princeton Littlebrook School\PE Report\Boring Logs.bg4[(master 0 lab).tpl]

Project: **Princeton Littlebrook School** Project Location: **39 Magnolia Lane, Princeton, NJ 08540** Project Number: **L2A Land Design**	Log of Boring B-2 **Sheet 1 of 1**

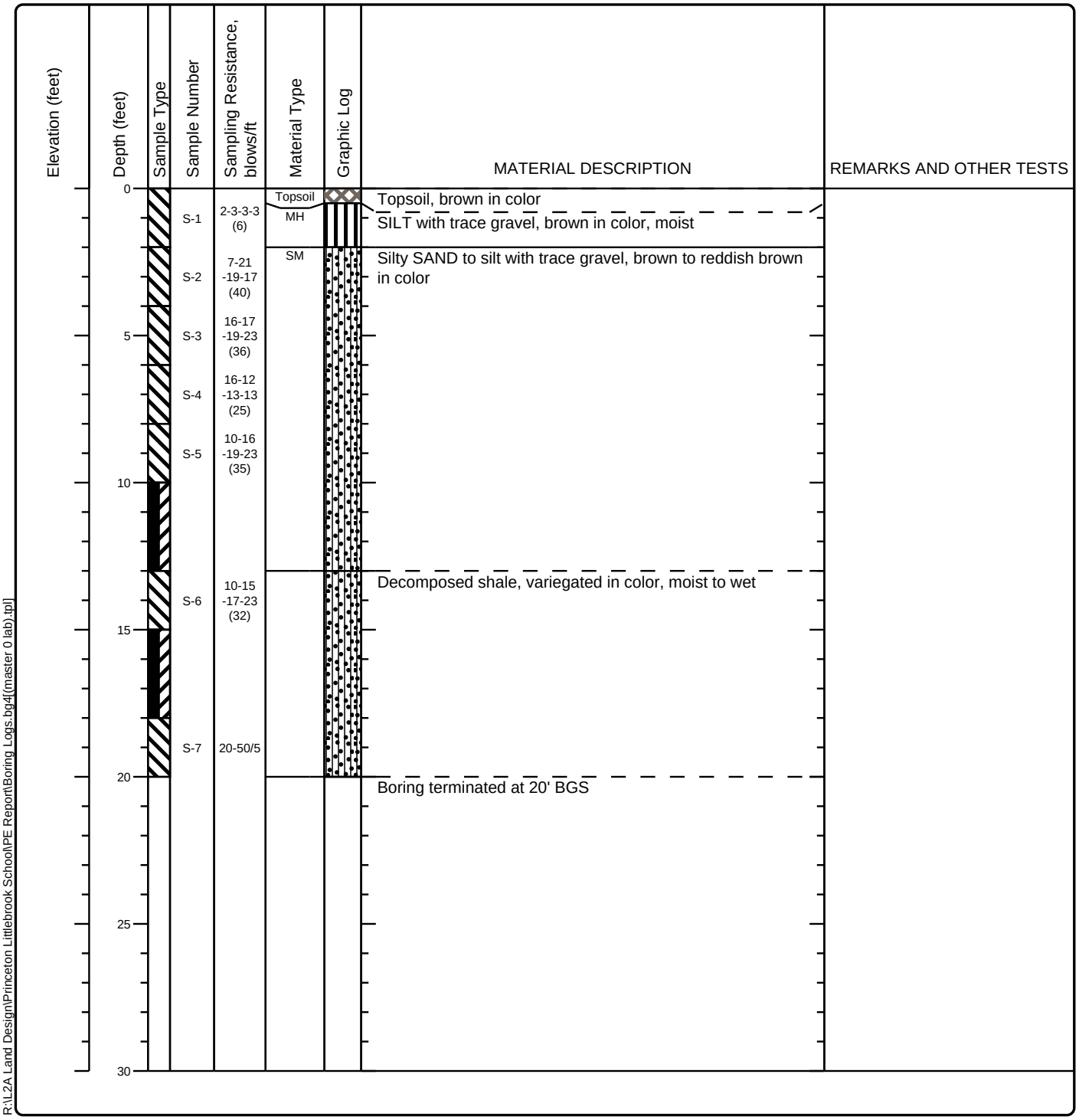
Date(s) Drilled **5/2/25**	Logged By **N. Dobson**	Checked By **C. Ingram**
Drilling Method **ASTM D1586-11**	Drill Bit Size/Type **6" Diameter HSA**	Total Depth of Borehole **10 feet bgs**
Drill Rig Type **Truck Mounted Drill Rig**	Drilling Contractor **Accurate Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **Perched water 4'-6'**	Sampling Method(s) **Auger, SPT**	Hammer Data **140lb-30" drop**
Borehole Backfill **Spoils**	Location **40°21'47.33"N 74°38'16.94"W**	



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Project: **Princeton Littlebrook School** Project Location: **39 Magnolia Lane, Princeton, NJ 08540** Project Number: **L2A Land Design**	Log of Boring B-3 **Sheet 1 of 1**

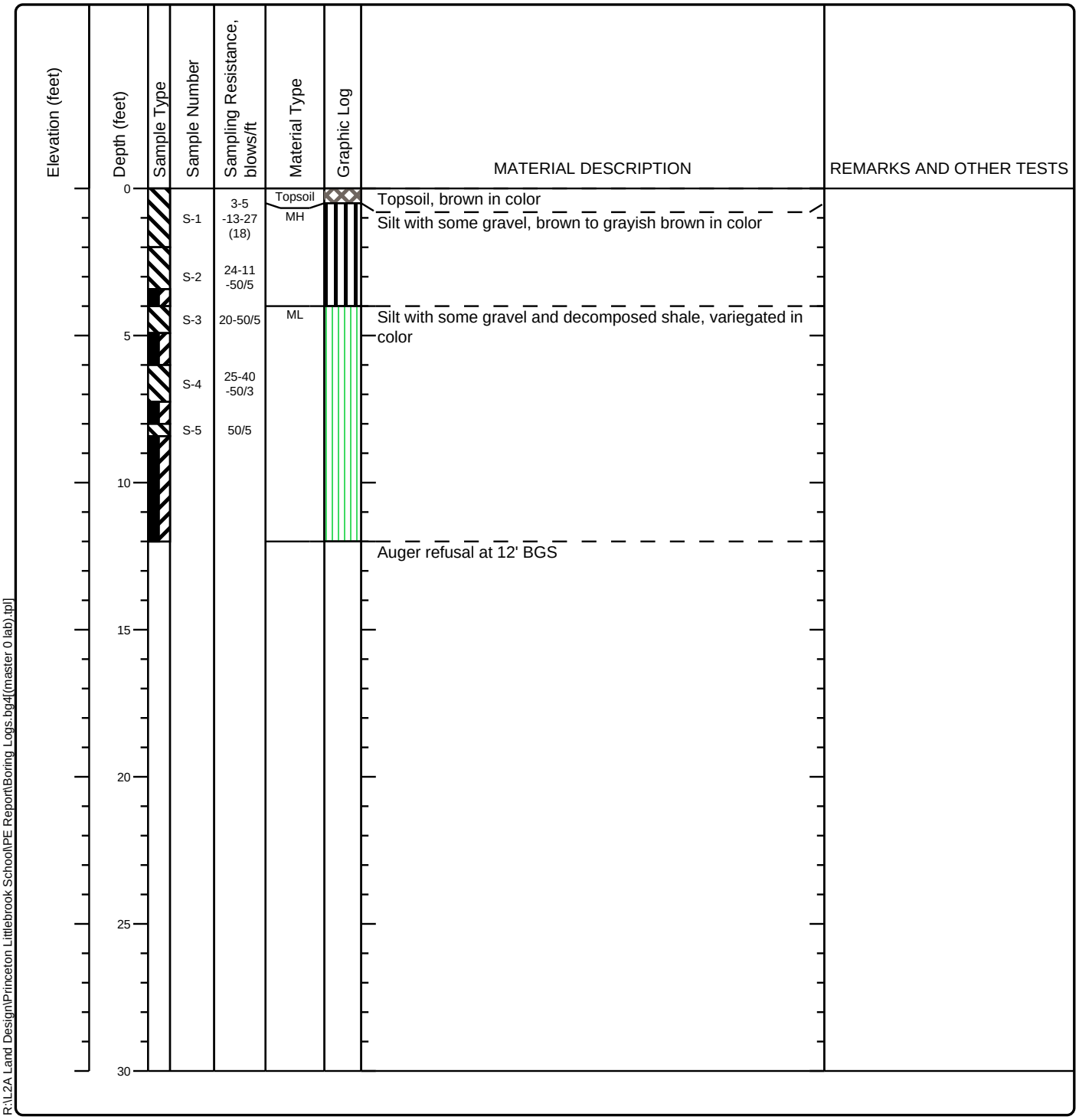
Date(s) Drilled **5/2/25**	Logged By **N. Dobson**	Checked By **C. Ingram**
Drilling Method **ASTM D1586-11**	Drill Bit Size/Type **6" Diameter HSA**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **Truck Mounted Drill Rig**	Drilling Contractor **Accurate Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **11.5'**	Sampling Method(s) **Auger, SPT**	Hammer Data **140lb-30" drop**
Borehole Backfill **Spoils**	Location **40°21'46.57"N 74°38'16.28"W**	



R:\L2A Land Design\Princeton Littlebrook School\PE Report\Boring Logs.bg4(master 0 lab).tpl

Project: **Princeton Littlebrook School** Project Location: **39 Magnolia Lane, Princeton, NJ 08540** Project Number: **L2A Land Design**	Log of Boring B-4 **Sheet 1 of 1**

Date(s) Drilled **5/2/25**	Logged By **N. Dobson**	Checked By **C. Ingram**
Drilling Method **ASTM D1586-11**	Drill Bit Size/Type **6" Diameter HSA**	Total Depth of Borehole **12 feet bgs**
Drill Rig Type **Truck Mounted Drill Rig**	Drilling Contractor **Accurate Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **NA**	Sampling Method(s) **Auger, SPT**	Hammer Data **140lb-30" drop**
Borehole Backfill **Spoils**	Location **40°21'46.76"N 74°38'17.32"W**	



R:\L2A Land Design\Princeton Littlebrook School\PE Report\Boring Logs.bg4[(master 0 lab).tpl]

Project: **Princeton Littlebrook School**
Project Location: **39 Magnolia Lane, Princeton, NJ 08540**
Project Number: **L2A Land Design**

Key to Log of Boring

Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sample Number: Sample identification number.
5 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6 Material Type: Type of material encountered.
7 Graphic Log: Graphic depiction of the subsurface material encountered.
8 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Asphaltic Concrete (AC)
SILT, SILT w/SAND, SANDY SILT (MH)
SILT, SILT w/SAND, SANDY SILT (ML)
Shale
Silty SAND (SM)
Topsoil

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler
Bulk Sample
3-inch-OD California w/ brass rings
CME Sampler
Grab Sample
2.5-inch-OD Modified California w/ brass liners
Pitcher Sample
2-inch-OD unlined split spoon (SPT)
Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting, AW)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

R:\L2A Land Design\Princeton Littlebrook School\PE Report\Boring Logs.bg4(master 0 lab).tpl]

Figure B-1

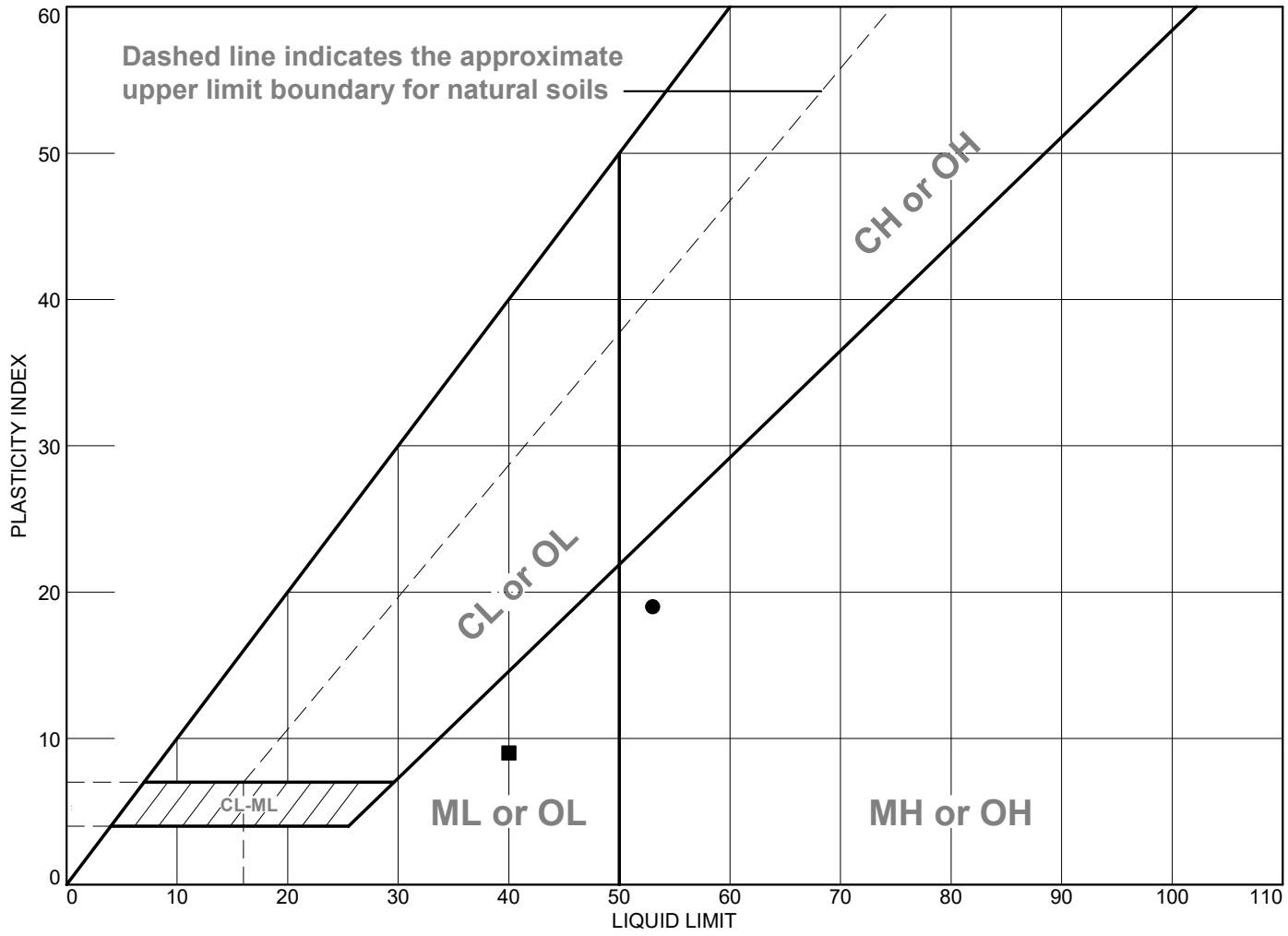
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APPENDIX D:

Laboratory Results

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	sandy elastic silt	53	34	19	83.5	68.5	MH
■	silty sand	40	31	9	53.7	31.4	SM

Project No. **Client:** L2A Land Design LLC

Project: Princeton Littlebrook School

● **Location:** B-1 **Depth:** 2-4' **Sample Number:** S-2

■ **Location:** B-3 **Depth:** 8-10' **Sample Number:** S-5

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Remarks:

● Natural Moisture = 34.0%

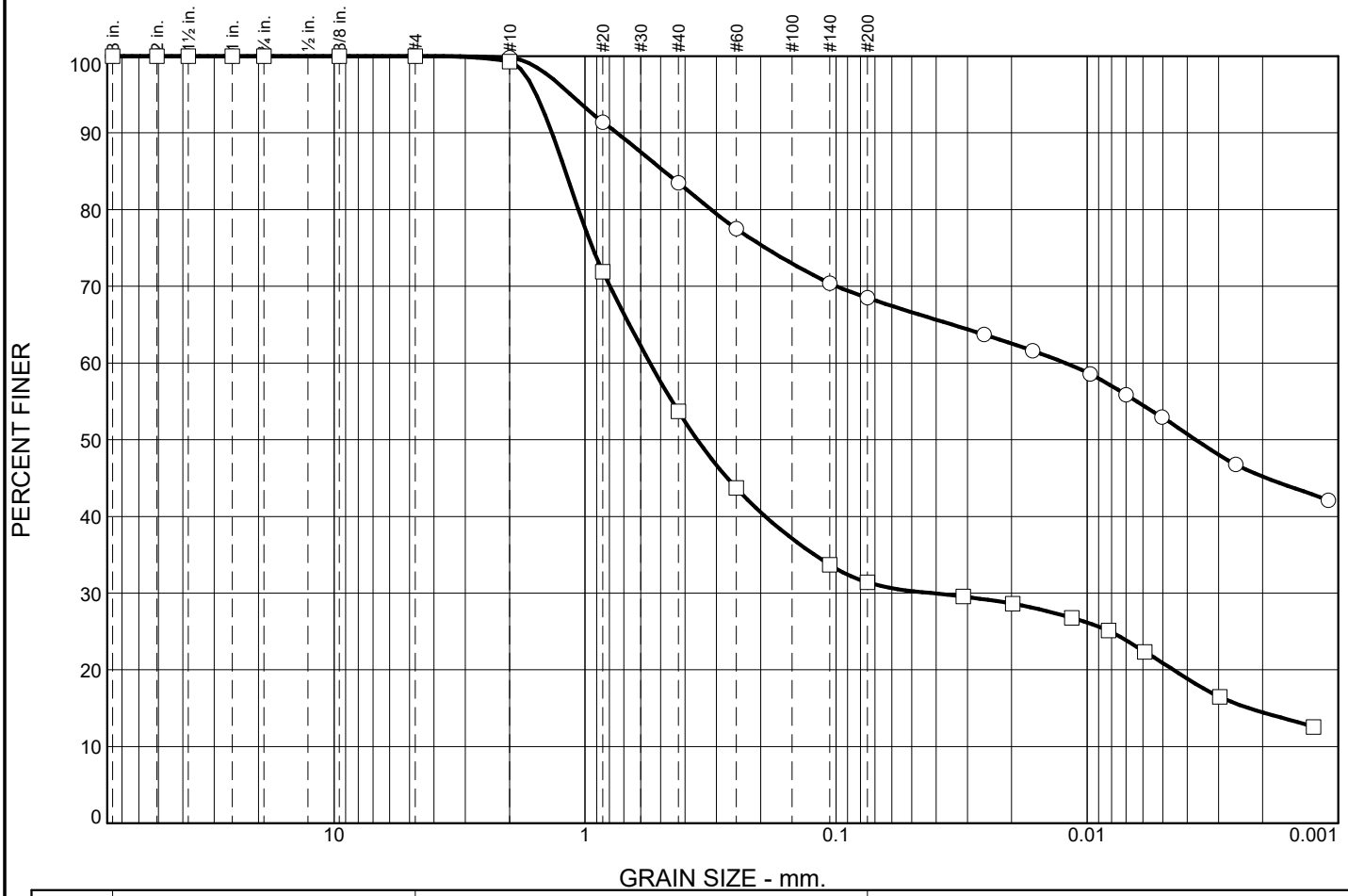
■ Natural Moisture = 26.2%

Figure

Tested By: G. Urich **Checked By:** M. MacCall

Particle Size Distribution Report

ASTM D6913 and D422



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	16.3	15.0	15.6	52.9
□	0.0	0.0	0.0	0.7	45.6	22.3	10.5	20.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	53	34	0.4843	0.0122	0.0037					
□	40	31	1.1988	0.5517	0.3573	0.0413	0.0023			

	Material Description	Test Date	USCS	NM
○	sandy elastic silt	05/14/25	MH	34.0%
□	silty sand	05/14/25	SM	26.2%

Project No. **Client:** L2A Land Design LLC

Project: Princeton Littlebrook School

○ **Location:** B-1 **Depth:** 2-4' **Sample Number:** S-2

□ **Location:** B-3 **Depth:** 8-10' **Sample Number:** S-5

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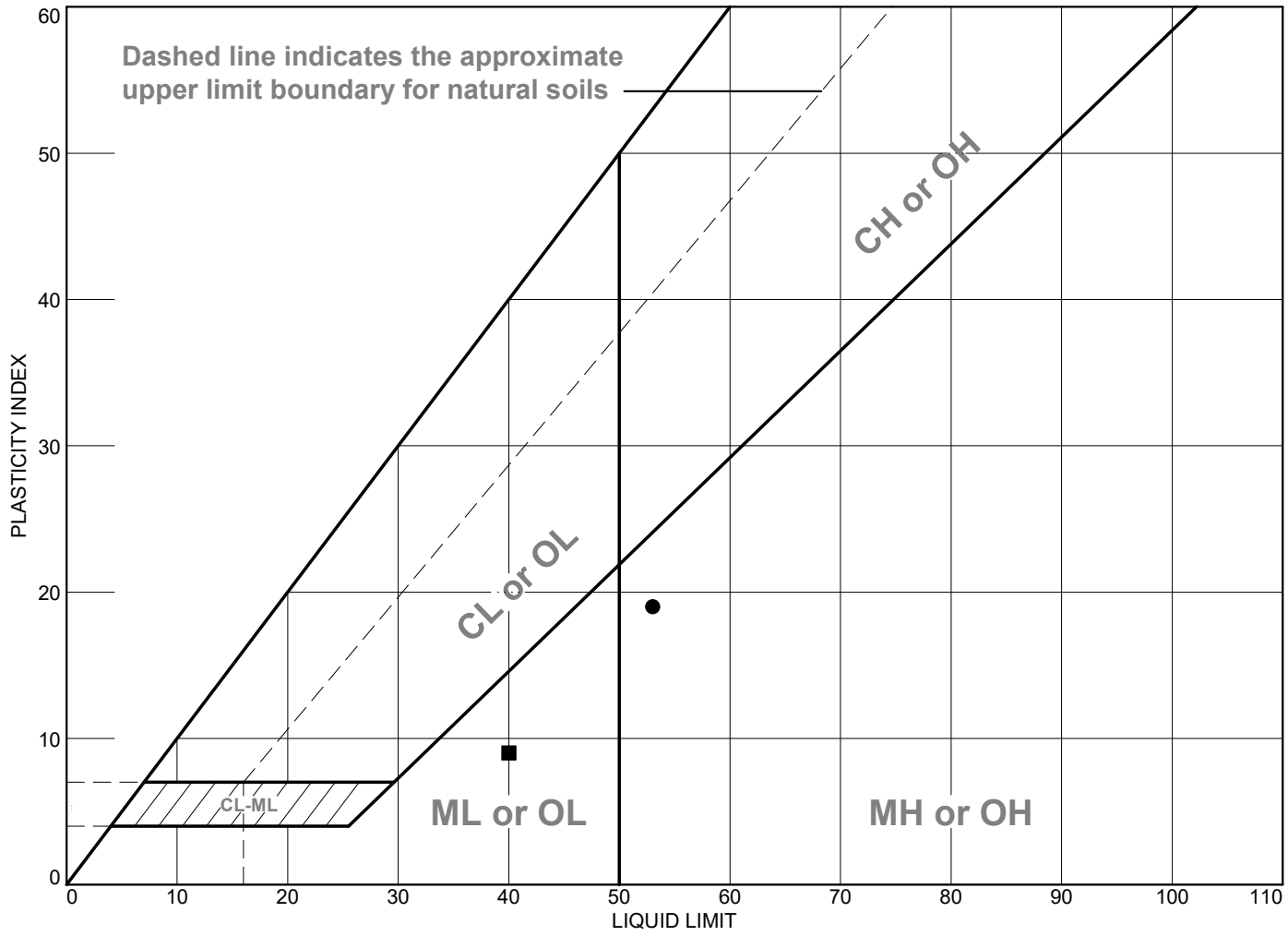
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Remarks:

Figure

Tested By: G. Urich **Checked By:** M. MacCall

LIQUID AND PLASTIC LIMITS TEST REPORT



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Project No. **Client:** L2A Land Design LLC

Project: Princeton Littlebrook School

● **Location:** B-1 **Depth:** 2-4' **Sample Number:** S-2

■ **Location:** B-3 **Depth:** 8-10' **Sample Number:** S-5

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Remarks:

● Natural Moisture = 34.0%

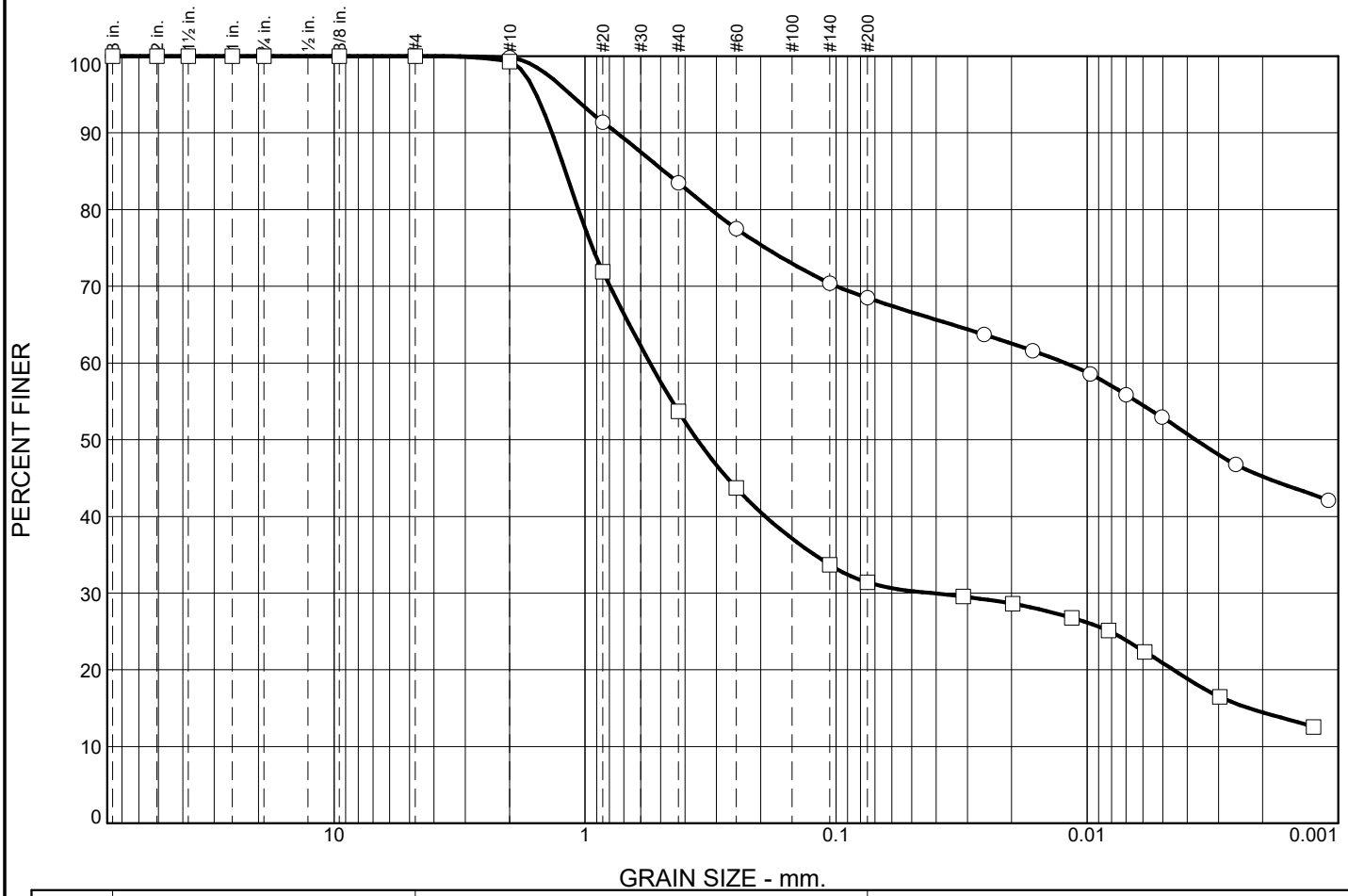
■ Natural Moisture = 26.2%

Figure

Tested By: G. Urich **Checked By:** M. MacCall

Particle Size Distribution Report

ASTM D6913 and D422



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		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	16.3	15.0	15.6	52.9
□	0.0	0.0	0.0	0.7	45.6	22.3	10.5	20.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	53	34	0.4843	0.0122	0.0037					
□	40	31	1.1988	0.5517	0.3573	0.0413	0.0023			

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Project No. **Client:** L2A Land Design LLC

Project: Princeton Littlebrook School

○ **Location:** B-1 **Depth:** 2-4' **Sample Number:** S-2

□ **Location:** B-3 **Depth:** 8-10' **Sample Number:** S-5

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Remarks:

Figure

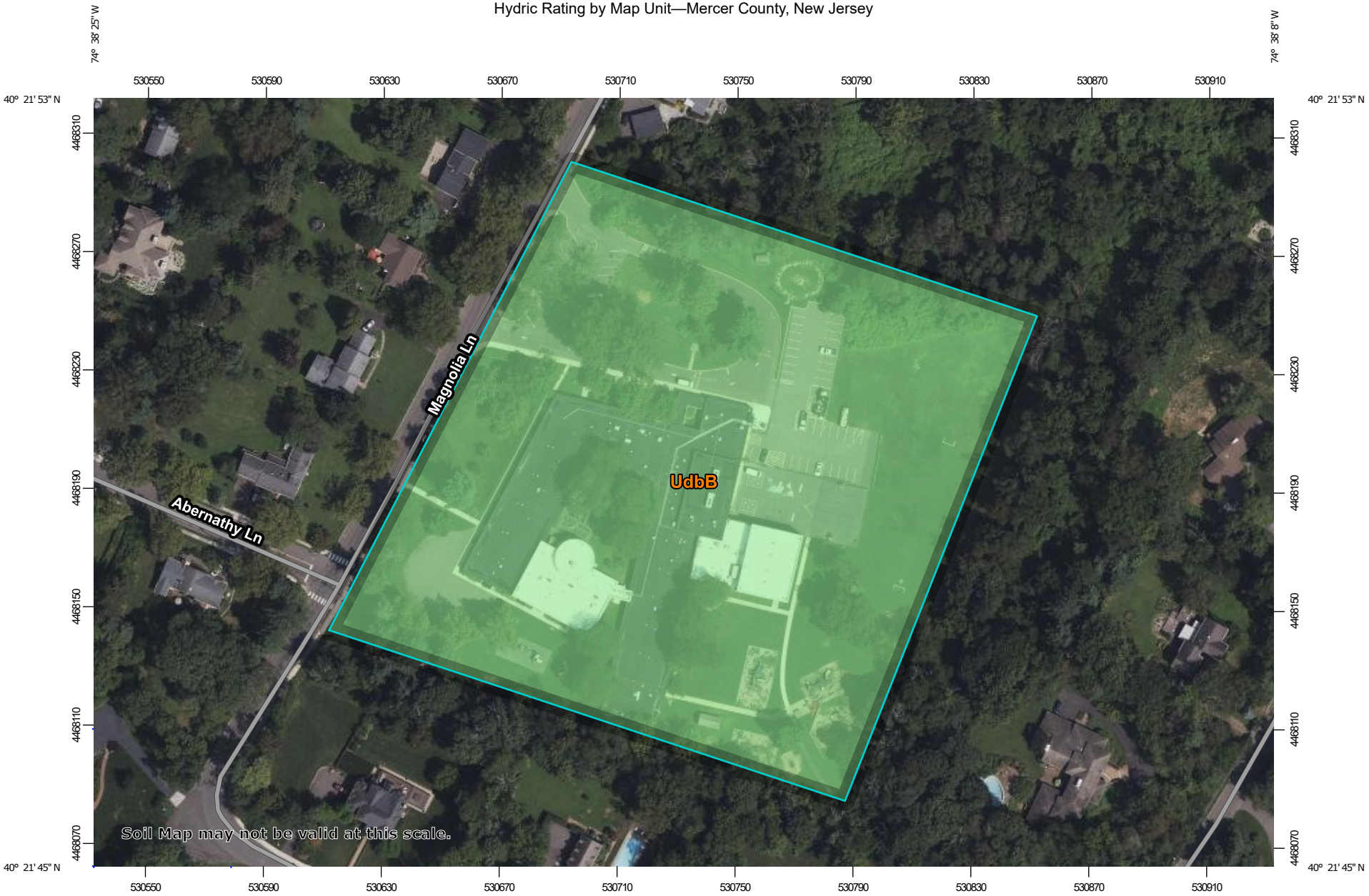
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APPENDIX E:

Hydric and Hydrologic Soil Maps



Map Scale: 1:1,830 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 20, Sep 3, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
UdbB	Udorthents, bedrock substratum, 0 to 8 percent slopes	4	7.7	100.0%
Totals for Area of Interest			**7.7**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

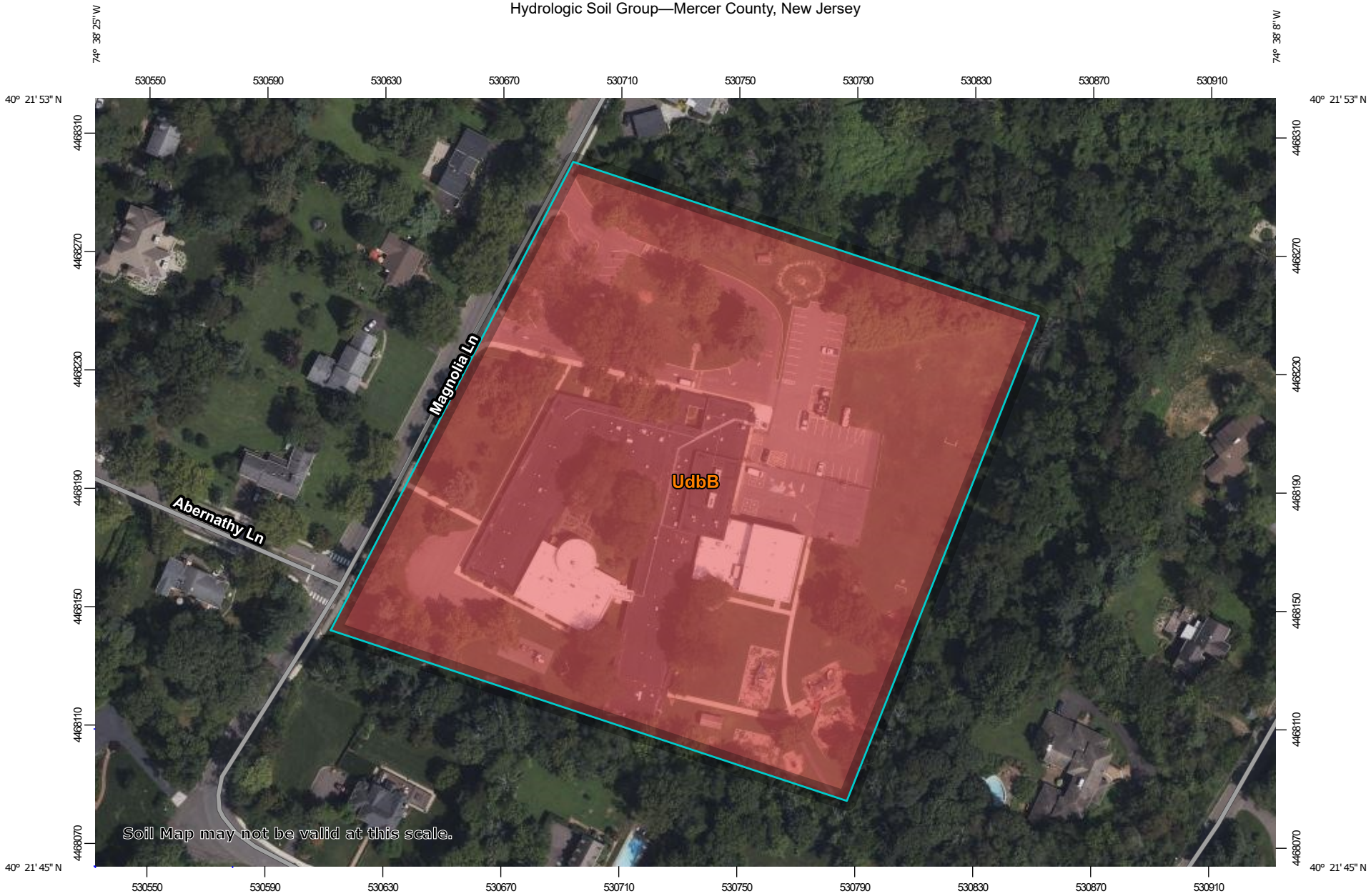
Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower



Map Scale: 1:1,830 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 20, Sep 3, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
UdbB	Udorthents, bedrock substratum, 0 to 8 percent slopes	D	7.7	100.0%
Totals for Area of Interest			**7.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
West Chester PA 19382
Office 484-947-5549
www.ingram-engineering.com

APPENDIX F:

Site Photos

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Boring B-2: 6' to 8'



PART 2 - GENERAL CONSTRUCTION

SECTION 02000 – SITE WORK

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 WORK COVERED BY CONTRACT DOCUMENTS (SITE WORK)

A. The work generally consists of:
   1. Site clearing and phased demolition as required for the proposed construction.
   2. Construction of new utilities including storm drainage systems, storm water management system, sanitary sewer systems and water utility.
   3. Construction of site improvements, including but not limited to bituminous asphalt pavement, curbs, concrete pavement, ramps, stairs, playground areas (mulch & border), landings, fencing, landscaping and retaining walls.
   4. Other site work as indicated on the Construction Plan Set.
   5. Lawn restoration as required.
   6. Control of access to the construction and staging areas, and construction traffic control.
   7. Control of soil erosion and sediment during the term of the contract or until permanent ground cover has been established.
   8. Engage a certified materials testing and inspection company to verify that the construction materials and procedures related to all site work (including: pavements, walls, utilities, and related appurtenances) in the project, meet or exceed the project specifications.
   9. Engage a licensed geotechnical (soils) engineer to dictate the soil compaction measures used to prepare subgrade soils for site work. The geotechnical engineer shall also review the soil compaction test reports prepared by the materials testing and inspection company and must certify that all specifications have been met. This requirement applies to all pavement and parking lot areas, concrete slabs, utility trenches, and foundations.
   10. Final cleanup, owner walk through and punch list.
   11. Coordinate with local gas and electric utility companies for installation of new services to the building.

1.3 CONTRACTOR USE OF PREMISES AND LOGISTICS

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the work is indicated.
   1. The Contractor shall provide all temporary signage for traffic control, access, and safety requirements.
   2. The Contractor shall maintain site access at all times to the Owner’s facilities, including, but not limited to adjacent roads, driveways, and receiving areas.
   3. Owner Occupancy: Allow for Owner occupancy and use by the public as permitted by the Owner. Coordinate with the Owner in this regard.
   4. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.4 CONTROL OF THE WORK AND STORAGE AREAS

A. The construction area shall be enclosed by temporary construction fencing.

B. Gate locations for the temporary fencing shall be coordinated with the owner. Gates may be moved throughout construction as needed by the Contractor. All associated costs shall be included in the contract. All gates shall be secured after working hours by security locks or other means acceptable to the Owner. During working hours, the work and staging areas shall remain open as little as practicable. The contractor will provide all padlocks and keys to secure all construction gates and provide copies of keys to Owner's representative.

C. The contractor may move construction fencing as needed to provide clearance for the work, however, the site shall be secured from public trespass at all times.

D. The Contractor shall periodically inspect the security measures to insure they function properly and that unauthorized persons, particularly children, are effectively prohibited from gaining entry or from coming into contact with hazardous site features.

E. The Contractor shall regularly walk the perimeter of the site and inspect the condition and safety of the existing and temporary construction fence. Any sharp edges, loose parts, burrs, or other potentially harmful components shall be repaired/modified to a safe condition.

END OF SECTION 02000

SECTION 02050 – FIELD ENGINEERING

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. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, the following:
   1. Land survey work.
   2. Engineering support for various aspects of construction.
   3. Materials Testing and Inspection for site work.
   4. Geotechnical Engineering Services

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Coordination" for procedures for coordinating field engineering with other construction activities.
   2. Division 1 Section "Submittals" for submitting Project record surveys.
   3. Division 1 Section "Project Closeout" for submitting final property survey with Project Record Documents and recording of Owner-accepted deviations from indicated lines and levels.

1.3 SUBMITTALS

A. Certificates: Submit an as-built survey prepared and signed by a NJ licensed land surveyor certifying the final location and elevation of improvements.

B. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

C. Furnish signed and sealed shop drawings for any site work component that requires additional engineering (i.e. modular block retaining walls, fencing support systems, shoring & bracing).

1.4 QUALITY ASSURANCE

A. Surveyor Qualifications: Engage a land surveyor, registered in the State of New Jersey, to perform required land-surveying services.

B. Engineer Qualifications: Engage an engineer of the discipline required; licensed in the State of New Jersey, to perform required engineering services for shop drawings and other construction related work requiring an engineering certification.

C. Materials Testing & Inspections: Engage a certified materials testing and inspection company to perform daily inspections and materials testing as required herein. The company shall possess requisite NJ DPMC and NJ SDA pre-qualifications for work required in this project.

D. Engage a Geotechnical (soils) engineer to oversee and certify the backfilling and compaction of subgrade soils within structural areas of the project, including, but not necessarily limited to; pavement areas, concrete slabs and pedestrian walkways, foundations, and related construction. This work does not apply to the IBC "Special Inspections" related to the building footprint and land within 5 feet thereof (unless a foundation related to site or utility work is located within said 5-foot distance).

E. Engage an underground utility mark out company to mark the location of all buried utilities within the limit of disturbance and within 50 feet thereof. Prior to the commencement of demolition work, excavate test pits to verify the size, depth and alignment of all utilities found within proposed work areas. Report any conflicts to the Architect for instructions via the Request For Information (RFI) process.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
   1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
   2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.

B. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.
   1. Prior to construction, verify the location and invert elevation at points of connection.

C. The Contractor's certified materials testing and inspection company shall oversee all site work on a daily basis, document the placement of materials and progress of site construction, prepare daily reports, and perform materials testing on soil aggregates, subgrades, pavements, miscellaneous poured-in-place concrete site improvements, and storm and sanitary sewer appurtenances.
   1. The inspection and testing of all storm and sanitary sewer construction shall verify that all work meets or exceeds the construction and materials requirements set forth in applicable sections of the project specifications and construction plans. As a minimum, this includes the depth and composition of pipe bedding & trench backfill, pipe materials, pipe joints & fittings, construction of sewer chambers, and other ancillary work.
   2. All asphalt and Portland cement concrete pavements, subbases, and subgrades shall be inspected for material composition, density, thickness, and strength to verify conformance with applicable sections of the specifications and construction plans.

3.2 PERFORMANCE

A. Work from lines and levels established by the design drawings. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
   1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
   2. As construction proceeds, check every major element for line, level, and plumb.

B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
   1. Record deviations from required lines and levels, and advise the Owner's Representative, when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
   2. On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

C. Site Improvements: Locate and lay out site improvements, including the building, exterior enclosures, curbs, fencing, walls, pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
   1. Detailed spot elevations are provided on the Site Grading Plan to insure that all new improvements comply with applicable codes. These spot grades shall be used by the land surveyor when establishing control for the work. Note any specific and detailed grading that has been provided for sidewalk and ADA crossings. This work requires a high degree of construction accuracy and quality control checking during construction. The maximum slopes shown on the plans shall not be exceeded.

D. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

E. The Contractor’s Land surveyor and/or Engineer shall submit a Request For Information (RFI) to the Owner, if there is any conflicting plan information or confusion over the design intent. This includes a design element that looks out of place, a spot elevation that bucks the grading trend, or a number that appears to be juxtaposed or otherwise incorrect.

END OF SECTION 02050

SECTION 02100 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DCUMENTS

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. The phased demolition and removal of selected site elements. Refer to plans for additional demolition notes and requirements. Maintain surface conditions as long as possible before demolishing same to prevent soils from becoming saturated and damaged.
   2. Perform underground utility mark out before proceeding with any demolition work.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 2 Section "Summary of Work" for use of the building and phasing requirements.
   2. Division 2 Section "Contract Closeout" for record document requirements.
   3. Division 2 Section "Site Clearing" for site clearing and removing above- and below-grade improvements.
   4. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Demolish: Completely remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area. Note that the designated storage area may be in another location within the municipality.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse (replace missing hardware); store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Owner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.

B. Proposed dust-control measures.

C. Proposed noise-control measures.

D. Schedule of selective demolition activities indicating the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

E. Inventory of items to be removed and salvaged.

F. Inventory of items to be removed by Owner.

G. Photographs or video recordings, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

H. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."
   1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Pre-Demolition Conference: Conduct conference at Project site to comply with preinstallation conference requirements of Division 1 Section "Project Meetings."

1.7 PROJECT CONDITIONS

A. Storage or sale of removed items or materials on-site will not be permitted.

1.8 SCHEDULING

A. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.

1.9 WARRANTY

A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Applicable)

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.
   1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Owner or Owners representative.

E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Maintain all remaining existing utilities, as required, for the connection to the required new utility connections indicated in the documents. Protect against damage during selective demolition operations.
   1. Do not interrupt existing utilities serving adjacent properties during work. Provide temporary services during new construction work to existing utilities, as acceptable to Owner and to governing authorities.
   2. Utility Requirements: Confirm with local water, electric, and gas utilities, prior to the commencement of selective demolition work that all utilities are properly located and marked out.
   3. Engage the services of a private underground utility mark out company to locate all utilities within the limit of disturbance and at least 50 feet beyond in all directions (when accessible).

3.3 PREPARATION

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Conduct demolition operations and remove debris 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 detouring signs and barricades as needed to define alternate routes around closed or obstructed sidewalks and roadways as required by the local police department and County of Bergen as applicable.

C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
1. Protect existing site improvements, appurtenances, and landscaping to remain.
2. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
3. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

D. Maintain dust control screening around all fencing that surrounds the construction site at all times.

3.5 SELECTIVE DEMOLITION

A. Phase the demolition of existing construction so that the site and adjacent areas are kept in a safe and uniform condition. The intent of the demolition limit is for work to be taken to the nearest control joint, but not less than the extent of demolition shown. If a control joint is not present on or beyond four (4) feet of the indicated demolition limit, then sawcut at the designated location. New work shall be constructed to the limit of demolition. Use methods required to complete Work within limitations of governing regulations.
1. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
2. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. 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.

C. The plans define demolition areas with a hatch as shown in the legend. Demolish all surfaces and structural elements within the hatched area down to subgrade. Protect existing improvements and utilities indicated to remain.

3.6 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

C. Install temporary pavement patches over utility trenches and other areas where surfacing has been removed and maintain the temporary patch until permanent pavements are installed. Temporary patches will not be permitted in roadways. In roadways, construct permanent pavement repair upon completion of the related work,

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials, not to be re-used, off of Owner's property and legally dispose of them.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Remove and salvage the following:

1. Existing signage, as coordinated w/ owner of signage.
2. Existing on-site utility poles, as coordinated w/ owner of pole.
3. All existing features to be removed shall be coordinated with owner prior to removal from site.

END OF SECTION 02100

SECTION 02110 – SITE CLEARING

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. Clearing removing and disposing of surface features in conflict with new construction.
   2. Protection of existing trees, shrubs and other landscape features and improvements to remain.
   3. Removal of trees and other vegetation.
   4. Topsoil stripping and stockpiling.
   5. Clearing and grubbing.
   6. Removal of at grade and above grade improvements including but not limited to: benches, fences, pavements, curbing, concrete walkways, trees, shrubs, poles, lighting, playground equipment, and other site amenities within the scope of construction.
   7. Re-install site amenities indicated on the drawings to be temporarily removed and/or relocated. Consult with the owner's representative first to determine the desired location for the re-installation.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, parking lots, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from Owner and without proper detouring measures (both pedestrian & traffic) in place.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
   1. Protect improvements on adjoining properties and on Owner's property.
   2. Restore damaged improvements to their original condition, as acceptable to property owners.

1.4 EXISTING SERVICES

A. General: Locate and protect existing utilities servicing existing facilities, and in proximity to the construction area.

PART 2 - PRODUCTS (Not Applicable)

2.1 TEMPORARY PATCH

A. Temporary pavement patch shall be HMA 9.5M64 (or FABC-1 Marshall Mix) bituminous pavement, 2" thick, atop 4" DGA subbase per specification section 02400.

2.2 **TEMPORARY CONSTRUCTION FENCE**

A. Furnish and install temporary metal construction security fence, 6 feet high, with lockable access gates at appropriate locations that facilitate work and site access. An exact quantity is not provided. The contractor shall estimate an amount of fencing, assuming that the entire construction area as defined by the limit of disturbance, shall be fenced in a contiguous manner at one time.

PART 3 – EXECUTION

3.1 SITE CLEARING

A. Comply with governing Soil Erosion and Sediment Control Standards.

B. Provide site clearing, within contract limits, or within other limits if indicated, including:

1. Protection of existing trees, shrubs and other landscape features and improvements to remain.
2. Removal of trees and other vegetation.
3. Topsoil stripping and stockpiling.
4. Clearing and grubbing of trees and other vegetation.
5. Removal of at grade and above grade improvements including but not limited to: benches, fences, pavements, curbing, concrete walkways, trees, shrubs, poles, lighting, playground equipment, and other site amenities within the scope of construction.
6. Cleaning of existing surfaces at the completion of work and as required to adhere to dust control and OSHA safety requirements.
7. Cleaning sediment and debris from all storm sewers located within the construction area and downstream to the nearest outfall, or public sewer main (whichever is closer).
8. Re-install site amenities indicated on the drawings to be temporarily removed and/or relocated. Consult with the owner's representative first to determine the desired location for the re-installation.
9. Sweep and clean all existing pavement areas within the scope of work to remove sand, gravel, and broken pavement pieces.

C. Remove all waste materials cleared from the site and dispose of in a legal manner off-site.

D. Install temporary 6 foot high construction security fencing around all work areas. As a minimum assume entire limit of disturbance is fenced, however, the exact location and quantity of fencing shall be dictated by the owner's construction manager.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

B. Removal from Owner's Property: Contractor to remove waste materials, all excess suitable fill and topsoil from Owner's property.

3.3 PROTECTION OF EXISTING TREES AND VEGETATION

A. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing. Protective guards shall as a minimum consist of bright orange-colored, 3' high PVC brightly colored snow fence installed around the drip line (perimeter) of existing trees and foliage to remain.

B. Provide protection for roots over 1 1/2 inches diameter cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

C. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner reviewed by the Engineer. Replace trees which cannot be repaired and restored to full growth status, as determined by arborist. Employ qualified arborist acceptable to Owner's Representative to evaluate damage and to repair damages to trees and shrubs.

D. Trim lower branches of trees to provide required clearance for construction.

3.4 REMOVAL & RELOCATION

A. Remove trees, shrubs, grass and other vegetation, improvements, and obstructions interfering with new work, and elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

1. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new work. Protect as specified in this section.

2. Completely remove stumps, roots of trees, and other debris within 4 feet of the ground surface beyond the building limits. Completely remove all trees, tree stumps, roots, foliage, debris and other foreign matter within the footprint of the proposed building foundation and within 5 feet thereof. Completely remove stumps, roots of trees, and other debris within 4 feet of the ground surface in all areas where future pavements or other hard surfaces are proposed.

3. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

B. Removal of At Grade and Above Grade Improvements: Remove pavements, concrete slabs, curbs, walks, concrete or wood headers, playground equipment, fences, fence post remains, gravel, foliage, and other existing improvements in way of new work and elsewhere as specifically indicated. Include removal of crushed stone, gravel, or other bases at slabs, paving, and other work removed under this requirement.

C. Fill depressions caused by work of this section, except topsoil stripping, with satisfactory well-graded soil aggregate material unless further excavation or earthwork at location of depression is indicated. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to 95 percent maximum dry density per ASTM D-1557 testing requirements as amended.

D. The limits of pavement removal shall be clearly measured and marked in the field prior to the removal operation. Pavement shall be cut with a suitable masonry/bituminous saw along the marked limits in order to provide a uniform clean edge. If severe cracking or "alligator skin" appearance is observed along or within 10 feet of the specified limit of pavement removal, then the limit of pavement removal shall be increased as needed to insure structural stability of adjacent areas. For this reason, it is important for the contractor to visit the project site before submitting his/her bid and examine the condition of areas within the construction limits.

E. For any tree or shrub noted to be relocated: Cut a root ball of sufficient diameter to incorporate 65-70% of the existing root mass, or a minimum 3/4 of the drip line diameter. Relocate tree to new planting location immediately. If the relocated tree will not be immediately replanted, wrap the root ball in burlap blanket and carefully bind roots inside burlap. Thoroughly wet burlap ball and store transplanted tree in shady location. Re-plant within 2-3 days maximum.

F. Relocation of at-grade and above-grade site amenities shall include carefully dismantling said amenities and re-installing same at a location identified by the owner's representative. The contractor shall also furnish and install all required hardware and replacement parts damaged or missing after dis-assembly. Re-installation shall also include proper anchoring and foundations for said amenities in similar fashion as they currently exist.

G. The construction limits shown are approximate and the contractor shall remove only the minimal amount of site improvements needed for the proper construction of the improvements shown.

3.5 CLEANING OF STORM SEWER SYSTEM

A. Clean sediment and debris from all on-site storm sewer inlets and pipes on a regular basis and immediately prior to the date of substantial completion.

B. All storm sewers and inlets located downstream of construction areas and/or convey storm water runoff from construction areas shall be cleaned of all sediment and debris regularly and at the completion of the project. The extent of downstream storm sewer cleaning shall be limited to the storm sewer pipes exiting the subject property that connect into the nearest municipal storm sewer system, including the municipal storm sewer structure into which the connection is made.

1. The contractor will be responsible for cleaning additional storm sewers and inlets that are affected by the contractor's work or construction practices.

END OF SECTION 02110

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(s), streets, 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 may 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)

C. Building excavation is specified in Section 02260.

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 qualified foundation and selective demolition consultant(s).

B. Submit name of engaged consultant and qualifying technical experience.

C. Regulations: Comply with local codes and ordinances of governing Authorities Having Jurisdiction.

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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.

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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

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SECTION 02200 - 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 and grading subgrades to achieve the lines and grades indicated on the Site Grading Plan.
   2. Excavating and backfilling, including imported controlled compacted backfill (Satisfactory Soil Material) placed in the voids resulting from demolition work.

B. Related Sections: The following Sections contain requirements that relate to this Section.
   1. Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal.
   2. Division 2 Section "Selective Demolition" for backfilling of voids created by demolition of site improvements.
   3. Division 2 Section "Erosion Control & Sediment Control”

1.3 DEFINITIONS

A. Excavation: The removal of all material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations. All imported material shall be certified clean and shall meet the composition requirements established herein.

D. Sub-base Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

E. Base Course: The layer placed between the sub-base and surface pavement in a paving system.

F. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Owners Representative. Unauthorized excavation, as well as remedial work directed by the Owners Representative, shall be at the Contractor's expense.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

H. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

I. NJDOTSS: The New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition and addenda.

J. Site Improvement: Any man-made structure, wall, foundation, pavement, material, system, component, or topographic condition that is not naturally in existence on or under the earth.

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for the following:
1. Filter fabric.

C. Samples of the following:
1. 5 lb samples, sealed in air-tight containers, of each proposed fill and backfill soil material from on-site or borrow sources.
2. 12 x 12 inch (300 x 300 mm) sample of filter fabric.

D. Test Reports: In addition to test reports required under field quality control, submit the following:
1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources as well as screen topsoil. All soil shall meet the New Jersey Department of Environmental Protection, Residential Clean Fill Standards and all imported material shall be certified as such. A minimum of one soil test for every 250 cubic yards of imported material shall be performed.
2. One optimum moisture-maximum density curve for each soil material encountered or used in the project.
3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested. Schedule for earthwork operations.
4. Location of site receiving spoil material and certification of acceptance.
5. Contractor certification in writing that all excavations were properly backfilled and thoroughly compacted.
6. Testing certification that all imported soils are free of contamination and deleterious materials.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

B. Testing and Inspection Services:
1. The Owner shall employ a qualified licensed independent geotechnical engineering & testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing for the proposed building & foundation construction as required under Chapter 17 of the International Building Code, New Jersey edition.
2. All earthwork related to site work, including, but not limited to pavements, underground sewer construction, and other related site construction shall be inspected & tested on a daily basis for proper soil composition and compaction by the Contractor's geotechnical engineer and certified material testing and inspection company.

C. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1. Before commencing earthwork, meet with representatives of the Owner, Architect, Engineer, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities, as required. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
2. The contractor will be expected to grade the site in accordance with the Site Grading Plan for this project and meet all adjacent surfaces around the limit of demolition work flush.

1.6 PROJECT CONDITIONS

A. Neither the plans, nor the specifications state or imply that cut and fill are balanced on the project site. The contractor shall be responsible for determining the amount of export and required quantities of imported soil needed in the project.

B. A Report of Geotechnical Investigation, was performed for the Owner by Ingram Engineering Services, dated July 20th, 2025. This report will be available to the Contractor for reference only.

C. Existing Utilities:

1. Protect existing sewers and utilities noted to remain. Provide adequate means of support and protection for remaining utilities during earthwork operations.

    a. Existing utilities shown on Drawings are based on field observations and mapping obtained from local utility companies. All locations are represented as approximate.

    b. If excavation locates existing utilities which are to remain and if such utilities are not located as shown on Drawings, record locations and identifications of utilities on Record Document drawings. Provide same information to the Engineer.

    c. Adhere to other utility location requirements specified in other sections of the specifications.

2. Uncharted, or incorrectly charted, piping or other utilities: If encountered during excavation, consult utility owner immediately for directions. Cooperate with utility companies in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

3. Do not interrupt existing utilities or sewers serving facilities occupied and used by Owner or others, at any time, except when notice has been filed, permission granted, and other conditions satisfied as specified in Section 01010 subsection 1.6.

4. Refer to Pre-demolition work (section 024119) as it pertains to utility locations, test pits, and mark-out.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS & AGGREGATE

A. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM; free of: rock or gravel, larger than 2 inches (50 mm) in any dimension; debris; waste; frozen materials; vegetation; other deleterious matter.

B. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Subbase and Base Material: Dense Graded Aggregate (DGA) conforming to NJDOTSS Section 901.10.

D. Engineered or Select Fill: Soil Aggregate Designation I -15, per NJDOTSS, latest edition.

E. Bedding Material: Sub-base or base materials with 100 percent passing a 1 inch (25 mm) sieve and not more than 8 percent passing a No. 200 (75 micrometer) sieve.

F. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2 inch (38 mm) sieve and not more than 5 percent passing a No. 8 (2.36 mm) sieve.

G. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2 inch (38 mm) sieve and 0 to 5 percent passing a No. 50 (300 micrometer) sieve.

H. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

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.

B. Detectable 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 minimum, 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.
   1. Tape Colors: Provide tape colors to utilities as follows:
      a. Red: Electric.
      b. Yellow: Gas, oil, steam, and dangerous materials.
      c. Orange: Telephone and other communications.
      d. Blue: Water systems.
      e. Green: Sewer systems.

C. Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.
   1. Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

a. Grab Tensile Strength (ASTM D 4632): 100 lb (45 kg).
b. Apparent Opening Size (ASTM D 4751): #100 U.S. Standard (150 micrometer) sieve.
c. Permeability (ASTM D 4491): 150 gallons per minute per sq. ft. (102 L/s per sq. m).

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. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide 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.

D. Tree protection is specified in the Division 2 Section "Site Clearing."

E. Strip Topsoil from work area. Only strip topsoil from areas where work will immediately be performed. Maintain existing vegetated areas as long as possible throughout construction to control erosion. Phase the stripping of topsoil and vegetation accordingly.

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding the building excavation, the project site, and surrounding areas. Install de-watering pumps, piping and siltation filters (at discharge piping) as needed to keep excavations and soils dry and to prevent sediment from washing onto downstream properties and roadways.
1. De-watering pits and pumps shall (MUST) be installed in any excavation where perched water is encountered, and in any excavation deeper than 6 feet. De-watering pumps and filters shall also be used to evacuate surface water from excavations, at all times when water cannot freely drain away by gravity, unimpeded.
2. Install sedimentation control fencing downstream of all de-watering measures.
3. Install a siltation filter bag at the downstream end of discharge piping from de-watering equipment.

B. Protect subgrade soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

A. Unclassified Excavation: All excavation is unclassified and includes excavation to required subgrade elevation as needed to construct the new building and related site improvements, regardless of the character of materials and obstructions encountered.

B. Strip topsoil layer and underlying soils to establish subgrades for foundations and pavements and construct granular subbases as noted on the plans. The total depth of excavation shall include what is required to establish subgrade for footings and pavement, inclusive of any drainage courses required in the project. Refer to foundation plans for additional notes and details.

C. When directed by the Geotechnical Engineer, or the Owners representatives, remove and dispose of unsuitable material encountered in excavations for structures, pipes, utilities, etc.

D. The on-site soil material may be used as compacted backfill in the upper layers of utility trenches, when soil fill is noted in the trench detail. This provision does not apply to utilities that pass beneath a foundation wall. Backfill for that section shall be ¾" clean stone.

3.4 STABILITY OF EXCAVATIONS

A. Soils are sandy and lack cohesion. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations. Adhere to CFR 029 for OSHA safety requirements. Shore and brace excavations as needed and terrace/slope side walls in accordance with OSHA regulations.

3.5 GENERAL EXCAVATION

A. Excavate only to the minimum extent needed to construct each site improvement, including subbase materials. All excavation shall be performed under the direct observation of the geotechnical engineer. Over excavation will not be permitted and no additional payment will be made for said work.

3.6 APPROVAL OF SUBGRADE

A. Geotechnical Engineering oversight must be provided when excavation has reached subgrade, so soil conditions can be analyzed.

B. When the Geotechnical Engineer determines that unforeseen unsatisfactory soil is present, continue excavation deeper, and take the following action:
   1. Beneath building foundation systems, backfill with ¾" clean stone material as directed.
   2. Beneath pavements, walkways, walls and other site improvements, backfill with prepared and compacted, moisture-controlled on-site Soil Fill material per the Geotechnical Engineer.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Geotechnical Engineer and/or Owners' Representative at no additional cost.

3.7 UNAUTHORIZED EXCAVATION

A. All excavation and backfilling within the building footprint shall be performed under the presence of the Owner's Geotechnical Engineer.

B. Excavation and backfilling in other areas shall be performed under the presence of the Contractor's Geotechnical Engineer.

C. All excavation shall extend only to the limits needed to properly construct each site improvement so that it is bearing on suitable subgrade. Any excavation beyond suitable subgrade that has not been authorized by a Geotechnical Engineer and the construction manager shall be considered unauthorized.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill in designated area, including suitable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust. Place siltation control fencing around the downslope side of all piles.
   1. Stockpile soil materials away from edge of excavations.

3.9 FILL AND BACKFILL

A. Backfill excavations promptly, but not before completing the following:
   1. Testing and compaction of existing subgrade.
   2. Acceptance of subgrade by the Geotechnical Engineer.
   3. Surveying locations of underground utilities, unusual geological formations, or other features to remain for record documents.
   4. Testing, inspecting, and approval of underground utilities.
   2. Removal of trash and debris from excavation.
   3. Removal of temporary shoring and bracing, and sheeting.
   4. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. The exposed subgrades for the slab on grades and any paved areas are to be proof rolled with a vibratory compactor in the presence of the soil engineer to detect and repair any unsuitable soil conditions and to attain a uniform firm subgrade throughout. Any loose soils encountered may be densified by proof rolling and further compaction by additional passes if necessary.

C. Building subgrades may be brought up to desired elevation with approved on-site soils or imported structural (select) fill in lifts no greater than twelve (12) inches loose thickness and compacted to 95% of the material's maximum dry density per ASTM D-698. Materials compacted by hand operated equipment shall be placed in lifts no greater than four (4) inches loose thickness.

D. Backfill all voids from demolition work and utility trenching with suitable on-site soil material or satisfactory soil material compacted in maximum 8-inch lifts, to minimum 95% maximum density per ASTM D-698, under the direct supervision of the Geotechnical Engineer. Bring compacted backfill material to required subgrade elevation, accounting for the thickness of subbase materials, as required.

E. Place suitable Soil Fill in areas where the grade is being raised, in lifts not exceeding 8 inches and thoroughly compact to 95% dry density per ASTM D-698. Soil Fill shall be moisture-controlled and prepared as noted in Part 2.1.

3.60 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content per ASTM D-1557.
   1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to 95% maximum density per ASTM D-1557.
      a. Stockpile or spread and dry removed wet satisfactory soil material.

3. Include in project schedule, sufficient time for moisture control measures to restore soil stability due to unforeseen prolonged periods of inclement or unseasonable weather.

3.71 COMPACTION

A. Strip topsoil and remove upper 2 feet of soil. Thoroughly densify the exposed subgrade with a minimum of six (6) passes with a twenty (20) ton equivalent vibratory compactor to 95 % of the material's maximum dry density per ASTM D-698In confined areas, smaller compacting equipment shall be used. The compaction of soils shall be tested and accepted by the geotechnical engineer before placing fill or backfill. Building subgrades may be brought up to desired elevation with approved on-site soils or imported structural (select) fill in lifts no greater than twelve (12) inches loose thickness and compacted to 95% of the material's maximum dry density per ASTM D-698 Repeat compaction operations and remove any unstable soils, replacing same with on-site suitable material or borrow. All exposed footing subgrades are to be compacted by two (2) passes with a jumping jack compactor immediately prior to the placement of the footing concrete.

B. In areas where grades are being lowered, excavate and remove soils down to the required subgrade elevation and perform subgrade soil compaction as described in Part A above.

C. Place backfill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Place backfill materials evenly across open excavations to required elevations. Place backfill uniformly along the full length of each area.

E. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 698:
   1. Compact areas within building footprint and 5 feet thereof to 95 percent maximum dry density.
   2 Compact pavement and structural slab subgrade soils to 98 percent maximum dry density per ASTM D698.
   3. Other areas of the site, including lawn areas, compact subgrade soils to 90% maximum dry density per ASTM D698

F. All backfill shall be inspected and compaction tested by a geotechnical engineer and certified materials testing & inspection company. All inspection and testing reports shall be furnished to the Owner’s Representative on a weekly basis.

3.12 GRADING

A. General: Strip topsoil from areas to be graded, section-by-section, exposing subgrade soils only when absolutely necessary. Uniformly grade areas to a smooth surface, to maintain positive overland drainage, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Employ interim grading measures as needed to maintain the site in good condition.
   1. Provide a smooth transition between existing adjacent grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish grades to required elevations within the following tolerances:
   1. All areas: Plus or minus ½ inch (13 mm).

3.13 FIELD QUALITY CONTROL

A. Testing Agency Services: All soil inspection and compaction testing shall be under the supervision of a licensed geotechnical engineer. Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
   1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.
      a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.
      b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
   2. At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2000 sq. ft. (186 sq. m) or less of area, but in no case fewer than three tests.
   3. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet (45 m) or less of trench, but no fewer than two tests.

B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained. Continue this process until specified compaction is achieved. The contractor may elect to excavate and replace the soil material with imported Satisfactory Soil Material and re-compact same to achieve required density, however, this work shall be treated as unauthorized excavation and no additional payment will be made.

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, standing water, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or loose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace material to depth directed by the Construction Manager / Owners Representative; reshape and recompact at optimum moisture content to the required density under the supervision of the Geotechnical Engineer.

C. Settling: Where settling occurs during the maintenance period, remove finished surfacing, test compaction levels, backfill with additional approved material, compact, test compaction levels, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

D. Provide de-watering measures at all times. The on-site soils must not be allowed to become too wet.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove waste material, including excess unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property. There shall be no excess material, as the site shall be graded uniformly as shown on the Grading Plan and all surfaces shall meet existing grades around the perimeter of the site flush (or to the designated grade shown on the plan).

B. There shall be no excess soil material stockpiled on the project site at the end of this work.

END OF SECTION 02200

SECTION 02220 - EROSION CONTROL AND SEDIMENT CONTROL

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.

B. All work under this item must comply with the Standards for Soil Erosion and Sediment Control in New Jersey, and the latest revisions thereto.

1.2 SUMMARY

A. Soil Erosion and Sediment Control measures are shown on the plans and all measures must be in place before land disturbance begins. The contractor shall maintain these measures and supplement the measures as needed to accommodate the progression of construction. The contractor shall relocate the siltation control fence to provide clearance for the work, relocate the stabilized construction entrance, provide additional temporary topsoil and seeding to exposed soils, and install additional silt fence as needed to ensure that soils remain on-site and that erosion is controlled.

PART 2 PRODUCTS

2.1 EROSION CONTROL DEVICES

A. Silt Fence may be commercially available silt fence systems, consisting of synthetic geotextile fabrics and hardwood stakes. The height of the fence shall be a minimum of three (3) feet, and the fabric shall be wide enough to allow for a minimum embedment in the ground of one (1) foot of fabric. Sections shall be joined in a manner such that the fence shall function continuously.

B. Miscellaneous materials shall conform to NJDOTSS Sections 909.09 and 909.11.

C. All other materials shall conform to the Plans as indicated on the details for Soil Erosion and Sediment Control, and the NJDOTSS Supplemental Specifications, Section 111.

PART 3 EXECUTION

3.1 GENERAL

A. The contractor shall maintain and supplement all permanent soil erosion and sediment control measures during the entire duration of the project. Temporary features shall be incorporated with the permanent features and with the earthwork, pavement and building construction, drainage, etc., to maintain the maximum protection against soil erosion and sedimentation possible, throughout the life of the contract.

B. All erosion and sediment control practices shall conform to the Plans, the Standards for Soil Erosion and Sediment Control in the State of New Jersey, and the approval from the Mercer County Soil Conservation District.

C. A schedule of construction operations shall be submitted to the Owners representatives for approval. Said schedule shall outline construction phasing and shall indicate how and where erosion control measures will be utilized to conform with the approval. The schedule shall include indications of locations for construction staging, soil stockpiles, etc., and any disturbances outside the limit of work shown on the Plans.

D. All water pumped from excavations shall be filtered before being discharged off site, to prevent downstream siltation.

E. The smallest practicable area of land shall be disturbed at any one time during the project and, whenever feasible, natural vegetation shall be retained and protected. Stripping of vegetation, grading and other solid disturbances shall be completed in a manner that will minimize soil erosion and sedimentation.

F. Soil erosion and sediment control notes are shown on the Soil Erosions Sediment Control Plan and shall be followed.

G. All other construction procedures shall conform to the NJDOTSS Supplemental Specifications.

END OF SECTION 02220

SECTION 02221 - TRENCHING, BACKFILLING AND COMPACTION

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. Excavating and backfilling trenches for buried storm sewer, sanitary sewer, natural gas, and mechanical and electrical utilities.

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

B. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

C. Excavation: Removal of material encountered above subgrade elevations.

D. Fill: Soil materials used to raise existing grades.

E. Utilities include underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
   2. Certification that all imported materials are “clean” per NJ DEP Residential Clean Fill Standards.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials testing, as documented according to ASTM D 3740 and ASTM E 548, shall certify the compaction of all utility trenches. Refer to section 02050.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Perform underground utility mark out as explained in the Site Demolition Section. Do not interrupt existing public utilities.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory Soil Fill materials are not available from excavations.

B. On-site soils are suitable for re-use as compacted backfill in trenches (as allowed by construction details) provided that they are prepared and moisture-controlled in accordance with the earthwork specifications and direction by the Contractor's Geotechnical Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 24 inches higher than top of pipe or conduit, unless otherwise indicated. Provide trench shoring or slope the sidewalls of trenches in accordance with OSHA requirements, Code of Federal Regulations 029.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade. No trench bottom shall be over excavated. If over excavation occurs, the over excavated area shall be filled and compacted as directed by the Engineer or filled with crushed stone to the correct elevation.

D. Compact trench bottoms and test prior to placing backfill materials.

3.2 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials as directed by the Engineer. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water.

3.3 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for record documents.
   3. Inspecting and testing underground utilities.

3.4 UTILITY TRENCH BACKFILL

A. 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.

B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch to a height of 12 inches over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit.

D. Coordinate backfilling with utilities testing.

E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

F. Place and compact final backfill of satisfactory soil material to final subgrade.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.5 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 10 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than 95% percentages of maximum dry unit weight according to ASTM D 698:

END OF SECTION 02221

SECTION 02240 - DEWATERING

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 construction dewatering for perched or seasonal high ground water conditions.

B. Related Sections include the following:
   1. Division 2 Section "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 surface and 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. 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 adjacent to excavation.
   5. Install filtration measures at the downstream end of discharge piping to insure that silt laden water does not leave the site.

1.4 SUBMITTALS

A. Shop Drawings: For dewatering system. 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 layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
   2. Include a written report outlining control procedures to be adopted if dewatering problems arise.
   3. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
   1. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.
   2. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
   3. 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 Architect and then only after arranging to provide temporary utility services according to requirements indicated.

B. Survey adjacent structures and improvements, employing a qualified professional engineer or surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
   1. During dewatering, resurvey benchmarks weekly, maintaining an 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 in adjacent construction.

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. 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. Install sediment filtration measures at the discharge end of piping.

E. 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.

F. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 02240

SECTION 02260 – EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes, but is not limited to, the following:
   1. Shoring and bracing necessary to protect existing buildings, streets, 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. Building structure installation will be specified by others.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer. System design and calculations must be acceptable to local authorities having jurisdiction, as well as OSHA.

C. Trench details shown on the site plans are intended to provide information regarding backfilling materials, general material depths and payment limits only. The Contractor shall be responsible for the means and methods of construction and shall provide appropriate safety measures, sheeting, and bracing as may be required due to field conditions. The Contractor shall comply with all applicable OSHA standards and details for trench excavation. The design engineer assumes no responsibility or liability for field conditions, trenching or backfilling operations during construction.

1.4 QUALITY ASSURANCE

A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located, and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.

B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer.
   1. Submit name of engaged consultant and qualifying technical experience.

C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.5 JOB CONDITIONS

A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing conditions not readily identified on the plans. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

B. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags or other damage is evident.

1.6 EXISTING UTILITIES

A. Protect existing active storm and sanitary sewer, water, gas, electricity and other utility services and structures, if any.

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.

END OF SECTION 02260

SECTION 02275 - GEOGRID SOIL REINFORCEMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work includes furnishing and installing geogrid reinforcement, wall fill, and backfill to the lines and grades designated on the construction drawings and as specified herein.

B. Work includes furnishing and installing all appurtenant materials required for construction of the geogrid reinforced soil retaining wall (a.k.a. modular block retaining wall) as shown on the construction drawings.

1.2 RELATED WORK

A. Section 02276: Modular Retaining Wall Systems

B. Section 02200: Earthwork

C. Section 02221: Trenching, Backfilling and Compaction

D Section 02820: Chain Link Fence

1.3 REFERENCE STANDARDS

A. ASTM D4595 - Tensile Properties of Geotextiles by the Wide-Width Strip Method

B. ASTM D5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geogrids

C. ASTM D6638 - Grid Connection Strength (SRW-U1)

D. ASTM D6916 - Grid Shear Strength (SRW-U2)

E. GRI-GG4 - Grid Long Term Allowable Design Strength (LTDS)

F. ASTM D6706 - Test Method for Grid Pullout

1.4 DELIVERY, STORAGE AND HANDLING

A Contractor shall check the geogrid upon delivery to assure that the proper material has been received.

B. Geogrid shall be stored above -10 F (-23 C).

C. Contractor shall prevent excessive mud, wet cement, or other foreign materials from meeting the geogrid material.

1.5 SUBMITTALS

A. Samples of all products used in the work of this section.

B. Latest edition of manufacturer's specifications for proposed materials, method of installation and list of materials proposed for use.

C. Shop Drawings for proposed modular block retaining wall system.
   1. Design shall be **site specific**, fully engineered wall system designed to meet TW (top of wall) and BW (bottom of wall) elevations, as shown on construction drawings, as closely as possible.
   2. Design shall be performed to accommodate onsite suitable material for use as backfill. Soil characteristics shall be assumed to be loose to medium compact silty sands with varying quantities of gravel. Soils are moisture sensitive and have low bearing capacity.
   3. Shop drawings shall be signed and sealed by a licensed NJ professional Engineer.
   4. Wall design shall include provisions for turning the wall to terminate smoothly into proposed grading.
   5. Wall design shall include corner pieces and transitions to incorporate a poured-in-place concrete stairway as shown on the plans.
   6. Shop drawings shall include provisions for the installation of chain link and ornamental metal fence atop the wall, positioned as close to the wall as possible.

1.6 QUALITY ASSURANCE

A. Earthwork observation and testing: The geotechnical engineer shall inspect the wall foundation base area and test soil compaction to assure that required bearing conditions are met. Additionally, the Geotechnical Engineer shall monitor fill and geogrid placement and test compacted soil materials to assure that proper soil type and compaction specifications are being met. Follow guidelines and specifications provided by geotextile manufacturer or retaining wall system manufacturer.

B. Refer to Specification Section 02050.

PART 2 MATERIALS

2.1 DEFINITIONS

A. Geogrid products shall be of high density polyethylene or polyester yarns encapsulated in a protective coating specifically fabricated for use as a soil reinforcement material.

B. Concrete retaining wall units shall be as specified in Section 02276.

C. Wall fill is a free draining granular material used within the concrete units.

D. Suitable backfill is the soil which is used as fill for the reinforced soil mass. Backfill may be obtained from on-site sources, provided it meets or exceeds the requirements for suitable material as defined in the earthwork specification and geotechnical engineering report.

E. Foundation soil is the insitu soil (if suitable), or controlled compacted backfill.

F. Drainage Fill is the 3/4 inch clean stone section installed immediately below and behind the modular concrete block and between the controlled compacted backfill.

2.2 PRODUCTS

A. Geogrid shall be the type as shown on the drawings having the property requirements as described within the manufacturer's specifications.

B. Geogrid shall be installed at the lengths and orientations shown on the construction drawings.

2.3 ACCEPTABLE MANUFACTURERS

A. Basis of Design:
   1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
      a. US Fabrics, Inc,;
      b. IWT/Cargo-Guard;
      c. SRW Products
      d. Mirafi;
      e. or approved equal

PART 3: EXECUTION

3.1 WALL FOUNDATION SOIL PREPARATION

A. Foundation soil shall be excavated to achieve the lines and grades as shown on the construction and shop drawings, or as directed by the on-site soils engineer.

B. Foundation soil shall be examined by the on-site soils engineer to assure that the actual foundation soil strength meets or exceeds assumed design strength.

C. Over-excavated areas shall be filled with compacted backfill material approved by on-site soils engineer.

D. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

E. Foundation soils shall be proof –rolled prior to fill and geogrid placement.

3.2 WALL CONSTRUCTION

A. Wall construction shall be as specified under Section 02276: CONCRETE MODULAR RETAINING WALL.

B. Wall elevations shown on the drawings are designated as Top of Wall (TW) and Bottom of Wall (BW), and are further defined as follows:

1. Top of Wall (TW) shall be the elevation of the highest unit (capstone) of the wall.
2. Bottom of Wall (BW) shall be the finished ground elevation adjacent to the face of the wall. The actual bottom of the overall wall system shall be embedded below grade as per the approved engineered shop drawings.

3.3 GEOGRID INSTALLATION

A. Install wall system to designated height of first geogrid layer. Backfill and compact in layers not to exceed 8 in. (200 mm) lifts behind wall to depth equal to designed grid length before grid is installed.

B. Cut geogrid to designed embedment length and place on top of block to back edge of lip. Extend away from wall approximately 3% above horizontal on compacted backfill.

C. Lay geogrid at the proper elevation and orientations shown on the construction drawings or as directed by the wall design engineer.

D. Correct orientation of the geogrid shall be verified by the contractor and on-site soils engineer. Strength direction is typically perpendicular to wall face.

E. Follow manufacturer's guidelines for overlap requirements, particularly for curves and/or angle points.

F. Place next course of Block on top of grid and fill block cores with wall rock to lock in place. Remove slack and folds in grid and stake to hold in place.

G. Adjacent sheets of geogrid shall be butted against each other at the wall face to achieve 100 percent coverage.

H. Geogrid lengths shall be continuous. Splicing parallel to the wall face is not allowed.

I. Incorporate the fence installation sleeves into the geogrid, per manufacturer's requirements.

J. Coordinate geogrid installation with the installation of beam guide rail footings to insure that each component interleaves with the other.

3.4 FILL PLACEMENT AND BACKFILL PLACEMENT

A. Infill material shall be placed in lifts and compacted as specified under Section 02200 and 02276.

B. Backfill shall be placed, spread and compacted in such a manner that minimizes the development of slack or movement of the geogrid.

C. Only hand-operated compaction equipment shall be allowed within 3 ft (1 m) behind the wall. This area shall be defined as the consolidation zone. Compaction in this zone shall begin by running the plate compactor directly on the block and then compacting in parallel paths to the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. (200 mm).

D. When fill is placed and compaction cannot be defined in terms of Modified Proctor Density, then compaction shall be performed using ordinary compaction process and compacted so that no deformation is observed from the compaction equipment or to the satisfaction of the engineer of record or the site soils engineer.

E. Tracked construction equipment shall not be operated directly on the geogrid. A minimum backfill thickness of 6 in. (150 mm) is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

F. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 mph (16 Km/h). Sudden braking and sharp turning shall be avoided.

G. The infill shall be compacted to achieve 95% Modified Proctor (ASTM D1557). Compaction tests shall be taken at 3 ft (1 m) behind the block and at the back of the reinforced zone and frequency shall be as determined by the geotechnical engineer. Material Product data sheets of the backfill material shall be submitted to the geotechnical engineer for review and approval prior to the placement of any backfill. The contractor is responsible for achieving the specified compaction requirements. The on-site soils engineer may direct the contractor to remove, correct or amend any soil found not in compliance with these written specifications.

3.5 FENCE INSTALLATION

A. Follow wall manufacturer's guidelines and specifications for installation of fencing along top of wall, per construction drawings. Interleave the geogrid with the fence mounting system as required.

END OF SECTION 02275

SECTION 02276 - MODULAR BLOCK RETAINING WALL

PART 1 – GENERAL

1.1 DESCRIPTION

A. This is a performance-based specification which allows for various wall system manufacturer's product lines. Fully engineered, site specific shop drawings from the wall system selected by the contractor shall be provided and must demonstrate equivalence with these specifications. A sample wall system is shown on the plan to demonstrate the minimum wall components required for the project. This wall section(s) contains the general requirements of the project and shall be supplemented to suit actual field conditions, as necessary.

B. Work includes furnishing and installing modular concrete block retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

C. Work includes earthwork, preparing foundation soil, furnishing and installing soil infill and stone, furnishing and installing leveling pad, unit fill and backfill to the lines and grades designated on the construction drawings and as supplemented by the wall manufacturer's wall system shop drawings.

D. Furnishing and installing all appurtenant materials required for construction of the retaining wall as shown on the construction drawings, including clean stone backfill, filter fabric, fencing anchors (as recommended by the wall and/or geogrid manufacturer), and rear wall drainage pipe.

E. Delegated Design:
   1. 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. Designated Design includes, but is not limited to:
      a. Site specific modular block retaining wall indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified professional engineer responsible for their preparation in the State of New Jersey.
   2. Certified shop drawings for site specific walls shall be prepared by a licensed professional engineer (NJ License), the cost of which shall be included in the contractor's bid.

1.2 RELATED WORK

A. Section 02200: Earthwork - Site

B. Section 02221: Trenching, Backfilling and Compaction

C. Section 02275: Geogrid Soil Reinforcement

D Section 02820: Chain Link Fencing & Gates

1.3 REFERENCE STANDARDS

A. ASTM C1372 Standard Specification for Segmental Retaining Wall Units.

B. ASTM 1262 Evaluating the Freeze thaw Durability of Manufactured CMU's and Related concrete Units

C. ASTM D698 Moisture Density Relationship for Soils, Standard Method

D. ASTM D422 Gradation of Soils

E. ASTM C140 Sample and Testing concrete Masonry Units

1.4 DELIVERY, STORAGE AND HANDLING

A. Contractor shall check the materials upon delivery to assure that proper material has been received.

B. Contractor shall prevent excessive mud, wet cement, epoxy and like materials which may affix themselves to the blockwork, from coming in contact with the materials.

C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated into the retaining wall structure.

1.5 SUBMITTALS

A. Samples of all products used in the work of this section. Manufacturer's full range of available colors for Modular Retaining Wall Systems are to be submitted for review and approval by Owner and Architect for color selection prior to their procurement.

B. Site specific design (shop) drawings for the wall system, signed and sealed by a Professional Engineer licensed in the State of New Jersey.

C. Latest edition of manufacturer's specifications for proposed materials, method of installation and list of material proposed for use.

D. Shop Drawings: Include plans, elevations, sections, details and attachments to other work, and the following:
   1. Corner details
   2. Cap details,
   3. Dimensioned elevations showing accent block locations,
   4. Plan details where abutting walkways and other walls.
   5. Plan details for assimilating poured-in-place concrete stairways into the wall system.

1.6 QUALITY ASSURANCE

A. Soil testing and inspection service for quality control testing during earthwork operations will be scheduled by the contractor in accordance with Specification Section 02050.

PART 2 - MATERIALS

2.1 MODULAR WALL UNITS

A. Wall units shall be Keystone, Allan Block, Rockwood Retaining Walls, or approved equal. A sample wall system is shown on the plan for reference only and is not intended to demonstrate all required wall system components.

B. Wall units shall have minimum 28 day compressive strength of 3000 psi (20.7 MPa) in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection in accordance with ASTM C1372 or an average absorption rate of 7.5 lb/ft3 (120 kg/m3) for northern climates and 10 lb/ft3 (160 kg/m3) for southern climates.

C. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 in. (3 mm).

D. Wall units shall provide a minimum of 110 lbs total weight per square foot of wall face area (555 kg/m2). Fill contained within the units may be considered 80% effective weight.

E. Exterior face shall be textured. Color as specified by Owner and/or Architect.

2.2 WALL ROCK

A. Material must be well-graded compactable aggregate, 0.25 in. to 1.5 in., (6 mm - 38 mm) with no more than 10% passing the #200 sieve. (ASTM D422)

B. Material behind and within the blocks may be the same material.

2.3 INFILL SOIL

A. Infill material shall be prepared on-site Soil Fill, per the earthwork specifications. Note that this soil is extremely moisture sensitive and if it becomes too wet, then it must be aerated to restores its properties for full compaction, otherwise, the soil must be replaced with suitable material at the contractor's expense.

2.4 DRAINAGE PIPE

A. Install perforated polyethylene pipes of the sizes and locations noted on the plans and sample wall detail, wrapped in a filter sock, behind the wall and extend these drain pipes downhill in a continuous manner to connect into the new storm sewer inlet located in the new driveway. There shall be a minimum of six (6) inches of clean stone around all sides of each pipe. Suggested pipe inverts are shown and shall be adjusted per the final shop drawings.

B. The drainage pipes shall be laid in a continuous downhill manner from top end to bottom, with the minimum design slope noted on the plans. In no case shall the drain pipes be back pitched.

PART 3 EXECUTION

3.1 EXCAVATION

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown.

B. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

C. Verify that all required utility relocation work needed to accommodate wall construction has been completed.

3.2 FOUNDATION SOIL PREPARATION

A. Foundation soil shall be defined as any soils located beneath a wall.

B. Foundation soil shall be excavated as dimensioned on the plans and compacted to a minimum of 95% of modified Proctor density (ASTM D1557) prior to placement of the base material.

C. Foundation soil shall be examined by the contractor's on-site geotechnical (soils) engineer to ensure that it has achieved maximum compaction at the ideal moisture level, before placing any block courses. Soil not meeting the required strength shall be removed and replaced with acceptable granular fill material, such as DGA or clean ¾" stone.

3.3 BASE

A. Base material shall be placed as shown on the construction drawing. Top of base shall be located to allow bottom wall units to be buried to proper depths as per wall heights and specifications.

B. Base material shall be installed on undisturbed native soils or suitable replacement fills compacted to a minimum of 95% dry density per ASTM D1557.

C. The base shall be constructed to ensure proper wall embedment and the final elevation shown on the plans. Well-graded sand can be used to smooth the top 1/2 in. (13 mm) on the base material.

D. Base material shall be as shown on the plans.

3.4 UNIT INSTALLATION

A. The first course of wall units shall be placed on the prepared base with the raised lip facing up and out and the front edges tight together. The units shall be checked for level and alignment as they are placed.

B. Ensure that units are in full contact with base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.

C. Fill all cores and cavities and a minimum of 12 in. (300 mm) behind the base course with wall rock. Use approved soils to backfill behind the wall rock and in front of the base course to firmly lock in place. Check again for level and alignment. Use a plate compactor to consolidate the area behind the base course. All excess material shall be swept from top of units.

D. Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3 in. (75 mm) minimum offset is recommended. Check each block for proper alignment and level. Fill all cavities in and around wall units and to a minimum of 12 in. (300 mm) depth behind block with wall rock. Spread backfill in uniform lifts not exceeding 8 in. (200 mm) in uncompacted thickness and compact to 95% of MPD behind the consolidation zone.

E. The consolidation zone shall be defined as 3 ft (1 m) behind the wall. Compaction within the consolidation zone shall be accomplished by using a hand operated plate compactor and shall begin by running the plate compactor directly on the block and then compacting in parallel paths from the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. (200 mm). Maximum lifts of 4 inches (100 mm) may be required to achieve adequate compaction within the consolidation zone. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall.

F. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.

G. Minimum tolerances.
Vertical Control - ±1.25 in. (32 mm) max. over 10 ft (3 m) distance.
Horizontal Location Control - straight lines ±1.25 in. (32 mm) over a 10 ft (3 m) distance.
Rotation - from established plan wall batter : 2.0°
Bulging - 1.0 in. (25 mm) over a 10 ft (3.0 m) distance

H. Wall elevations shown on the drawings are designated as Top of Wall (TW) and Bottom of Wall (BW), and are further defined as follows:
1. Top of Wall (TW) shall be the elevation of the highest unit (capstone) of the wall.

2. Bottom of Wall (BW) shall be the finished ground elevation adjacent to the face of the wall. The actual bottom of the overall wall system shall be embedded below grade as per the typical wall section determined by the manufacturer's wall system design engineer.
3. The wall system shall be stepped with grade and geogrid layers shall be adjusted accordingly.

3.5 FENCES

A. Where indicated on the plan, install a minimum 4 ft high fence along the top of the wall. The fence shall be positioned to be as close to the wall as possible and permitted by the wall system manufacturer. Install custom fence post mounting system recommended by the selected wall manufacturer and include the mounting system in the wall submittal.

B. Note that the fencing system requires privacy slats and the additional wind loads shall be factored into the shop drawing design.

END OF SECTION 02276

SECTION 02360 - STORM DRAINAGE

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 storm drainage outside the building.

1.3 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure 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. Precast concrete drainage inlets including frames, covers, 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: Provide daily inspection reports that document field construction and interpret test results for compliance with performance requirements.

E. Product Data: Submit manufacturer's technical product data and installation instructions for water supply system materials and products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic structures, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

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 Architect or Engineer not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect or Engineer's written permission.

1.7 QUALITY ASSURANCE

A. Testing and inspection service for quality control testing during storm drainage system construction will be coordinated by the contractor in accordance with Specification Section 02050.

B. Manufacturer's Qualifications: Firms regularly engaged in manufacturing of storm sewage system products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

C. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with storm sewage work similar to that required for this project.

D. Codes and Standards:

   1. Plumbing Code Compliance: comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of storm sewage systems materials and products.

   2. Environmental Compliance: Comply with applicable portions of local Environmental Agency regulations pertaining to storm sewage systems.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.2 PIPES AND FITTINGS

1. Polyethylene Pipe (PEP): ASTM D3350, AASHTO M294, Hancor “Hi-Q” or ADS “N-12", smooth interior liner or equal. Provide and install all required couplers, fittings, gaskets, etc. as needed.
   a. Fittings: Pipe joints and fittings shall conform to AASHTO M252, ASTM D1056, AASHTO M294.
   b. Flared End Sections: Install flared end section and supporting concrete pad per manufacturer’s specifications.
   c. Perforated polyethylene pipe per manufacturers specifications.
2. Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D-2665, Schedule 40 (NOT SDR-35)
   a. Fittings: Sch 40 PVC, ASTM D-2665, solvent-cement joints complying with ASTM D2855 using solvent cement complying with ASTM D2664; or elastomeric joints complying with ASTM D3212 using elastomeric seals complying with ASTM F477.
   b. PVC pipes used for storm sewer applications shall not be SDR-35 wall thickness. Minimum Schedule 40 is required unless noted as thicker on the drawings.
   c. PVC pipes exposed to sunlight shall be chlorinated PVC.

3. Reinforced Concrete Pipe (RCP), ASTM C507 class III unless noted otherwise.
   a. Fittings: Reinforced concrete, same strength as adjoining pipe, bell & spigot joints complying with ASTM C443.
   b. All lifting holes shall be mortared closed to prevent exfiltration.
4. Ductile Iron Pipe
   a. Ductile Iron Pipe shall be centrifugally cast annealed and manufactured in accordance with the latest revision of:
      ANSI/AWWA C110/A21.10 (fittings)
      ANSI/AWWA C111/A21.11 (rubber gasket joints)
      ANSI/AWWA C115/A21.15 (Flanged joints)
      ANSI/AWWA C151/A21.5 (pipe)
   b. Pipe shall be double cement mortar lined inside and have an exterior coal-tar, epoxy type coating. The bituminous coating shall be in accordance with the requirements of the latest revision on ANSI A21.51. The cement-mortar lining shall be in accordance with the latest revisions of ANSI A21.4 (AWWA C104), and shall include a bituminous seal coat. The pipe length shall be in nominal 18-20 ft. lengths. The minimum wall thickness shall be Class 52.
   c. Special transition couplings and or gaskets are required for joining different types of pipe. Such transition devices are available. When ordering, the actual outside diameter of the pipe should be given. Push on joints and mechanical joints shall be assembled as specified in ANSI/AWWA C600, latest edition.
   d. Acceptable Manufacturers:
      U.S. Pipe
      Rockwell
      Griffin Pipe Products Co.
      Valley Steel Products

2.3 SPECIAL PIPE COUPLINGS AND FITTINGS

A. Bushing-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric bushing fabricated to mate with OD of smaller pipe and ID of adjoining larger pipe, for nonpressure joints.
   1. Material for Concrete Pipe: ASTM C 443 (ASTM C 443M), rubber.

2.4 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.
   2. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
   3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
   4. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
   5. Riser Sections: 4-inch (100-mm) minimum thickness, and lengths to provide depth indicated.
   6. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
   7. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
   8. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover. Adjust to grade with courses of brick (12” max.)

9. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for manholes less than 60 inches (1500 mm) deep. PVC-coated Aluminum, integrally cast into manhole sidewalls or as noted on the drawings.
10. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

B. Manhole Frames and Covers: ASTM A 48-83, Class 30B, gray-iron castings designed for heavy-duty service. Include 23-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 25-3/8-inch-diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover. Acceptable products are manufactured by Campbell Foundry, Neenah Foundry, or approved equal. Manhole castings with open grates shall be ADA compliant.

C. Acceptable manufacturers of pre-cast units include Modern Concrete, Oldcastle Precast, Flemington Precast & Supply, or approved equal.

2.5 CATCH BASINS

A. Normal-Traffic, Precast Concrete Catch Basins (NJ DOT standard inlet designations as noted on the plans): ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
1. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
2. Riser Sections: 4-inch (100-mm) minimum thickness, 48-inch (1220-mm) 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 (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
6. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for catch basins less than 60 inches (1500 mm) deep. PVC-coated Aluminum integrally cast into catch basin sidewalls on the direction of approaching traffic or as noted on the drawings. Steps are not required in trench drains.
7. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
8. Bottom, Walls, and Top: Reinforced concrete.
9. Channels and Benches: Concrete.

B. Frames and Grates: ASTM A 48-83, Class 30B, gray iron designed for heavy-duty service. Include flat grate with small square or short-slotted drainage openings. Acceptable products are manufactured by Campbell Foundry, Neenah Foundry, or approved equal.
1. Size: As indicated on plan set.
2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
3. Reference Product: Campbell Foundry Co. casting designation per plan.
4. All new Castings shall be equipped with ADA compliant and bicycle safe grates.
5. All castings on storm inlets located within the construction area shall be changed to ADA compliant and bicycle-safe type castings.

C. Acceptable manufacturers of pre-cast units include Modern Concrete, Oldcastle Precast, Flemington Precast & Supply, or approved equal.

2.6 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 (27.6 MPa) 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 (27.6 MPa) 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.
         1) Invert Slope: 1 percent through manhole.
         b. Benches: Concrete, sloped to drain into channel.
         2) Slope: 4 percent.
   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.
         1) Invert Slope: 1 percent through catch basin.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) 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.

2.7 PROTECTIVE COATINGS

A. Description: One- or two-coat, coal-tar epoxy; 15-mil (0.38-mm) 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.
   7. Stormwater Detention Structures: On exterior surface.
   8. Stormwater Detention-Structure Manhole Frames and Covers: On entire surfaces.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section 02200 and 02221.

3.2 IDENTIFICATION

A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
   8. Use warning tape or detectable warning tape over ferrous piping.
   9. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.3 PIPING APPLICATIONS

A. General: Include watertight, silt-tight, or soil-tight joints, unless watertight or silt-tight joints are indicated.

B. 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.

C. Gravity-Flow Piping: Use the following:
   1. PVC Sewer Pipe and Fittings, NPS 15 (DN375) and smaller, SCH40, for solvent-cemented or gasketed joints.
   2. Polyethylene Pipe (PEP): ASTM D3350, AASHTO M294, Hancor “Hi-Q” or ADS “N-12", smooth interior liner or approved equal. Provide and install all required couplers, fittings, gaskets, etc... as needed.
      a. Fittings: Pipe joints and fittings shall conform to AASHTO M252, ASTM D1056, AASHTO M294.

3.4 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.
   1. Use the following pipe couplings for non-pressure applications:
      a. Sleeve type to join piping, of same size, or with small difference in OD.
      b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
      c. Bushing type to join piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
   2. Use pressure-type pipe couplings for force-main joints. Include PE film, pipe encasement.

B. Special Pipe Fittings: Use where indicated. Include PE film, pipe encasement.

3.5 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 building's 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.

F. Cleaning Piping: Clear interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.
   1. In large, accessible piping, brushes and brooms may be used for cleaning.
   2. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.
   3. Flush lines between manholes of required to remove collected debris.

G. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.
   1. Make inspection after lines between manholes or manhole locations have been installed and approximately 2 inches of backfill is in place. Inspect again at completion of project.
   2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, correct such defects, and reinspect.

I. Final connections: Provide connections to storm sewer lines exiting the building, which are installed by the Plumbing Contractor, up to five feet beyond the exterior walls (with the exception of courtyards where applicable). Courtyard drainage work shall be performed by the site contractor. Furnish and install all required fittings, adaptors, reducers, elbows, tees, tee wyes, cleanouts and other conversion fittings (i.e. Ductile Iron pipe to Concrete Pipe) as needed to make a proper and integral connection.

3.6 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

3.7 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 1 inch (25 mm) above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

E. Construct cast-in-place manholes as indicated.

F. Provide rubber joint gasket complying with ASTM C443 at joints of sections.

3.8 CATCH-BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated. Use courses of brick to adjust grades to proposed grade as needed.

3.9 CONCRETE PLACEMENT

A. Cast in place concrete to be 4,000 psi.

3.10 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 (600 mm) 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.

C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2 . Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate reports for each test.
   5. Leaks and loss in test pressure constitute defects that must be repaired.
   6. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

D. Furnish inspection and test reports from the Contractor’s certified materials testing and inspection company for all work performed, certifying that all construction and materials meets or exceeds the specifications.

END OF SECTION 02360

SECTION 02400 - HOT-MIX ASPHALT PAVING

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. Hot-mix asphalt (HMA) paving (top and base courses) conforming to the New Jersey Department of Transportation Standard Specifications (NJDOTSS) for the construction of new “Superpave” bituminous (HMA) concrete pavements as shown on the drawings.
   2. Restoration of pavements due to installation or replacement of storm or sanitary sewers, utilities, or other underground structures, or due to excavation for other work adjacent to pavements.

B. Related Sections include the following:
   1. Division 2 Section "Earthwork" for aggregate subbase and base courses.

1.3 SYSTEM DESCRIPTION

A. Provide super pave hot-mix asphalt (HMA) pavement according to the materials, workmanship, and other applicable requirements of the standard specifications of the state or of authorities having jurisdiction.
   1. Standard Specification: NJDOT Standard Specifications for Road and Bridge Construction (NJDOTSS), latest edition, with amendments.

1.4 REFERENCE STANDARDS

A. AASHTO American Association of State Highway & Transportation Officials:
   1. M17.
   2. M20.
   3. M22.
   4. M82.
   5. M140.
   6. M208.
   7. M248.

B. ASTM American Society for Testing and Materials:
   1. D242.
   2. D946.
   3. D977.
   4. D2027.
   5. D2397.
   6. D3381.
   7. D3515.

C. FS Federal Standard

1. TT P 115.

D. NJDOT New Jersey State Department of Transportation, Standard Specifications for Roadway & Bridge Construction, latest edition.

1.5 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. Samples: 12 by 12 inches (300 by 300 mm) minimum, of paving fabric.

D. 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 Engineers and owners, and other information specified.

E. Material Test Reports: Indicate and interpret test results for compliance of materials with requirements indicated.

F. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed 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.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

1. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the NJDOT.

C. Schedule and Coordinate all material testing and inspection work in accordance with Section 02050. Any pavement that has not been tested and inspected will not be accepted. All testing and inspection work shall adhere to NJ DOT Standard Specifications for Road and Bridge Construction, whichever is more stringent.

D. Regulatory Requirements: Conform to applicable standards of authorities having jurisdiction for asphalt paving work on public property.

E. Asphalt-Paving Publication: Comply with the Asphalt Institute's "The Asphalt Handbook," except where more stringent requirements are indicated.

F. Pre-installation Conference: Conduct conference at Project site with Geotechnical Engineer and Testing Company to comply with requirements of Division 1 Section "Project Meetings" Review methods and procedures 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 on the subgrade.
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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Conform to applicable NJDOTSS requirements.

1.8 PROJECT CONDITIONS

A. Pavements, weather limitations and laydown conditions: Conform to NJDOTSS Sections 404.12 and 404.13, including requirements for prime and tack coats, which also shall be included in the overall contract.

PART 2 - PRODUCTS

2.1 PAVEMENTS AND BASE COURSES

A. General: Use materials, gradations, and product formulations conforming to the NJDOTSS.

B. Bituminous Stabilized Base Course: NJDOTSS Division 400. Mix shall be HMA 19M64.

C. Bituminous Concrete Surface Course (i.e. pavement top course or layers): NJDOTSS Division 400. Mix shall be HMA 9.5M64.

D. Prime Coat: NJDOTSS Section 401.03.02

E. Tack Coat: NJDOTSS Section 401.03.02

F. Water: Potable.

2.2 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by Environmental Protection Agency (EPA). Provide granular, liquid, or wettable powder form.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. Notify Owner, in writing, of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

3.2 PATCHING AND REPAIRS

A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Recompact new subgrade. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically.
   1. Tack coat faces of excavation and allow to cure before paving.
   2. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.
   3. Thickness shall conform to existing pavement thicknesses, however, in no case shall the total thickness of bituminous pavement for patching or restoration be less than five (5) inches.

B. Temporary patching is not allowed in public roadways. Permanent pavement must be constructed in public roadways immediately upon completion of the related work. In other areas, temporary pavement patching is permitted, until such time and permanent pavement is installed. Temporary patching shall be continuously maintained to a safe and uniform condition. Temporary patching shall be constructed flush with adjacent surfaces, with no lips or irregularities in the paving surface. Temporary patching may consist of either Superpave HMA 9.5M64 or Marshall Mix FABC-1 surface course.

3.3 SURFACE PREPARATION

A. General: Conform to NJDOTSS Divisions 300 and 400 as applicable, including all referenced sections.

3.4 HOT-MIX ASPHALT INSTALLATION

A. Transportation and delivery, spreading and finishing, and compaction of the material shall conform to NJDOTSS Division 400 and related sections.

3.5 THICKNESS REQUIREMENTS AND FINISH SURFACE REQUIREMENTS

A. Thickness: Conform to NJDOTSS Division 400.

B. Surface Smoothness: Conform to NJDOTSS Division 400.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Refer to Section 02050.
   1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
   2. Contractor must schedule its work and coordinate with the Testing Agency.

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 courses will be determined according to NJDOTSS.

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 NJDOTSS and tested for compliance.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 02400

SECTION 02450 - RADON MITIGATION 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 DESCRIPTION OF WORK

A. Notwithstanding the project location, provide radon mitigation measure which are, at a minimum, consistent with those required in Tier One Radon Hazard Areas as established by the Department of Environmental Protection and N.J.A.C. 5:23-10, the Radon Hazard Subcode on the New Jersey Uniform Construction Code (UCC).

B. Extent of the active radon mitigation system Work is shown on Drawings.

1. Under slab - on grade piping and fittings.
2. Above ceilings piping and fittings.
3. Electrical Work.
4. Vapor-vent system.

C. Provide inverts, instructions, supervision, and inspection to insure that Work of other related work by (Sub)Contractors on the project, (executing earthwork, masonry chases, roof flashings, electrical Work, etc.), will conform to the requirements for radon mitigation system Work. Report any deficiencies to the Architect.

D. Other Related Work by Subcontractors:

1. Section 02200 - Earthwork, for excavation, backfill and under slab aggregate covered under General Construction Work.

2. Section 03300 - Cast in Place Concrete for concrete slab on grade and continuous vapor barrier covered under General Construction Work.

3. Section 04200 - Unit Masonry for pipe chase covered under General Construction Work.

4. Division 7 for Roofing System Work for roof flashings covered under General Construction Work.

5. Refer to Part 6 - Specification Sections for electrical boxes, wiring, etc., covered under Electrical Work.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform Work in compliance with applicable requirements of governing Authorities Having Jurisdiction.

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1. All Work shall be in compliance with requirements of the NJ UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection.

1.4 REFERENCES

A. ANSI/ASTM D2729 - Poly Vinyl Chloride (PVC) pipe and fittings.

1.5 SUBMITTALS

A. Submit product data on materials proposed for use.

B. Certification: Submit certification signed by Contractor that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with fill.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Furnish under slab on grade vent pipe system complete with bends, adapters, couplings, T - pipe fittings and joint materials.

1. Polyvinyl Chloride Pipe (PVC): ASTM D 2729.

B. Furnish above ceilings vent piping system complete with fittings and joints material.

1. Cast-iron pipe and fittings: ASTM A 888.
   a. Provide hangers supports and clamps.

C. Pipe Accessories:

1. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, if required, tees, bends, elbows, reducers, and other configurations required.

2. Sealant, tapes, etc. for joints: Provide appropriate sealants, adhesives, tapes, connectors for approved connection of piping system. All materials shall be compatible and approved to satisfy installation requirements.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Install piping systems and accessories in accordance with the best practices of the various trades and the requirements specified herein. Install specialty products in conformance with the manufacturer's recommendations and approved shop drawings.

B. Comply with all applicable requirements of the "NJ UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection" and applicable requirements of governing Authorities Having Jurisdiction.

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3.2 EXCAVATING, TRENCHING, BACKFILLING, AND UNDER SLAB AGGREGATE

A. Coordinate Work of this section with Work specified in Section 02200.

3.3 PIPING

A. Test pipe for soundness and clean interior and joint surfaces before lowering the pipe into the trench.

B. Lay pipe in straight lines and on uniform grades between points where changes in alignment or grade are shown.

C. Bed the pipe barrel firmly and uniformly. Check the line and invert grade of each pipe from a top line carried on batter boards not over 25 feet apart.

D. Fit the pipes to form close concentric joints.

E. Keep a stopper in the pipe mouth when pipe laying is not in progress.

F. Testing Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

3.4 PROTECTION

A. Protect incomplete open ends of pipe runs from infiltration of water and debris by installing a row of straw bales across the open mouth of the pipe. Alternate protection may be provided using filter fabric secured to open end of pipe.

B. Remove all obstructions and correct all defects which are discovered.

3.5 FINAL INSPECTION

A. At the time of final inspection, the piping system covered by this section shall be completed in every aspect and in perfect operating conditions.

B. All surplus materials of every character resulting from the Work of this section shall have been removed. Any defects discovered in the Work subsequent to this inspection shall have been corrected.

C. Apply and pay for all required permits and arrange for inspections by all governing Authorities Having Jurisdiction. Obtain approvals and certificates which to be submitted in accordance with section 01700 - Project Closeout Document.

3.6 RECORD DRAWINGS

A. As the Work progresses, record on one set of Drawings all changes and deviations from the Contract Drawings in sizes, line and grade.

B. Record the exact final location of lines by offset distances to surface improvements such buildings lines.

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C. Make sufficient measurements to locate definitely all lines. Reference underground bends, etc., by offset distances to establish bench marks.

D. At completion of Work, transfer accurately all such records to a set of record prints of the Drawings as specified in Section 01700, and deliver to the Architect.

END OF SECTION 02450

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SECTION 02617 – PAVEMENT STRIPES AND MARKINGS

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. This work consists of applying white, blue or yellow traffic and pavement thermoplastic markings.
   2. The plans show the location of linework, pavement markings, lettering and other symbols to be constructed. Existing pavement markings, where pavement areas are being reconstructed in-kind, shall be restored to original configuration, unless noted otherwise on the plans.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Summary of Work" for use of the building and phasing requirements.
   2. Division 1 Section "Contract Closeout" for record document requirements.

1.3 MATERIALS

A. Materials for Pavement Stripes or Markings shall conform to NJDOTSS Section 610. Materials for Thermoplastic Traffic markings shall conform to NJDOTSS Section 610.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.

1.5 QUALITY ASSURANCE

A. Contractor Qualifications: Engage an experienced firm that has successfully completed Work similar to that indicated for this Project.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CONSTRUCTION

A. Surface preparation shall conform to NJDOTSS Section 610. All dirt, oil, grease and other foreign material shall be removed from the areas upon which the pavement marking or striping is to be placed.

B. Thermoplastic Pavement markings shall be applied in accordance with NJDOTSS Section 610 et. seq.

C. Thermoplastic Pavement markings and striping shall be completed and the material shall be thoroughly set before opening to traffic. Opening road to traffic shall be in accordance with NJDOTSS Section 610.

D. Should the contractor need to remove any existing striping or markings, in pavement areas that are to be preserved, this work shall be done in accordance with NJDOTSS Section 610.

E. All markings, and traffic control lettering shall conform with the Manual of Uniform Traffic Control Devices, latest edition.

END OF SECTION 02617

SECTION 02730 - SANITARY SEWAGE SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

A. Extent of sewage system work is indicated on Drawings and schedules, and by requirements of this section.

B. The Contractor shall certify the installation of sewer lines specified in this Section on a section-by-section basis as prescribed on the drawings. The Contractor shall furnish labor, materials, testing equipment and accessories, and air and water necessary to perform the required tests. Tests shall be made in the presence of and to the complete satisfaction of the Engineer.

C. The contractor shall excavate test pits to uncover existing sewer mains and/or service lines to verify alignment, size, outside diameter, and slope at locations where connections or other utility crossings will occur (also see E below). Adhere to all traffic control requirements.

D. Extent of sanitary sewage system work is indicated on Drawings and details, and by requirements of this section.

E. The contractor shall excavate test pits in all areas where pipe depths and/or alignment is noted as approximate or unverified. Some of the existing utility and sewer information shown on the plans was obtained from record mapping furnished by the owner. In many cases the exact depth and location of buried pipelines is shown schematically, and the contractor must prepare for making appropriate field adjustments to complete the intent of the work depicted on the drawings.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of sanitary sewage systems products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with sanitary sewage work similar to that required for this project.

C. Tester's Qualifications: Firm with at least 3 years of experience in testing sanitary sewers with similar air testing equipment on work of similar scope to this project.

D. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of sanitary sewage system materials and products.

1.4 SUBMITTALS

A. Make submittal under provisions of Appropriate Division 01 Section.

B. Product Data: Submit manufacturer's technical product data and installation instructions for sewage system materials and products.

C. Record Documents: At project closeout, submit record drawings of installed sanitary sewage piping and products, in accordance with requirements of Section 01720.

PART 2 - PRODUCTS

2.1 PIPES AND PIPE FITTINGS

A. Pipe fittings and accessories shall be of same material and weight/class as pipes, with joining method as indicated.

B. Gravity Sewer Pipe: Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D3033, Type PSP, SDR 35; or ASTM D3034, Type PSM, SDR 35.

1. Fittings: PVC, ASTM D3033 or ASTM D3034, solvent-cement joints complying with ASTM D2855 using solvent cement complying with ASTM D2664; or elastomeric joints complying with ASTM D3212 using elastomeric seals complying with ASTM F477.

C. Force Main Pipe

1. Provide pump discharge pipe (force main) of the following material, of weight/class as indicated on the construction plans. Provide pipe fittings and accessories of same material and weight/class as pipes with joining method as indicated/required. The construction drawings and details may not necessarily illustrate all required pipe fittings and connectors.
   a. Polyvinyl Chloride (PVC) Pressure Pipe: ASTM D-1785, Schedule 80, size per plan:
      i) Fittings: Sch 80 PVC, ASTM D-1785, no Sch 40 fittings will be allowed.
      ii) Cement: heavy-weight solvent-cement joints using Schedule 80 cement shall be used. Do not use light-weight Schedule 40 cement.
   b. Encase Force Main Pipe fittings in concrete restraining/thrust blocks. Where possible, thrust blocks shall be poured against the side wall of the pipe trench in contact with virgin (insitu) soil.

2.2 CLEANOUTS

A. Provide sanitary cleanouts within 5 feet of the building facade or as indicated, pipe extension to grade with ferrule and countersunk cleanout plug.

1. PVC Cleanouts are not permitted in paved or concrete areas. Use heavy-duty brass clean-out cover with non-slip surface and countersunk plug in pedestrian areas, Geneco style 40 with 429 cap, or equal.
2 In paved areas subject to vehicle loading use heavy duty brass clean-out cover with low hex plug recessed in a heavy duty cast iron cover, Geneco R3218-D or equal.
3. In areas not subject to vehicle loading, install CPVC cleanout with screw-on cap, 5" protrusion in lawn areas to insure that low hex cap does not protrude more than 2 inches above final topsoil grade.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE AND FITTINGS

A. Provide as indicated, pipe extension to grade with ferrule and countersunk cleanout plug. Provide round cast-iron access frame over cleanout, with heavy-duty secured scoriated cover with lifting device (See 2.02).

B. Inspect piping before installation to detect defects. Mark defective materials with white paint and promptly remove from site.

C. Lay piping beginning at low point of system, true to grades and alignment indicated, with unbroken continuity of invert.

D. Place bell ends or groove ends of piping facing upstream.

E. Install gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements.

F All Pipe: Install in accordance with manufacturer's installation recommendations, and in accordance with ASTM D2321.

G. Cleaning Piping: Clear interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.
3. Flush lines between manholes if required to remove collected debris.

H. Joint Adaptors: Make joints between different types of pipe with standard manufactured adaptors and fittings intended for that purpose. Use Fernco Series 1002 -55 or approved equal per N.J.S.A. 18A:18A-15(d) to suit actual pipe diameters.

I. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after lines between manholes or manhole locations have been installed and approximately 2-ft of backfill is in place. Inspect again at completion of project.
2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects, and reinspect.

3. Contractor shall not backfill trenches until inspected, unless inclement weather is forecast or imminent. If weather or the close of work day requires the backfilling of pipe trenches before inspection occurs, the contractor shall re-excavate for inspection if required by local official. Backfill & compact after final pipe inspection.

J. Final Connections:

1. Make final connection of new PVC sewer to existing sewer at approximate location shown on plans (preferably @ nearest bell joint). Coordinate requirements with local authorities.
2. Provide connections to sanitary sewer lines exiting the building, which are installed by the Plumbing Contractor up to five feet beyond the exterior wall or as indicated on the site utility plan.

3.2 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to requirements specified for new work.

B. Prevent concrete or debris from entering existing piping or structure while making tap connections. Remove debris, concrete, or other extraneous material which may accumulate.

3.3 BACKFILLING

A. Conduct backfilling operations of open-cut trenches closely following laying, jointing, and bedding of pipe, and after initial inspection and testing are completed.

B. Perform backfilling as described in Section 02200: Earthwork, and Section 2150.

C. Do not backfill until trenches and pipe work have been inspected by appropriate authority, except as further defined in Section 2150. Read Section 2150 carefully, since it contains backfilling requirements that are not standard practice, but are required in this project due to the on-site geology.

D Use imported granular fill in all pipe trenches. Pipe trench bedding shall be sand, no clean stone is permitted. On-site soils are unsuitable for use as backfill due to their non-homogenous nature.

3.4 FIELD QUALITY CONTROL

A. After the new section of sewer line has been backfilled, a "Line Acceptance Test" using low pressure air shall be performed by the Contractor.

B. The Contractor may elect to make an air test prior to backfilling for his own purposes, but the "Line Acceptance Test" shall be performed on the entire length of the pipe sewer line between the existing building and one section before the Fernco coupling.

C. Testing Equipment:

1. The low pressure "Line Acceptance Tests" shall be performed by air testing equipment consisting of an air-compressor and storage tank of adequate capacity; an air control panel equipped with necessary piping, valves and pressure gauges to control the rate at which the air flows to the test section and to monitor the air pressure inside the test section; and required plugs.
2. In order to prevent loading the test section with the full pressure of the compressor, the test equipment shall be provided with an approved pressure relief device set to blow out at 10 psi. An extra pressure gauge of known accuracy must also be provided so that the gauges of the test equipment can be frequently checked.
3. The air testing equipment shall be adequate to conduct the required "Line Acceptance Test" and shall be subject to review by the Engineer.

D. Cleaning: Before any "Line Acceptance Test" is performed, pipe lines in the section of the pipe sewer to be tested including the main and service connection lines shall be thoroughly cleaned by propelling a snug fitting rubber ball through the pipe lines with water. In the event cemented or wedged debris, or damaged pipe shall stop the ball, the Contractor shall remove the obstruction.

E. Test Procedures for "Line Acceptance Test" of gravity sewer:

1. After the section of pipe sewer to be tested has been cleaned to the complete satisfaction of the Engineer, The Contractor shall plug all pipe outlets.
2. The ends of branch fittings and service connection piping shall be plugged with plugs properly designed to withstand the test pressures to which they will be subjected. Each plug shall be securely braced after installation. Plugs must remain in place upon satisfactory completion of the test. Plugs shall be obtained from the pipe manufacturer.
3. The ends of the sewer main piping shall be plugged with pneumatic plugs at the upstream and downstream ends. The pneumatic plugs shall be inflated to 25 psig. The pneumatic plugs shall be seal tested before being used in the actual test installation. To seal test the pneumatic plugs, one length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 5 psig and the plugs shall hold at this pressure without bracing and without movement of the plugs out of the pipe.
4. Immediately after the section of pipe sewer line to be tested has been properly cleaned and sealed, low pressure air shall be slowly introduced into this sealed section of pipe sewer line until the internal air pressure reaches four (4) psig greater than the average back pressure of any ground water that may be over the pipe.
5. After an internal pressure of 4.0 psig is obtained, allow at least two minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure.
6. After the stabilization period (3.5 psig minimum pressure in the pipe), the air supply shall be disconnected, and then the rate of air loss shall be determined by measuring the time interval required for the internal pressure to decrease from 3.5 psig to 2.5 psig greater than the average back pressure of any ground water that may submerge the pipe.
7. The section of pipe sewer line being tested shall be considered acceptable when tested at an average pressure of 3.0 psig greater than the average back pressure of any ground water that may submerge the pipe, if (1-) the total rate of air loss from any section tested does not exceed 2.0 cfm, or (2-) the section under test does not lose air at a rate greater than 0.0030 cfm per sq.ft. of internal pipe surface.

8. The requirements of this Specification shall be considered satisfied if the time required in seconds for the pressure to decrease from 3.5 psig to 2.5 psig greater than the average back pressure of any ground water that may submerge the pipe is not less than shown for the given diameters in the Air Test Tables.

F. Hydrostatic Pressure Test Procedure for "Line Acceptance Test" of force main:

1. Hydrostatic testing of the force main shall be performed in accordance with the AWWA Standard for underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water, AWWA C605-94 with simultaneous pressure and leakage testing, meeting the requirements listed below.
2. Hydrostatic tests shall be made on the force mains between the new pump station and the final connection to a hydrostatic pressure of 100 psi. Pressure in excess of 150 psi will not be permitted.
3. Each section of pipe to be tested shall be slowly filled with water using care to expel all air. Water shall be allowed to stand in the pipe for 24 hours before test pressure is applied.
4. The required pressure shall be applied for not less than 2 hours. This pressure shall be as measured at the lowest elevation of the pipe.
5. Any leakage discovered in consequence of the pressure test shall be corrected, and the test shall be repeated until satisfactorily completed. Any defective pipe, fittings or valves shall be repaired or replaced.
6. Allowable leakage: 8 gallons per inch of internal pipe diameter per mile of pipe per day.
7. No force main will be accepted until the leakage is less than mentioned in 5. above.
8. Hydrostatic testing shall be performed in the presence of the Engineer, or an approved representative, and a representative of the Manchester Department of Utilities, if required by said authority.

G. Safety Requirements: The following safety requirements shall be observed by the Contractor in connection with the air testing of pipe sewer lines.

1. Gauges, air piping manifolds and valves of the air testing equipment shall be located above ground at the top of the trench.
2. The plugs used to close the ends of the sewer main piping, branch fittings and service connection piping shall be securely braced in such a way so as to prevent blow outs.
3. No person shall be allowed in the trenches during testing.
4. Special care shall be exercised during removal of plugs and the pressure in the piping of the test section shall be completely relieved before any plug shall be permitted to be removed.
5. Confined space entry procedures will be needed for all sewer construction work. Contractor shall adhere to all OSHA requirements including OSHA 1910.146 (c)(s) ventilation, 1910.146 confined space programs, 1910.27 manholes and the standard 1-1.9 CFR 1910.27.

H. Repair and Test: If any section of pipe sewer line fails to meet these test requirements, the Contractor shall determine the source or sources of leakage. The Contractor shall repair or replace defective material and/or workmanship and shall conduct such additional tests as required to demonstrate that the pipe sewer line meets the test requirements specified.

END OF SECTION 02730

SECTION 02740 - WATER SUPPLY SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to work of this Section.

B. The specifications in this section are intended to supplement any requirements and specifications established by the local utility company or agency which regulates water usage at the project site.

1.2 DESCRIPTION OF WORK

A. Extent of water supply systems work is indicated on the Drawings and schedules, and by requirements of this Section.

B. Coordinate all installation work with the local Water Utility. Contact Board of Education Business Administrator to obtain all applicable connection and tap fees.

C. Verify the exact location of existing water services using test pits or electronic location means. Water service locations shown on the drawings were obtained by water company mapping and, where available, utility company mark-out information. This information is deemed to be very inaccurate and the contractor must adjust installation to suit field conditions as indicated on the drawings.

D. Pressure-test system after installation.

E. Sterilize new water services and obtain health department approval of same.

F. Coordinate work with site plumbing contractor to insure continuity.

G. Coordinate work with all local water utility companies.

H. Restore all pavement and other areas to original or better (new) condition after utility work.

I. Provide trench de-watering, AS NEEDED, in accordance with Section 02150, Trenching, Shoring, & Bracing..

J. The contractor may need to provide trench shoring in some areas to keep trench widths to a minimum and to maintain the structural integrity of the existing structures.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of water supply system products of types, materials and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with water supply work similar to that required for this project.

C. The contractor shall contact the appropriate utility company or agency which regulates and provides water service at the project site for installation guidelines and specifications. The specifications in this section shall be superseded by all requirements set forth by the appropriate utility company or agency for the work described on the Drawings.

D. Codes and Standards:
   1. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of water supply system materials and products. Also comply with National Fire Prevention Association Code #24 for water supply systems for Private Fire Service.
   2. Environmental Compliance: Comply with applicable portions of local Environmental Agency and Health Department regulations pertaining to water supply systems.
   3. Safety Compliance: Comply with applicable portions of OSHA, related to trench safety.

E. All construction of water systems shall be inspected by the Water Utility's Engineer, either directly or through trained observers under his/her supervision. The Water Utility's Engineer shall inspect for general compliance with the approved plans and specifications. He/She shall notify the water company to have the work discontinued in the event of non-compliance.

F. The applicant shall give 48 hours notice to water utilities, the Heath Department, and the Building Department prior to construction or testing of water systems at all times during construction of this project.

G. Record Drawings
   1. After construction, and before operation of the system and final acceptance by the Utility Company, the Contractor is to furnish the Utility Company record drawings on reproducible mylar (in ink), and four sets of signed and sealed prints of each drawing showing the water lines, valves, fire hydrants, connections and all other facilities constructed and dimensioned.
   2. As-built Drawings shall be signed and sealed by a licensed Professional Engineer or Professional Land Surveyor licensed in the State of New Jersey.
   3. Record drawings shall be with full detail and accurate dimensions, setting forth the location of each service, cross, bend, and tee connection to adjacent mains, hydrant, valve, air release valve, blowoffs, etc. At all times possible, dimensions shall be tied to major site features, such as buildings, property corners, roadways, walls, etc.., for future locating purposes.
   4. Record drawings shall show length of each private service from the main to curb box.
   5. All locations shall be via triangulation off permanent physical features which are clearly evident at least 3 feet above ground. Trees and other plantings will not be acceptable for location purposes.
   6. Profile drawings shall be provided to ensure that minimum coverage above the main is provided.

H. The term "Engineer" within this section shall be defined as the Utility Engineer and the Civil/Site Consulting Engineer. All materials required to be submitted "to the Engineer" shall be submitted to both parties.

1.4 SUBMITTALS

A. Make submittals under provisions of Section 01340.

B. Product Data: Submit manufacturer's technical product data and installation instructions for water supply system materials and products.

C. Record Drawings: At project closeout submit record drawings of installed water supply piping in accordance with requirements of Section 01720.

D. The Contractor shall submit to the Utility Company copies of Purchase Orders and Delivery Tickets or Invoices for all materials incorporated into the work.

E. The Contractor shall furnish Shop Drawings, Catalogs, Specification Sheets or other Manufacturer's Literature for all hydrants and gate valves he/she proposes to furnish. Pipe certifications from the manufacturer shall also be provided.

F. The Contractor shall furnish "As-Built" drawings, as noted above, to the Owner and Engineer.

G. The Contractor shall submit a construction schedule to the Water Utility prior to the start of construction. At a minimum, the schedule shall include sequence of construction activity and estimated time of initiation and completion of each phase of work.

1.5 REFERENCE STANDARDS

A. ANSI
1. Ductile Iron Pipe: A21.51.
2. Bituminous Coating: A21.51.
3. Cement-mortar lining: A21.4, (AWWA C104)
4. Pipe Wall: A21.50, (AWWA C150).
5. Ductile Iron Pipe Joints: A21.11, (AWWA C111).
6. Flange: B16.1 or A21.10.
7. Ductile Iron Pipe Fittings: A21.10.
8. Underground Pipe Fittings: A21.11, (AWWA C111).

B. AWWA
1. Gate Valves: Specification C-500.
2. Fire Hydrants: Specification C-502
3. "Standard for Disinfecting Water Mains": Specification C-601.
4. Bacteriological Testing: Specification C-601.

C. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 1995 Edition

1.6 RELATED SECTIONS

A. Section 02110 - Site Clearing

B. Section 02200 - Earthwork - Site

C. Section 02221 – Trenching, Backfilling & Compaction

D. Section 02240 – Dewatering

E. Section 02260 – Excavation Support Systems

PART 2 - PRODUCTS

2.1 PIPES AND PIPE FITTINGS

A. The drawings identify most fittings, bends, tees, restraining measures, alignment changes, etc.., however, the Contractor shall adjust installation requirements to suit actual field conditions encountered and as dictated by the Water Utility's Engineer at no additional cost to the owner.

B. Distribution mains shall be of a minimum diameter of eight (8) inches.

C. Ductile Iron Pipe
   1. Ductile Iron Pipe shall be centrifugally cast annealed and manufactured in accordance with the latest revision of:
      a. ANSI/AWWA C110/A21.10 (fittings)
      b. ANSI/AWWA C111/A21.11 (rubber gasket joints)
      c. ANSI/AWWA C115/A21.15 (Flanged joints)
      d. ANSI/AWWA C151/A21.5 (pipe)
   2. Water mains used for fire prevention shall be ample size, in no case smaller than 6 in and constructed in the locations and alignment shown on the plans.
   3. Pipe shall be double cement mortar lined inside and have an exterior coal-tar, epoxy type coating. The bituminous coating shall be in accordance with the requirements of the latest revision on ANSI A21.51. The cement-mortar lining shall be in accordance with the latest revisions of ANSI A21.4 (AWWA C104), and shall include a bituminous seal coat. The pipe length shall be in nominal 18-20 ft. lengths. The minimum wall thickness shall be Class 52.
   4. Special transition couplings and or gaskets are required for joining different types of pipe. Such transition devices are available. When ordering, the actual outside diameter of the pipe should be given. Push on joints and mechanical joints shall be assembled as specified in ANSI/AWWA C600, latest edition.
   5. Acceptable Manufacturers:
      a. U.S. Pipe
      b. Rockwell
      c. Griffin Pipe Products Co.
      d. Valley Steel Products
      e. Or approved equal per N.J.S.A. 18A:18A-15(d).

D. Ductile Iron Pipe Joints
   1. All pipe underground shall have joints or push-on fittings conforming to the latest revision of ANSI A21.11 (AWWA C111). Where concrete reaction backings (thrust blocks) cannot be installed due to poor soils other pipes in this area, restrained joints shall be used.

2. All exposed pipe (within structures, etc..,) shall have flange joints unless otherwise noted. The flange shall be faced and drilled to the Class 125 standard.
3. Reference Manufacturers:
   a. “Tyton” by U.S. Pipe
   b. “Fastite” by American Cast Iron Pipe Co.
   c. “ Super Bell-Tite” by Griffin Pipe Products Co.
   d. Or approved equal per N.J.S.A. 18A:18A-15(d).

E. Ductile Iron Pipe Fittings
1. All D.I. fittings shall be ductile iron class 250.
2. All buried ductile iron fittings (i.e. valves, couplers, transitions, blow-offs, backflow devices) shall have mechanical joints with retainer glands.
3. All underground pipe fittings shall be ductile iron conforming to the latest revisions of ANSI, A21.11 (AWWA C111).
4. Wye branches, dual purpose solid sleeves and hydrant fittings shall meet ANSI/AWWA C110/A21.10
5. Reference Manufacturers:
   a. U.S. Pipe
   b. Rockwell
   c. Griffin Pipe Products Co.
   d. Valley Steel Products
   e. Geneco Co.
   f. Or approved equal per N.J.S.A. 18A:18A-15(d).

F. Gate Valves
1. Gate valves for water service shall conform with all applicable provisions of ANSI/AWWA C509, latest addition.
2. Distribution Mains shall be valved such that no more than one hydrant will be out of service as a result of a single water main break. They shall be located at each small branch off larger mains. Where eight (8) inch or larger mains intersect, there shall be a valve in each branch. At street intersections, valves shall be located near pipe intersections.
3. Type: Double disc, parallel seat. Underground valves shall be of the non-rising stem type and exposed valves in pits or structures shall be of the open rising stems and yoke type.
4. Seals: "O-ring" unless stuffing box and gland are required. Gland, bushing, and bolts where required, shall be of bronze.
5. End Connections: Bell, mechanical joint, flange (American Standard), or "Ring-tite" to suit the type of pipe in which the valve is installed.
6. Discs and Seat Rings: Bronze mounted.
7. All valves up to 12" in diameter shall be supplied wit mechanical joint ends and shall be suitable for working pressures up to 200 psi with a bubbletight shutdown and shall be installed in the vertical position.
8. Lubrication and O & M instructions and parts lists shall be furnished in quadruplicate for each type of valve provided.
9. All valves shall open counterclockwise, shall be set plumb, and shall be furnished with a 2 inch square operating nut.

10. Buried resilient seat gate valves shall have iron body, inside screw, epoxy coated inside and out, resilient seat, “O” rings seals and mechanical joint ends. Valves shall be of the non-rising stem type and shall be “SUPER-SEAL RESILIENT SEAT NRS” (A-2370) ad manufactured by the Mueller Company or approved equal per N.J.S.A. 18A:18A-15(d).
11. Reference Manufacturers:
    a. Mueller Company
    b. American Darling Company
    c. Or approved equal per N.J.S.A. 18A:18A-15(d).

G. Valve Boxes
1. All buried valve boxes shall be 2-piece sliding type cast iron valve boxes.
2. Where valves are deeper than 4'-0" extension stems shall be provided to within a maximum of 3'-0" from the finished grade.
3. All extension stems shall be of heavy duty construction, shall be coated with two (2) coats of asphaltum varnish, and shall be provided with a self-centering ring to maintain the stem in the center of the valve box.
4. Each valve box shall be of sufficient length to allow a vertical adjustment of approximately 8 inches in either direction.
5. All existing valve boxes and castings that are in good condition shall be reset to new grades. Contractor to replace any broken or deteriorated valve boxes as needed. Contractor to furnish and install new standard and deep valve boxes as required, to reset to new grades.
6. All valve boxes and extension stems shall be set plumb.
7. All water main valve box covers shall have the word “water” and arrow indicating the direction of valve opening cast on.
8. Concrete block shall be poured around all valve boxes not set in paved areas as shown on the detail sheet.
9. Reference Product
    a. Geneco, Tuflite shaft buffalo-type service boxes
    b. Joseph G. Pollard Company, Buffalo-type
    c. Bingham & Taylor (Opelika)
    d. Or approved equal per N.J.S.A. 18A:18A-15(d).
10. All valve boxes shall be approved by the Water Engineer.

H. Backflow Prevention
1. Mains shall be provided with a double check valve assembly to prevent backflow into the water system as required by the Water Company.
2. Gate valves shall be installed at each side of the check valve assembly.
3. The water meter for the assembly shall be furnished.
4. Backflow preventer and water meter shall be installed in a location approved by Borough of South River Utilities.

I. Wet Taps
1. Prior to ordering sleeves, the Contractor shall be responsible for determining the size and material of the water main to be connected to.
2. Valves shall comply with ANSI/AWWA C509, latest edition for resilient seated gate valves.

J. Water Meters
1. Water meters shall be sized according to the Water Utility. Contractor shall coordinate installation of Water Meter with the Water Utility.

2. Meters shall comply with ANSI/AWWA C700, latest edition.

K. Fire Hydrants
1. All Fire Hydrants shall be Mueller Super Centurion A-423 breakaway hydrants.
2. Fire hydrants shall be of the frost proof compression type with 6 inch hub inlet, 5 inch hydrant valve, two 2-1/2 inch hose nozzles, (National Standard Threads) and one 4-1/2 inch steamer nozzle (4" dia. x 6 7/8" per inch threads).
3. All Fire Hydrants shall be suitably restrained against thrust.
4. Hydrant outlet threads shall have the NH external threads for the size outlet(s) supplied as specified in NFPA 1963, Standard for Fire Hose Connections.
   a. Where local fire department connections do not conform to NFPA 1963 the authority having jurisdiction shall designate the connection to be used.
5. Hydrants shall be 8-3/4 inch minimum diameter barrels, self lubricating "O-ring" seals, suitable for 4-1/2 feet cover and the standpipe as well as the main valve rod shall be equipped with breakable coupling. Hydrants shall be made in accordance with AWWA Specification C-502 latest revision.
6. Reference Product:
   a. American Darling Company, Model B-62-B.
   b. Mueller Company, Centurion Model A-423.

PART 3 – EXECUTION

3.1 INSTALLATION OF PIPE AND FITTINGS

A. Laying Water Pipe
1. The laying conditions for ductile-iron pipe shall be completed in accordance with ANSI/AWWA C150/A21.50 and the approved details.
2. All pipe, fittings, valves, hydrants, and other appurtenances shall be inspected by the Contractor prior to installation. Defective materials shall be marked and held for inspection by the Contractor who may prescribe corrective repairs or reject the material.
3. All pipe shall be laid and maintained at required lines and grades shown on the approved plans, as called for in these specifications or as may be directed by the Engineer or Water Utility having jurisdiction Fittings, valves, air vents, and hydrants shall be installed at required locations with valve and hydrant stems properly set. The axis of fittings shall align with the longitudinal axis of the pipe.
   a. The Contractor shall establish all bench marks and position of control points for water main and service installation. From these established controls the Contractor shall run all offset lines, set and drive stakes, and take all other measurements in order to lay out the work in accordance with the intent of the Contract Documents. After the Contractor has set elevations for the work, the Water Utility Engineer will check such work for alignment, grade and location of steel, piping and equipment.

4. It shall be the responsibility of the Contractor to provide adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of work. When the required grade or alignment of the pipe is obstructed by existing utility structures (such as conduits, ducts, pipes, branch connections to main sewers, or main drops), the obstruction shall be permanently supported, relocated, removed, reconstructed, or bypassed by the Contractor as provided in the specifications and in cooperation with the owners of such utility structures.
5. Pipes, valves, hydrants, and fittings shall be inspected for damage when received and shall be inspected prior to installation. Bolted joints shall be checked for proper torquing of bolts.
6. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit, or any foreign materials before the pipe is laid.
7. Foreign materials shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other materials shall be placed in the pipe at any time. No trench water shall be allowed to enter the pipe fittings. Before lowering and while suspended, the pipe shall be inspected for defects.
8. At times when pipe-laying is not in progress, the open ends of pipe shall be closed by a watertight plug. The plug shall be fitted with a means for venting. When practical, the plug shall remain in place until the trench is completely dry. Care must be taken to prevent pipe flotation, if the trench fills with water.
    a. Prior to removal of the plug for extending the line or for any other reason, air and/or water pressure of the line shall be released.
9. Under no circumstances shall water main materials be dropped or dumped. Pipe shall not be rolled or skidded against other pipe materials.
10. Proper implements, tools, and facilities shall be provided and used for the safe and convenient performance of the work.
11. All pipe, fittings, valves, and hydrants shall be lowered carefully into the trench by means of a backhoe, a crane, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials shall be dropped or dumped into the trench.
12. Where practical, the trench should be dewatered prior to installation of the pipe.
13. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
14. Pipes shall bear throughout their full length and shall not be supported by the bell ends only or by blocks.
    a. If ground is soft, or of a quicksand nature, special provisions shall be made for supporting pipe. For ordinary conditions of soft ground, longitudinal wooden stringers with cross ties will give good results.
15. The depth of cover over water pipes shall be determined by the maximum depth of frost penetration in the locality where the pipe is laid. The top of the pipe shall be buried not less than 4.0 feet below final grade as specified in N.J.A.C. 7:10-11:10.
16. Except where necessary in making connections with other lines and as authorized by the Site Engineer, pipe shall be laid with the bells facing in the direction of laying and for lines on an appreciable slope, the bell shall, at the direction of the engineer, face upgrade.

a. When the main is being laid on a slope, the pipe is frequently laid with the bells facing uphill for ease of installation.

17. Not less than two lengths of pipe shall be in position with packing installed and earthfill tamped alongside the pipe, ahead of each joint before it is completed, except at closures.
18. Pipelines or runs intended to be straight shall be so laid. Deflections from straight line or grade made necessary by vertical curves or horizontal curves or offsets shall not exceed ½ inch per linear foot of pipe between the centerline extended of any two connected pipes.
19. All gasketed joints shall be made in strict accordance with the recommendations of the joint manufacturer.
20. Joints shall be assembled by persons familiar with the particular materials used and in accordance with the manufacturer's instructions and specifications.
21. All bolted joint accessories shall be cleaned and thoroughly coated with asphalt or other corrosion-retarding material after installation.
22. All fittings at bends in mains shall be restrained with threaded rods and a concrete thrust block as shown on the Drawings. Care must be taken as not to cover MJ bolts, rods and nuts with concrete.
23. All exposed pipe fittings, within structures, etc.., shall have flange joints. The flange shall be faced and drilled to the 125# standard in accordance with the latest revisions of ANSI b16.1 or A21.10.
24. Provide and coordinate final connection to public water main(s) with the appropriate utility company/agency.
25. Verify in advance of construction whether the governing utility company/agency will install the required wet-tap and line valve and whether there is a fee involved. The contractor shall pay the required fee and/or install the wet-taps and line valves as appropriate.
26. Provide connections to water and fire suppression service lines exiting the building, which are installed by the plumbing contractor up to five feet beyond the exterior walls.
27. When it is necessary to deflect pipe from a straight line in either the horizontal or vertical plane, the amount of pipe deflection shall not exceed that shown in Tables 4 or 5 of ANSI/AWWA C600, latest edition. The deflections listed are maximum deflections and should not be exceeded. Deflection should be limited to 80 percent of the values shown.
28. Cutting pipe for insertion of valves, fittings, or closure pieces shall be done in conformance with all safety recommendations of the manufacturer of the cutting equipment. Cutting shall be done in a safe, workmanlike manner without creating damage to the pipe or cement-mortar lining.
    a. Existing gray-iron pipe may be cut using an abrasive pipe saw, rotary wheel-cutter, guillotine pipe saw, milling wheel saw, or oxyacetylene torch if recommended by te pipe manufacturer.
    b. Ductile-iron pipe may be cut using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, milling saw wheel, or oxyacetylene torch if recommended by the pipe manufacturer.
    c. Cut ends and rough edges shall be ground smooth, and, for push-on joint connections, the cut end shall be beveled by methods recommended by the manufacturer.

d. ANSI/AWWA C151/A21.51 requires factory gauging of the spigot and to ensure that the outside diameter of each spigot and falls within the tolerances stipulated in the standard. Accordingly, pipes selected for cutting should be field-gauged. A mechanical joint (MG) gland inserted over the barrel might serve as a convenient indicator for this purpose.

B. Restraining Water and Fire Mains

1. All tees, plugs, caps, bends, and hydrant branches shall be restrained against movement.
2. Thrust blocks are satisfactory where soil is suitable. The thrust blocks shall be of a concrete mix not leaner than one part cement, two and one-half parts sand, and five parts stone. Thrust blocks shall be placed between undisturbed earth and the fitting to be restrained, and shall be of such bearing as to ensure adequate resistance to the thrust to be encountered. In general, thrust blocks shall be so placed that the joints will be accessible for inspection and repair.
   a. Concrete Thrust Blocks shall be poured at all alignment changes as specified in the thrust block detail in the construction drawings.
3. Pipe clamps and tie-rods, thrust blocks, locked mechanical or push-on joints, mechanical joints utilizing set screw retainer glands, or other approved methods or devices shall be used. The type of pipe, soil conditions, and available space determine the method.
   a. Clamps shall be:
      1/2 in. x 2 in. (12.7 mm x 50.8 mm) for pipe 4 in. to 6 in.
      5/8 in. x 2 1/2 in. (15.9 mm x 63.5 mm) for pipe 8 in. x 10 in.
      5/8 in. x 3 in. (15.9 mm x 76.2 mm) for pipe 12 in.
   b. Bolt holes shall be 1/16 in. (1.16 mm) diameter larger that bolts.
   c. Minimum rod size shall be 5/8 in. (15.9 mm) diameter.

	Number of Bolts			
Nominal Pipe Size (inches)	**5/8 in. (15.9 mm)**	**3/4 in. (19.1 mm)**	**7/8 in. (22.2 mm)**	**1 in. (25.4 mm)**
4	2	--	--	--
6	2	--	--	--
8	3	2	--	--
10	4	3	2	--
12	6	4	3	2
14	8	5	4	3
16	10	7	5	4

   d. When using bolting rods, the diameter of mechanical joint bolts limits the size of rods to 3/4 in. (19.1 mm)
   e. When using clamps, rods shall be used in pairs, two to a clamp.
   f. When using combinations of rods greater in number than two, the rods shall be symmetrically spaced.
   g. Clamp bolts shall be:
      5/8 in. (15.9 mm) diameter for pipe 4 in., 6 in., and 8 in.
      3/4 in. (19.1 mm) diameter for pipe 10 in.

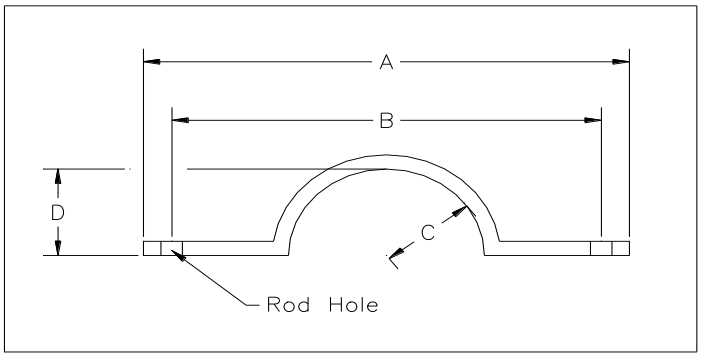
7/8 in. (22.2 mm) diameter for pipe 12 in.

h. Washers can be cast iron or steel, round or square.
Dimensions for cast iron washers shall be
5/8 in. x 3 in. (15.9 mm x 76.2 mm) for pipe 4 in., 6 in., 8 in., and 10 in.
3/4 in. x 3 1/2 in. (19.1 mm x 88.9 mm) for pipe 12 in.
Dimensions for steel washers shall be
1/2 in. x 3 in. (12.7 mm x 76.2 mm) for pipe 4 in., 6 in., 8 in., and 10 in.
1/2 in. x 3 1/2 in. (12.7 mm x 88.9 mm) for pipe 12 in.

i. Holes shall be 1/8 in. (3.2 mm) larger than rods.

4. Restraint Straps for Tees
   a. Straps shall be
   5/8 in. (15.9 mm) thick and 2 ½ in. (63.5 mm) wide for pipe 4 in., 6 in., 8 in., and 10 in.
   5/8 in. (15.9 mm) thick and 3 in. (76.2 mm) wide for pipe 12 in
   b. Rod holes shall be 1/16 in. (1.6 mm) larger than rods.

Restraint Straps for Tees



Nominal Pipe Size	A		B		C		D	
in.	in.	mm	in.	mm	in.	mm	in.	mm
4	12 ½	318	10 1/8	257	2 ½	64	1 ¾	44
6	14 ½	368	12 1/8	308	3 9/16	90	2 13/16	71
8	16 ¾	425	14 3/8	365	4 21/32	118	3 29/32	99
10	19 1/16	484	16 11/16	424	5 ¾	146	5	127
12	22 5/16	567	19 3/16	487	5 7/8	171	5 7/8	149

5. Threaded sections of rods shall not be formed or bent.
6. Material used for clamps, rods, rod couplings or turnbuckles, bolts, washers, restraint straps, and plug straps shall be of material having physical and chemical characteristics such that its deterioration under stress can be predicted with reliability.
7. After installation, rods, nuts, bolts, washers, clamps, and other restraining devices, except thrust blocks, shall be cleaned and thoroughly coated with a bituminous or other acceptable corrosion-retarding material.

8. On steep grades, mains shall be properly restrained to prevent slipping. The pipe shall be restrained at the bottom of a hill and at any turns (lateral or vertical). The method for restraining pipe bends at uphill or downhill changes in alignment shall be as shown in the detail for "Looping Water Mains" around obstructions. If possible, the restraining shall also be done either to natural rock or by means of suitable piers or gravity thrust blocks built on the downhill side of the bell. Bell ends shall be installed facing uphill. Straight runs on hills shall be restrained as determined by the design engineer.

C. Trench Construction

1. The trench width at the ground surface may vary with the trench depth, the nature of soils encountered, existence of any pavement, and the proximity of adjacent structures.
   a. The minimum clear width of an unsupported or supported trench measured at the centerline of the pipe shall be at least 18 inches or the pipe outside diameter plus 12 inches, whichever is greater.
   b. Where embedment compaction is required, the trench shall be wide enough to accommodate the compaction equipment.
   c. Whenever possible, the clear width of the trench at the top of the pipe should not exceed the pipe outside diameter plus 24 inches.
2. The trench shall be excavated to the depth that permits pipe to be laid at the elevations shown on the engineering drawings or with the required depth of cover. The depth of cover shall be measured from the finished grade or the surface of the permanent improvement to the top of the pipe barrel.
3. The trench bottom shall be constructed to provide a firm, stable, and uniform support for the full length of the pipe. Blocking shall not be used to change pipe grade or to intermittently support pipe across excavated sections. Bell holes at each joint shall be provided to permit the joint to be assembled and pipe to be supported properly.
4. Ledge rock, boulders, and cobbles, and large stones shall be removed to provide at least 6 inches of embedment cushion on each side of and below all pipe and appurtenances. The excavation shall be sufficiently wide to enable proper placement of the embedment specified by the Purchaser. When excavation is completed, excavation material shall be placed, leveled, and compacted to provide a proper cushion for the pipe. Such embedment shall be dense graded aggregate as specified by NJDOT.
5. If the trench passes over s ewer or other previous excavation, the trench bottom shall be compacted to provide support equal to that of the undisturbed native soil or conform to specific regulatory requirements that preclude damage to the existing installed facility.
6. Where all unstable subgrade conditions exist that, in the opinion of the , cannot support the pipe, an alternative foundation shall be provided. At the discretion of the , ans additional depth shall be excavated and refilled to pipe foundation grade with embedment material. Any part of the trench excavated below grade shall be backfilled to grade and compacted to the required density. Such embedment shall be dense graded aggregate as specified by NJDOT.
7. Where running or standing water occurs in a trench bottom or where the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps. The trench shall be kept free from water during installation operations by suitable means, such as well points or pervious underdrain bedding, until the pipe has been installed and backfill placed and compacted to a sufficient height to prevent pipe flotation.
8. The Contractor shall dewater all excavations promptly and continuously throughout the progress of the work. The contractor shall protect uncompleted

D. Backfilling: Do not backfill until trenches and pipe work have been inspected by appropriate authority, except as further defined in Section 2150. Read Section 2150 carefully, since it contains backfilling requirements that are not standard practice, but are required in this project due to the on-site geology.

1. Use imported granular fill in all pipe trenches. Pipe trench bedding shall be sand, no clean stone is permitted. On-site soils are unsuitable for use as backfill due to their non-homogenous nature. Backfill shall be tamped in layers under and around pipes (and puddled where possible) to prevent settlement or lateral movement, and shall contain no ashes, cinders, refuse, organic matter, or other corrosive materials.
2. Rocks shall not be placed in trenches. Frozen earth shall not be used for backfilling.
3. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, frozen soil, or other unsuitable material. See note 1 above.
4 From 1 foot above the top of the pipe to the subgrade of the pavement, material containing stones up to 8 inches in their greatest dimension may be used, unless otherwise specified.
5. When special backfill compaction procedures are required, they shall be accomplished in accordance with project specifications or applicable federal, State, and local regulations.
6. Newly installed pipelines are normally tested after backfilling. When unusual conditions require that pressure and leakage testing be accomplished before completion of backfilling or with pipe joints accessible for examination, sufficient backfill material shall be placed over the pipe barrel between the joints to prevent movement, and due consideration shall be given to restraining thrust forces during the testing. In particular, restrained-joint systems, which derive their stability from the interaction of the pipe and soil, should be backfilled prior to testing.

E. Polyethylene Wrapping:

1. Provide 8 mil thick polyethylene tube if and where indicated on the drawings. Installation in accordance with ANSI/AWWA C105/A21.5 Method A.

F. Reddy Bolts and Duc-Lugs

1. Reference Product:
   a. Stellar Corporation

G. 5/8" Threaded Rod

1. Reference Product:
   a. Stellar Corporation 5/8" All Thread Rod.

3.2 INSTALLATION OF FIRE SERVICE

A. Fire Hydrants

1. The center of a hose outlet shall be not less than 18 in. above final grade.
2. Fire Hydrants shall be constructed per detail. All fittings shall be restrained.
3. Fire Hydrants shall be installed complete with auxiliary isolation resilient seat gate valve, six inch (6") mechanical joint elbow, adjustable cast iron valve box, six inch (6") tee off distribution main, thrust blocks, concrete blocks, clean one and one-half (1 2@) crushed stone, polyethylene sheathing, granular backfill and all other material and labor needed to install the hydrant assembly in accordance with standard hydrant detail.

4. Hydrant, valve stem and valve box shall be set plumb. Valve box shall be centered and installed so that the auxiliary valve can easily be operated from the street level by use of proper valve wrench. Cover of valve box shall be one inch (1") above surrounding ground level in non-paved areas and flush to ground in paved areas.
5. Hydrants shall be placed so that the barrel shall be 24 inches from face of curb, with the four and one half (4 2) pumper nozzle facing the street. The hydrant elbow shall be placed on a structural foundation as shown on the hydrant detail.
    a. The back side of the hydrant opposite the pipe connection shall be firmly braced against the vertical face of the trench by means of a poured concrete thrust block.
    b. The bottom of the ditch and lower part of the hydrant barrel shall be surrounded with coarse gravel so that water released from the standpipe by the drain valve may escape quickly.
6. Hydrant must be firmly supported underground all around the standpipe since the proper working of the safety breakable section depends on the unyielding support of the ground standpipe. Solid ground support shall be at ground level line mark of the hydrant barrel, resulting in center line of hose and pumper nozzles being eighteen inches (18") above grade. The backfill around the hydrant barrel, therefore, must be carefully and thoroughly compacted.
7. When a hydrant is ready for service, it shall be opened and closed to see that all parts are in working condition . After closing hydrant, the standpipe interior shall be inspected to make sure of proper drainage.
8. Until the hydrants and adjacent piping has been tested and accepted, the Contractor shall securely cover the hydrants with burlap to clearly indicate that they are not in service.
9. Bury depth (grade to bottom of connecting pipe) shall not be less than 3.5' to top of pipe.

3.3 SAFETY

A. Contractor shall furnish the with a certification that an experienced foreman superintendent trained in safety will be present at all times that construction activities are underway.

3.4 FLUSHING

A. All mains shall be flushed thoroughly with water after backfilling is complete. All dirt, rubbish and debris shall be removed from the mains.

B. The contractor shall furnish and install all temporary piping, valves, corporations, fittings, pumps, hose and appurtenances which may be necessary to properly flush the pipeline.

C. Flushing operations shall be in strict conformance with NJDEP requirements and water shall be discharged so as not to cause any soil erosion or sedimentation problems.

D. The Contractor shall obtain permission from the Water Engineer when he/she wishes to obtain flushing water from the Water Utility's water system. Hydrants or valves shall be operated by Water Utility or UWMA Personnel only. Under no circumstances shall the Contractor operate any valve or hydrant whether or not those facilities have been accepted by the . Flushing operations shall be conducted at the sole convenience of the Water Utility and only after 48 hours advance notice to the Water Utility.

3.5 STERILIZATION AND TESTING OF MAINS

A. Sterilization

1. All finished water piping shall be thoroughly cleaned, flushed, and disinfected in accordance with the requirements of the latest edition of ANSI/AWWA C651 and the New Jersey Safe Drinking Water Act, except as herein otherwise noted. The continuous-feed methods specified in Section 5.2.3 of ANSI/AWWA C651 shall be preferred.
2. Before being placed in service, all new water lines or extensions to existing systems shall be chlorinated to the satisfaction of the Water Utility and Health Departments, local municipal inspector, and/or municipal water company engineer. Contact appropriate agencies to schedule and coordinate appropriate inspections.
3. Prior to chlorination, all dirt and foreign matter shall be removed by a thorough flushing. The minimum rate of flow shall not be less than the water demand rate of the system, which is determined by the system design, or not less than that necessary to provide a velocity of 10 ft/sec (3 m/s), whichever is greater. For all systems, the flushing operations shall be continued for a sufficient time to ensure thorough cleaning. When planning the flushing operations, consideration shall be given to disposal of the water issuing from the test outlets. The flushing shall occur after pressure testing and trench backfilling.

Flow Required to Produce a Velocity of 10 ft/sec (3 m/s) in Pipes

Nominal Pipe Size	Flow Rate	
(in.)	(gpm)	(L/min.)
4	390	1476
6	880	3331
8	1560	5905
10	2440	9235
12	3520	13323

When the flow rate as listed in this table cannot be verified or met, supply piping shall be flushed at the maximum flow rate available to the system under fire conditions.

4. A chlorine gas-water mixture of hypochlorite solution shall be applied by means of a solution-feed device, or the gas shall be fed directly from a chlorine cylinder equipped with proper devices for regulating the rate of low and the effective diffusion of gas within the pipe.
5. Water from the existing distribution system or other source of supply shall be controlled to flow very slowly into the newly laid pipe line during the application of chlorine, in such proportion that the chlorine dose applied shall be at least 40 to 50 parts per million.
6. Treated water shall be retained in the pipe long enough to destroy all spore-forming bacteria. This period shall be at least 3 hours and preferably longer as directed by the local inspector.

7. After the chlorine treated water has been retained for the required time, the chlorine residue at the pipe extremities and at other representative points shall be at least 5 parts per million.
8. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe line at its extremities until the replacement water throughout its length shall upon testing be equal to the water quality served the public from the existing water supply system.
9. Should the initial treatment in the opinion of the regulatory officials or Engineer prove ineffective, the chlorination procedure shall be repeated until confirmed test shows that water sampled from the newly laid pipe conforms to the requirements.
10. All water mains shall be disinfected in accordance with AWWA C601 "Standard for Disinfecting Water Mains".
11. Provide written certification from local health department that sterilization procedures have been accepted and the system is suitable for operation.
12. The installation of chlorine tablets within the pipeline during construction shall not be an acceptable method for providing disinfection of the mains.
13. The Contractor is responsible to provide all materials, equipment, and labor to perform the flushing and disinfection of the new water lines as many times as is necessary if the initial treatment is not adequate and until tests show the waterline meets the required aforementioned requirements.
14. Heavily chlorinated waters must first be neutralized prior to discharge in accordance with federal, State, and local regulations.
15. Following the completion of the flushing and disinfection procedures, samples shall be taken and analyzed by the Health Department. Bacteriologic testing shall be conducted at the sole convenience of the Health Department and only after 48 hours advance notice to the Department. No portion of the new system may be open to the existing system without first passing the bacteriologic testing.

B. Hydrostatic Testing
1. All pipe lines shall be hydrostatically tested to a minimum of 150 psi or 1.5 times the working pressure of the line, whichever is greater, for 2 hours When all joints being subject to testing are found to be tight at this excess pressure, in the presence of the engineer. The cost of testing the pipe lines shall be borne by the contractor, who must furnish all necessary equipment, material , and labor for the tests. All pipe shall be tested for a minimum of two hours with a leakage not to exceed 11.65 gallons per inch-diameter per mile per 24 hours, while maintaining the test pressure with an allowable tolerance of 5 psi maximum.
    a. The above maximum leakage value takes into account any leakage across valves.
    b. In any case, any visible leaks shall be corrected, regardless of the overall leakage rate.
    c. Should the test indicate a leakage greater than that permitted, the contractor shall locate and repair or rebuild the defective portion of the main responsible for the leak. The test shall then be repeated until it is found that the leakage is within the allowable limit.
2. The Contractor shall install corporations within the pipeline for the purpose of air release, pressurization, and disinfection for water mains. Upon successful testing of the pipeline, the corporations will be closed and capped with a threaded brass cap.
3. All new private fire service mains shall be tested hydrostatically at not less than 200 psi (13.8 bars) pressure for two hours, or at 50 psi (3.4 bars) in excess of the maximum static pressure when the maximum static pressure is in excess of 150 psi (10.3 bars)

4. The amount of leakage in buried piping shall be measured at the specific test pressure by pumping from a calibrated container. For new pipe, the amount of leakage at the joints shall not exceed two quarts per hour (1.89 L/hr) per 100 gaskets or joints irrespective of pipe diameter. No visible leakage shall be allowed in aboveground piping.
5. The amount of allowable leakage specified in item #4 shall be permitted to be increased by one fluid once per inch valve diameter per hour (30 ml/25 mm/h) for each metal seated valve isolating the test section. If dry barrel hydrants are tested with te main valve open, so the hydrants are under pressure, an additional five ounces per minute (150 ml/min) leakage is permitted for each hydrant.
6. Tests shall be made by the contractor in the presence of the authority having jurisdiction, and if requested, by a representative of the owner.
7. Additives, corrosive chemicals such as sodium silicate, brine, or other chemicals shall not be used while hydrostatically testing systems or for stopping leaks.
8. Each hydrant shall be fully opened and closed under system water pressure and dry barrel hydrants checked for proper drainage. Where fire pumps are available, this shall be done with the pumps running.
9. All control valves shall be fully closed and opened under system water pressure to ensure proper operation.

C. Bacteriological Testing shall be as specified in AWWA Designation C-601.

END OF SECTION 02740

SECTION 02750 - LANDSCAPING

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. Lawns: Seeding requirements are found on the Soil Erosion & Sediment Control Plan.
   2. Topsoil and soil amendments.
   3. Fertilizers and mulches.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 2 Section "Site Clearing" for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.
   2. Division 2 Section "Earthwork" for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
   1. Manufacturer's certified analysis for standard products.
   2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
   3. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and 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.

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 address of architects and owners, and other information specified.

D. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
   1. Analysis of existing surface soil.

E. Planting schedule indicating anticipated dates and locations for each type of planting.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

C. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of existing topsoil.
   1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.6 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

1.7 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.8 WARRANTY

A. 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.

B. Remove and replace dead planting materials immediately unless required to plant in the two (2) succeeding planting seasons.

C. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

D. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.9 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
   1. Seeded Lawns: 60 days after date of Substantial Completion.
      a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4 inches.
   1. Water lawn at the minimum rate of 1 inch per week.

D. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent 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.

E. Postfertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
   1. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. of lawn area.

PART 2 PRODUCTS

2.1 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.
   1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Screen and clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
   2. Dispose of excess topsoil off site in a legal manner.

2.2 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.
   1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

F. Peat Humus: For acid-tolerant trees and shrubs, provide moss peat, with a pH range of 3.2 to 4.5, coarse fibrous texture, medium-divided sphagnum moss peat or reed-sedge peat.

G. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
   When site treated, mix with at least 0.15 lb of ammonium nitrate or 0.25 lb of ammonium sulfate per cu. ft. of loose sawdust or ground bark.

H. 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.

I. Herbicides: EPA registered and approved, of type recommended by manufacturer.

J. Water: Potable.

2.3 FERTILIZER

A. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.4 MULCHES

A. Wood-fiber or paper fiber mulch. Shall be made from wood, plant fibers or paper containing no growth or germination inhibiting materials, used at the rate of 1500 lbs. per acre (or as recommended by the product manufacturer) and may be applied by manually. This mulch shall not be mixed in the tank with seed. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.

B. Pelletized mulch. Compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers and coloring agents. The dry pellets, when applied to a seeded area and watered, form a mulch mat. Pelletized mulch shall be applied in accordance with the manufacturer's recommendations. Mulch may be applied by hand at the rate of 60-75 lbs/1000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation areas, seeded areas

where weed-seed free mulch is desired or on sites where straw mulch and tackifier agent are not practical or desirable.

2.5 WEED-CONTROL BARRIERS

A. Sheet Polyethylene: Black, 0.006-inch minimum thickness.

2.6 EROSION-CONTROL MATERIALS

A. 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. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb per sq. yd. minimum, with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

2.7 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

B. Trunk-Wrap Tape: Two layers of crinkled paper cemented together with bituminous material, 4 inches wide minimum, with stretch factor of 33 percent.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. Verify the location of underground utilities.

3.2 PREPARATION

A. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

B. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.
   1. A "Planting Soil Amendments Schedule" is included at the end of this Section.

D. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

1. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants.

3.4 LAWN PLANTING PREPARATION

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous materials.

C. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.
   1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

D. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:
   1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.
   2. Till surface soil to a depth of at least 6 inches. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.
   3. Clean surface soil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
   4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.

E. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1 inch in any dimension, and other objects that may interfere with planting or maintenance operations.

F. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.5 SEEDING NEW LAWNS

A. Sow seed with a spreader or by hand. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.
   1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

B. Sow seed at the rates indicated on the plans.

C. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.

D. Protect seeded slopes exceeding 1:4 against erosion with erosion-control blankets installed and stapled according to manufacturer's recommendations.

E. Protect seeded slopes exceeding 1:6 against erosion with jute or coir-fiber erosion-control mesh installed and stapled according to manufacturer's recommendations.

F. Spread straw mulch uniformly at a minimum rate of 2 tons per acre to form a continuous blanket 1-1/2 inches loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into topsoil by suitable mechanical equipment.

Anchor straw mulch by spraying with asphalt-emulsion tackifier at the rate of 10 to 13 gal. per 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 against hot, dry weather or drying winds by applying peat mulch within 24 hours after completion of seeding operations. Soak and scatter uniformly to a depth of 3/16 inch thick and roll to a smooth surface.

3.6 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.

B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of it off the Owner's property.

E. Till stripped, bare, and compacted areas thoroughly to a depth of 6 inches.

F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Provide new planting soil as required to fill low spots and meet new finish grades.

G. Apply seed and protect with straw mulch as required for new lawns.

H. Water newly planted areas and keep moist until new grass is established.

3.7 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

3.9 PLANTING SOIL AMENDMENTS SCHEDULE

A. Lawns: Provide soil amendments based upon recommendations made by qualified professionals and recognized standards, subject to Owner's approval:

3.10 MAINTENANCE OF SEEDED LAWNS

A. Contractor shall maintain seeded lawns until acceptance by the Landscape Architect and Engineer.

B. The Contractor's responsibility for maintenance is to be continuous to the time of final acceptance of the work. It is to include, but not be limited to, reseeding of areas that have not rooted properly, watering, mowing, weeding and reworking as follows:
   1. Reseeding of any bare areas.
   2. Proper and adequate watering.
   3. Refilling of rain washed gullies and rutted areas.
   4. Refertilization and lime application if recommended by soil tests and weed and pest control.
   5. Reworking and reseeding of any areas which fail to show a uniform stand or grass shall be done at the Contractor's expense with the same seed mixture applied at the rate originally used and repeated until all areas are covered with a satisfactory stand of grass.
   6. Mowing grass and weeks to a height of 1 ½" to 2" when grass attains height of 4" or when growth tends to smother new seedlings. A minimum of three mowings are to be completed before final inspection and a minimum of three mowings are to be completed after grass has been accepted.
   7. If seeded in fall and not given 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.

END OF SECTION 02750

SECTION 02751 – CEMENT CONCRETE PAVEMENT

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 exterior cement concrete pavement for the following:
   1. Aprons & ramps.
   2. Walkway and pads.
   3. Sitework related foundations.

B. Related Sections include the following:
   1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.
   2. Division 3 Section "Cast-in-Place Concrete" for general building applications of concrete.

1.3 REFERENCES

A. "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.

B. ACI 318-83 - Building Code Requirements for Reinforced Concrete.

C. ACI 302 - Guide for Concrete Floor and Slab Construction.

D. ACI 305R-77 (R1982) - Hot Weather Concreting.

E. ACI 306R-78 - Cold Weather Concreting.

F. ASTM A-185-90a - Steel Welded Wire Fabric, Plain, For Concrete Reinforcement.

G. ASTM A-615-90 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

H. ASTM C-31-90 - Making and Curing Concrete Test Specimens in the Field.

I. ASTM C-33-90 - Concrete Aggregates.

J. ASTM C-94-90 - Ready-Mixed Concrete.

K. ASTM C-143-90 - Slump of Portland Cement Concrete.

L. ASTM C-150-89 - Portland Cement.

M. ASTM C-172-90 - Sampling Freshly Mixed Concrete.

N. ASTM C-173-78 - Air Content of Freshly Mixed Concrete by the Volumetric Method.

O. ASTM C-231-89 - Air Content of Freshly Mixed Concrete by the Pressure Method.

P. ASTM C-260-86 - Air-Entraining Admixtures for Concrete.

Q. ASTM C-309-89 - Liquid Membrane-Forming Compounds for Curing Concrete.

R. ASTM C-494-86 - Chemical Admixtures for Concrete.

S. ASTM D-994-71 - Performed Expansion Joint Filler for Concrete (Bituminous Type).

T. MCTCB - Maine Concrete Testing Certification Board.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials.

D. Submit Shop Drawings showing control joint layout for slabs.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed pavement 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: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

C. Testing Agency Qualifications: All concrete construction shall be inspected and tested in accordance with specification Section 02050.

D. Source Limitations: Obtain each type or class of cement material of the same brand from the same manufacturer's plant and each aggregate from one source.

E. ACI Publications: Comply with ACI 301, “Specification for Structural Concrete for Buildings”; ACI 318, “Building Code Requirements for Reinforced Concrete”; and Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice”.

F. Minimum Field Testing Requirements: Field testing of concrete mixes shall be in accordance with Section 903.03.05 of the NJ DOTSS.

G. Mockups: When/if requested, cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.
1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.

2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 PRODUCTS

2.1 FORMS

A. Form materials shall conform to NJDOTSS Section 405.

B. Form materials shall consist of plywood, metal, metal-framed plywood, steel, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces. Materials shall resist movement during concrete placement and to retain horizontal straight forms, free of distortion and defects. Use flexible or curved forms for curves of radius of 100 feet of less.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.

C. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 , deformed.

D. Epoxy-Coated Reinforcement Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, deformed bars.

E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60), deformed bars; assembled with clips.

F. Plain Steel Wire: ASTM A 82, as drawn.

G. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A coated, plain steel.

H. Plastic-surfaced or reinforced-paper-covered dowels are available from proprietary sources.

I. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

J. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.

K. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

L. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

J. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports.

2.3 CONCRETE MATERIALS

A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.

B. Portland Cement: ASTM C 150, Type I or II.
1. Fly Ash: ASTM C 618, Class F or C.

C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
1. Class: 4S.
2. Maximum Aggregate Size: 3/4 inches nominal.
3. Do not use fine or coarse aggregates containing substances that cause spalling.

D. Water: Potable.

E. Concrete curb and gutters shall conform to NJDOTSS Section 605.02, except that the minimum 28 day compressive strength shall be 4000 psi.

F. Concrete sidewalks, aprons, ramps, pads, and other miscellaneous flatwork shall conform to NJDOTSS Section 607.02, except that the minimum 28 day compressive strength shall be 4000 psi.

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. Air-entrained concrete shall be used where concrete is exposed to the weather.

B. Air-Entraining Admixture: ASTM C 260.

C. Water Reducing Admixture: "Eucon 75" by The Euclid Chemical Company, Polyheed Non-Chloride by Master Builders, WRDA with Hycol by Grace Construction Products, or Platocrete 160" by Sika Chemical Corporation or approved equal. The admixture shall conform to ASTM C-494, Type A, and not contain more chloride ions than are present in municipal drinking water.

D. Non-Corrosive, Non-Chloride Accelerator: "Accelguard80" by The Euclid Chemical Co., or approved equal. The admixture shall conform to ASTM C-494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (or at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures.

1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
    a. “Accelguard80" by The Euclid Chemical Co.
    b. “Plastocrete 161FL”, by Sika
    c. or approved equal.

E. Air Entraining Admixture: Conform to ASTM C-260, "Darex AEA" as manufactured by The Construction Products Division of W.R. Grace & Company, or approved equal.

1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
    a. “Darex AEA" by WR Grace Co.
    b. “Eucon Air Mix 250”, by Euclid
    c. or approved equal.

F. Prohibited Admixture: Calcium chloride, thiocyanates or admixture containing more than 0.05% chloride ions are not permitted.

G. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Architect.

H. Curing Paper: Water, reinforced appear; "Orange Label Sisalkraft," as manufactured by the American Sisalkraft Corporation, "Scuf-Champ,: as manufactured by Ludlow Papers, "Flor-Cur W/S," as manufactured by Glas-Kraft, or approved equal.

I. Moisture Barrier: "J" Pro Vapor Shield, Super Sampson SS4 or Tu Tuff 4, or approved equal.

J. Concrete Slab Sealer: Prosoco Inc., SLX 100 penetrating sealer, or approved equal.

1. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
    a. “SLX 100” by Prosoco, Inc.
    b. “Chemstop WB” by Euclid Co.
    c. or approved equal.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation retarder below temporarily reduces moisture loss from concrete surfaces awaiting finishing in hot, dry, and windy conditions. Evaporation retarders are neither curing compounds nor chemical surface retarders used to delay concrete setting.

E. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

F. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

G. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

H. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

I. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

J. Products: Subject to compliance with requirements, provide one of the following or approved equal:
   1. Evaporation Retarder:
      a. Cimfilm; Axim Concrete Technologies.
      b. Finishing Aid Concentrate; Burke Group, LLC (The).
      c. Spray-Film; ChemMasters.
      d. Aquafilm; Conspec Marketing & Manufacturing Co., Inc.
      e. Sure Film; Dayton Superior Corporation.
      f. Eucobar; Euclid Chemical Co.
      g. Vapor Aid; Kaufman Products, Inc.
      h. Lambco Skin; Lambert Corporation.
      i. E-Con; L&M Construction Chemicals, Inc.
      j. Confilm; Master Builders, Inc.
      k. Waterhold; Metalcrete Industries.
      l. Rich Film; Richmond Screw Anchor Co.
      m. SikaFilm; Sika Corporation.
      n. Finishing Aid; Symons Corporation.
      o. Certi-Vex EnvioAssist; Vexcon Chemicals, Inc.
      p. or approved equal
   2. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound:
      a. AH Curing Compound #2 DR; Anti-Hydro International, Inc.
      b. Res-X Cure All Resin; Burke Group, LLC (The).
      c. RX Cure; Conspec Marketing & Manufacturing Co., Inc.
      d. Day-Chem Rez Cure; Dayton Superior Corporation.
      e. Kurez DR; Euclid Chemical Co.
      f. Nitocure S; Fosroc.
      g. #64 Resin Cure; Lambert Corporation.
      h. L&M Cure DR; L&M Construction Chemicals, Inc.
      i. 3100-Clear; W. R. Meadows, Inc.
      j. Seal N Kure FDR; Metalcrete Industries.

k. Rich Cure; Richmond Screw Anchor Co.
l. Resi-Chem C309; Symons Corporation.
m. Horncure 30; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
n. Uni Res 150; Unitex.
o. Certi-Vex RC; Vexcon Chemicals, Inc.
p. or approved equal

3. Clear Waterborne Membrane-Forming Curing Compound:
   a. AH Curing Compound #2 DR WB; Anti-Hydro International, Inc.
   b. Aqua Resin Cure; Burke Group, LLC (The).
   c. Safe-Cure Clear; ChemMasters.
   d. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
   e. Day Chem Rez Cure (J-11-W); Dayton Superior Corporation.
   f. Nitocure S; Fosroc.
   g. Aqua Kure-Clear; Lambert Corporation.
   h. L&M Cure R; L&M Construction Chemicals, Inc.
   i. 1100 Clear; W. R. Meadows, Inc.
   j. Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
   k. Rich Cure E; Richmond Screw Anchor Co.
   l. Resi-Chem Clear Cure; Symons Corporation.
   m. Horncure 100; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
   n. Hydro Cure; Unitex.
   o. Certi-Vex Enviocure; Vexcon Chemicals, Inc.
   p. or approved equal.

4. White Waterborne Membrane-Forming Curing Compound:
   a. AH Curing Compound #2 WB WP; Anti-Hydro International, Inc.
   b. Aqua Resin Cure; Burke Group, LLC (The).
   c. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
   d. Thinfilm 450; Kaufman Products, Inc.
   e. Aqua Kure-White; Lambert Corporation.
   f. L&M Cure R-2; L&M Construction Chemicals, Inc.
   g. 1200-White; W. R. Meadows, Inc.
   h. White Pigmented Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
   i. Rich Cure White E; Richmond Screw Anchor Co.
   j. Resi-Chem High Cure; Symons Corporation.
   k. Horncure 200-W; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
   l. Hydro White 309; Unitex.
   m. or approved equal.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Pavement-Marking Paint: Alkyd-resin type; ready mixed; complying with FS TT-P-115, Type I, or AASHTO M 248, Type N. Color: white, yellow or blue.

C. Glass Beads: AASHTO M 247.

D. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

E. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

F. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 CONCRETE MIXES

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
1. Do not use Owner's field quality-control testing agency as the independent testing agency.

C. Proportion mixes to provide concrete with the following properties:
1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 3 inches.
   a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches after adding admixture to plant- or site-verified, 2- to 3-inch slump.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4 Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

E. 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.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus or minus 1.5 percent:
1. Air Content: 5.5 percent for 1-1/2-inch maximum aggregate.
2. Air Content: 6.0 percent for 1-inch maximum aggregate.
3 Air Content: 6.0 percent for 3/4-inch maximum aggregate.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.
   1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Comply with requirements and 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 mixers of 1 cu. yd. or smaller capacity, 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 mixers of capacity larger than 1 cu. yd. , increase mixing time by 15 seconds for each additional 1 cu. yd.
   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.

PART 3 EXECUTION

3. 1 PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum 2” cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4 JOINTS

A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
   1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
   1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
   2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
   3. Provide tie bars at sides of pavement strips where indicated.
   4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   5. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
   1. Locate expansion joints at intervals of 16 feet for 4 inch concrete and 20 feet for 6 inch concrete, unless otherwise indicated.
   2. Extend joint fillers full width and depth of joint.
   3. Terminate joint filler less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
   4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
   5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
   6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: 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 the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

a. Radius: 1/4 inch).

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

E. Edging is included in this Article for its similarity to jointing. Timing of edging after initial floating is critical.

F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: 1/4 inch.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, at Project site, or during placement.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

I. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

J. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic for service yard slabs.

3.7 SPECIAL FINISHES

A. Slip-Resistant Aggregate Finish: Before final floating, apply slip-resistant aggregate finish to pavement surfaces according to manufacturer's written instructions and as follows:

1. Uniformly spread 25 lb/100 sq. ft. of dampened nonslip aggregate over the surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.8 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 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 concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. 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 , and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. 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.

3.9 CONCRETE PADS, SIDEWALKS, RAMPS AND APRONS

A. Set forms accurately to line, radius and grade. Securely stake to prevent movement.

B. Thoroughly consolidate and screed to thickness of 4” or 6” except as otherwise shown.

C. Set premolded joints at equal spacing, maximum 16’ on center. Provide joint filler against foundation walls and other vertical surfaces. Set ¾” below level of finish slab for walks with concrete finish and flush where brick finish is shown.

D. Trowel concrete to remain exposed and finish with a fine wet broom drawing across the surface of walk. Provide transverse tooled control joints between expansion joints in intervals equal to 5 feet by 5 feet sidewalk width, except as otherwise shown. Tool all edges including both sides of expansion joints. Provide expansion joints every 16 feet.

E. Damp cure all concrete in accordance with requirements specified.

F. Protect surface from damage from pedestrians and traffic until fully cured.

G. Cure and seal exposed surfaces of walks in accordance with requirements specified.

3.10 FIELD QUALITY CONTROL

A. Testing & Inspection Agency: Refer to Section 02050.

B. Testing Services: Testing shall be performed according to the following requirements:

1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
3. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each set of compressive-strength specimens.
5. Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. . One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
9. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi .

C. Test results shall be reported in writing to Owner's Representative, Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as the sole basis for approval or rejection.

E. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02800 – SITE RESTORATION

PART 1 GENERAL

1.1 SUMMARY

A. The work under this section shall consist of furnishing all labor, equipment and materials for performing site restoration activities to return the site to pre-construction or improved conditions as described in the Specifications and shown on the Construction Drawings.

B. Related Sections
   1. Section: “Site Clearing”
   2. Section: “Earthwork”

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil
   1. The Contractor shall spread sufficient amounts of topsoil material required to provide a minimum of five inches of topsoil over disturbed areas to be vegetated. The Contractor shall prepare topsoil that meets the requirements of Section 02750.

B. Fertilizers
   1. The Contractor shall furnish sufficient amounts of fertilizer, which may be either fluid or dry formulations of commercial carriers of available plant nutrients. The fertilizer shall contain total nitrogen, available phosphoric acid, and soluble potash in the ratio of 10-20-10. The Contractor shall submit the manufacturer's label or certificate indicating compliance with specifications to the Construction Oversight Engineer and for review and approval. During the work, the Construction Oversight Engineer reserves the right to reject any material that has become caked or otherwise damaged.

C. Mulch
   1. The Contractor shall furnish sufficient amounts of mulch. The Contractor may use either hay or straw for mulch. Hay for mulching shall be mowings of acceptable herbaceous growth free from noxious weeds. Straw for mulching shall be stalks of oats, wheat, rye or other approved crops free from noxious weeds.

D. Asphalt
   1. The Contractor shall furnish sufficient amounts of each asphalt pavement layer. The subbase course shall be dense graded aggregate (DGA) conforming to the requirements of Section 02200. The asphalt base course shall be NJDOT HMA 19M64. The asphalt surface course shall be NJDOT specification HMA 9.5M64

E. Fence

1. New fence shall be installed per plan details and reference specifications. The Contractor shall reinstall existing fencing or provide new fencing to replace the type of fence removed to support remedial activities to restore fencing to original or “like new” condition. Fencing shall be replaced with a similar style, height and type to the existing fencing.

2.2 EQUIPMENT

A. The Contractor shall furnish all equipment required to complete the work of this Section.

PART 3 EXECUTION

3.1 RESTORATION OF THE SITE

A. The Contractor shall provide a final layer of material over excavation areas consistent with the existing conditions (i.e., quarry process, asphalt, etc.) in accordance with the requirements below.

3.2 LANDSCAPED AREAS

A. Prior to the placement of topsoil, the subgrade soil shall be loosened to a depth of two inches and graded so that it will be parallel to the proposed finished grade. Topsoil shall be spread, raked and compacted to form, after settlement, smooth draining grades. The minimum depth of topsoil after compaction shall be six inches.

B. Fertilizer shall be evenly spread over the surface of soil in areas as directed. Rates of application shall be as required to promote tree growth. Tests required to determine rate of fertilizer application shall be made by the Contractor and the rate accepted by the Engineer. Any method of application that will ensure an even distribution will be acceptable.

C. The surface of areas where mulch is to be applied shall be cleared of stones, stumps, wire, and other obstacles that might hinder subsequent landscaping operations. The ground shall be harrowed or disked to produce a state of suitable tillage.

D. The mulch shall be spread uniformly in a continuous blanket of sufficient thickness to completely hide soil from view. Mulch may be spread before or not later than three days after placement of topsoil unless otherwise approved. Anchorage to hold mulch in place may be applied by an approved method during mulching operation or subsequently.

E. The Contractor shall care for landscaped areas until final acceptance. Such care shall consist of providing protection against traffic by approved warning signs or barricades, and repairing areas damaged following seeding or mulching operations due to wind, water, fire or other causes. Damaged areas shall be repaired to re-establish condition and grade of area prior to seeding and shall be re-fertilized, re-seeded, and re-mulched as specified herein. The Contractor shall keep seeded areas mowed until acceptance by cutting to a height of three inches when growth reaches six inches, or as directed.

F. When, in the judgment of the Construction Oversight Engineer, at any time prior to acceptance, any area which has been landscaped fails to produce a satisfactory growth of grass after a suitable period of time has elapsed, the Contractor shall re-plant, re-fertilize and re-mulch such areas as specified.

3.3 ASPHALT COVER

A. For areas requiring a final asphalt cover, the Contractor shall perform asphalt installation in accordance with the minimum layer thicknesses shown on the Construction Drawings and Section 2400. The subbase course shall be dense graded aggregate conforming to the requirements of Section 2200. The asphalt base course shall be NJDOT HMA 19M64. The asphalt surface course shall be NJDOT HMA 9.5M64. The Contractor shall install all asphalt courses based on the requirements of the NJDOT Standard Specifications, latest edition.

B. The Contractor shall install the asphalt to the existing cut line of the asphalt. At the joint between the new asphalt and the existing pavement, the Contractor shall provide a smooth transition.

C. All pavement and subbase restoration courses shall be at least as thick as adjacent surfaces they adjoin.

3.4 CLEANUP OF THE PROJECT SITE

A. The Contractor shall perform final cleanup of all work areas and adjacent areas upon completing the site restoration (removal of tarps; broom cleaning paved surfaces; removal of any traffic barriers, etc.).

B. The cleaning work shall also include the following:
   1. Repair of any erosion or runoff related damage.
   2. Grading and final cover, as required, of all areas used by the contractor.
   3. Removal of all materials such as excess construction material, wood, debris and any other foreign material; and
   4. Removal of all construction equipment;

C. Final cleanup of all work areas and adjacent areas upon completing the site restoration (removal of tarps; broom cleaning paved surfaces; removal of any traffic barriers, etc.); removal of all constructed related equipment and material that is not part of the final site design; and all other items and services required for site restoration for which pay items are not provided elsewhere in this Contract.

END OF SECTION 02800

SECTION 02820 – CHAIN LINK FENCE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

A. Provide vinyl-coated chain link fencing, color matching existing fence posts and fabrics.

B. Provide all required accessories and concrete footings for posts.

C. Coordinate fence work to ensure compatibility between new and existing fencing materials and to avoid installation conflicts.

1.3 RELATED SECTIONS

A. Section 03300 – Concrete Mix Design

1.4 REFERENCED STANDARDS

A. ASTM American Society for Testing and Materials:
   1. Standards and Test Methods referenced in Part 2 - Products.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for metal fencing, fabric, gates and accessories. Include privacy slat cut sheets.

B. Compliance: Not used.

C. Color Selection: Match existing (dark green) vinyl-coated fabric, posts and rails.

D. Shop Drawings: Submit sample of fence section for each height specified.

E. Provide shop drawing depicting the means of installing fencing located in concrete curbs, walks or slabs.

1.6 QUALITY ASSURANCE

A. Provide chain link fences as complete units from a single source, including necessary erection accessories, fittings, and fastenings.

1.7 REGULATORY REQUIREMENTS

A. Comply with the applicable provisions of codes, standards and specifications referenced in this section.

PART 2 PRODUCTS

2.1 ACCEPTABLE 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. Steel Fencing and Fabric:
      a. American Fence Corp.
      b. Anchor Fence, Inc.
      c. United States Steel. (Cyclone Fence Division)
      d. National Fence Co.
      e. or approved equal.

2.2 GENERAL

A. Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

2.3 STEEL FABRIC

A. Fabric: Number 9 gage (0.418 inch) steel wires, 2 inch mesh, with top and bottom selvage. Provide one piece fabric widths for fencing up to 12 feet high.
   1. Fabric Finish: Galvanized, ASTM A392, Class II, with not less than 2.0 oz. zinc per sq. ft. of surface. Plastic-coated, color black, 2" mesh as required by plan details.
      a. Comply with ASTM F668, Class 2, except provide fabric with diameter (gage) of core wire equivalent to fabric diameter specified when measured prior to application of non-metallic coating.

2.4 FRAMING AND ACCESSORIES

A. General: Galvanized steel, painted black, ASTM A120 or A123, with not less than 1.8 oz. zinc per sq. ft. of surface.
   1. Fittings and Accessories: Galvanized, ASTM A153, with zinc weights per Table I.

B. End, Corner and Pull Posts: Refer to drawing detail(s) for post sizes.

C. Line Posts: Refer to drawing detail(s) for post sizes.

D. Gate Posts:
   1. For swing gates, provide posts for supporting each gate leaf for nominal gate widths as follows:

Leaf Width	Gate Post	lbs./lin.ft.
Up to 6 feet	3.5 inches x 3.5 inches roll-formed	4.85
	section or 2.875 inches OD pipe	5.79

E. Top Rail: 1.66 inches OD pipe, 2.27 lbs. per ft. or 1.625 inches x 1.25 inches roll-formed sections, 1.35 lbs. per ft. Manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

F. Bottom Rail: Same as top rail, except not continuous.

G. Post Brace Assembly: Adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace at mid-height of fabric. Use same material as top rail for brace; truss to line posts with 0.375 inch diameter rod and adjustable tightener.

H. Post Tops: Pressed steel, wrought iron, or malleable iron, to form a weather tight closure cap for posts. Provide one cap for each post, except where combination post top caps and barbed wire supporting arms are used. Provide caps with openings for through passage of top rail.

I Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16 inch x 3/4 inch. Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.

J. Stretcher Bar Bands: Steel, wrought iron, or malleable iron. Space not over 15 inches o.c., to secure stretcher bars to end, corner, pull, and gate posts.

2.5 CONCRETE

A. Provide concrete consisting of Portland cement, ASTM C150, aggregates ASTM C33, and clean water. Minimum 28-day compressive strength 2500 psi. Use at least 4 sacks of cement per cu. yd., 1 inch maximum size aggregate, maximum 3 inches slump, and 2 percent to 4 percent entrained air.

PART 3 - EXECUTION

3.1 INSTALLATION IN GROUND

A. Do not begin installation and erection before final grading is completed and finish elevations established.

B. Excavation: Drill or hand excavate (using post hole digger) holes for posts in firm, undisturbed or compacted soil.
   1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
   2. Excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface, except to greater depths where indicated.

C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing. Extend concrete footings to be flush with finish grade, except extend footings for swing gate posts to underside of bottom hinge. Trowel tops of footings to a crown to shed water away from posts.
   1. Set keeps, stops, sleeves and other accessories into concrete.
   2. Grout-in posts set into sleeved holes, concrete construction, or rock excavations, with non-shrink Portland cement grout.
   3. Allow concrete to attain at least 75 percent of its minimum 28-day compressive strength and wait at least seven (7) days after placement before installing rails, tension wires, barbed wire, or fabric. Do not stretch and tension fabric and wires, and do not hang gates, until the concrete has obtained its full design strength.

D. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.

E. Center Rails: Provide where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.

F. Install braces so posts are plumb when diagonal rod is under proper tension.

G. Fabric: Leave approximately 2 inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

H. Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to posts with metal bands spaced 15 inches o.c.

I. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing. Tie fabric to line posts with wire ties 12 inches o.c. Tie fabric to rails and braces with wire ties 24 inches o.c. Tie fabric to tension wires with hog rings 24 inches o.c.

J. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.2 PROTECTION AND REPAIR

A. Protect installed fencing from damage until final acceptance. Install barriers or attach protective materials at posts and other points subject to impact or abrasion.

B. Repair damaged coatings by recoating with high zinc dust content paint for repair of galvanizing, or by compatible and equivalent coating for repair of vinyl. Match adjacent coating, and apply per manufacturer's directions.

C. Replace any metal components distorted in the course of construction work. Remove and replace concrete footings displaced by impact.

END OF SECTION 02820

SECTION 02830 - CONSTRUCTION FENCING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

A. Install temporary six (6) foot high temporary light gage metal construction fencing to enclose all active work areas where final grading has not been completed. Provide dust screen on fencing that faces the school building and parking lot/driveway. All active work areas shall be fenced. Fencing may be moved as work is completed.

B. Include the maintenance of all required gates, latches, chains, locks, and hardware needed to secure the construction fencing around all work areas.
   1. Furnish extra sets of gate lock keys to the Construction Manager and Owner.

1.3. RELATED SECTIONS

A. Division 02 Section "Site Clearing"

B. Division 02 Section “Selective Demolition”

PART 2 PRODUCTS

2.1 CONSTRUCTION FENCING

A. Maintain, supplement, move, and re-install, as required, temporary metal construction security fence, six (6) feet high, with dust screen at selected areas, and lockable access gates at appropriate locations that facilitate work and control site access per the construction plans. The Owner’s representative reserves the right to determine the appropriate amount of fencing needed to maintain construction site security and safety, and the Contractor shall provide and maintain the required temporary construction fencing as needed. The temporary chain link construction fencing shall meet or exceed the following specifications.
   1. Minimum 11 gage mesh, 2” square
   2. Minimum post diameter: 1 1/2” (or larger as dictated by fence height)
   3. Minimum Post thickness: 0.065”
   4. Rails as needed to accommodate windscreens.
   5. Mesh to be tied every 12” along posts and rails.
   6. Fence shall be “post in ground” style.
   7. Fence to be provided with windscreen (for dust control) material to full height of fence.

B. All fencing components shall be free of burrs and other jagged edges that could cause bodily harm.

C. All fence shall be securedly anchored to prevent collapse, movement or dislocation.

PART 3 EXECUTION

3.1 GENERAL

A. Provide and maintain temporary construction security fencing around all work areas, including all gates and locking hardware.

B. Inspect and maintain fence in a safe and secure condition throughout construction.

C. Construction fencing may be moved and re-installed around the construction site as the work progresses, to insure that the construction site is secured at all times until substantial completion (or longer if construction site conditions warrant at no additional cost). At no time shall the construction site be left open and unsecured by temporary construction fencing.

D. Construction fencing may be removed when the site work is completed and all permanent fencing, railings, guards, and other safety measures are in place. In the event that the construction schedule is extended, the fencing rental agreement shall also be extended at no additional cost. The Owner reserves the right to require the temporary fencing to remain in place as needed to safeguard an undesirable site condition, until said condition is remedied to the satisfaction of the construction official and the site is deemed to be in safe and orderly condition.

END OF SECTION 02830

SECTION 02932 - ENGINEERED WOOD FIBER PLAYGROUND SURFACE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Construct engineered wood fiber playground surface, including mats, underdrainage system, geotextile fabrics, and other system components, as required by the selected manufacturer. Install per these guideline specifications, and as further defined by the approved Manufacturer's specifications and the Plan Set.

B. Protect existing site features, repair areas disturbed by construction practices, and remove and dispose of excess material off site in a legal manner through duration of construction.

C. General Contractor shall coordinate with the playground equipment Supplier and/or Installer prior to the installation of the new playing surface. Chosen surface (and thickness) shall be acceptable to the playground equipment manufacturer.

D. Coordinate work with storm drainage work, earthwork, concrete, fencing, and lighting work.

E. Engineered wood fiber surfacing shall be IPEMA Certified and meet all applicable ADA standards.

1.2 SUBMITTALS

A. Submit the following in accordance with the appropriate Division 01 Section:
   1. Pre-construction
      a. Manufacturer's product data and installation instructions.
      b. Manufacturer's standard verification samples.
      c. Certification from the playground manufacturer that the surface is suitable for its intended application.
      d. Warranty documents
   2. Post-construction:
      a. Manufacturer's written 20 –year warranty
      b. Two year Maintenance Bond
      c. Manufacturer's Recommended Maintenance Schedule

1.3 QUALITY ASSURANCE

A. Contractor shall have at least 5 years of experience in performing work described herein. Furnish list of 5 references, along with name and phone numbers of contact.
   1. Utilize an installer approved and trained by the manufacturer of the playground surfacing system, having a minimum of five years experience with other projects of the scope and scale of the work.
   2. Provide certification by manufacturer that installer is an approved applicator of the playground surfacing system.
   3. International Play Equipment Manufacturers Association (IPEMA) certified.

B. The Engineer shall review the quality of work being performed. The contractor shall adhere to requirements as set forth by the Engineer and the Owner.

1.4 SITE EXAMINATION

A. Verify that substrate conditions are suitable for installation of the playground surfacing system, per the recommendation of the playground equipment manufacturer and cushioned play surface manufacturer. At a minimum, substrate shall be level, graded per plan, free of debris, dry, and capable of compaction to 90 percent standard proctor density.

B. Do not proceed with installation until unsuitable conditions are corrected.

C. Location and layout of playground surface shall be clearly staked out in the field by a professional land surveyor at contractor's expense.

1.5 RELATED SECTIONS

A. 02200 – Earthwork – Site

B. 02513 – Portland Cement Concrete Paving & Curbs

1.6 REFERNCED STANDARDS

A. American Society for Testing & Materials
   1. ASTM F1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
      a. Results must be provided for new and 12-year old Engineered Wood Fiber.
      b. Testing of Engineered Wood Fiber in accordance with ASTM F 1292 must show G-max values of less than 155G for an 8-inch system, or 120G for a 12" system, at 12' drop heights, and HIC values of less than 1,000 for both new and 12-year-old material.
   2. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

1.7 DELIVERY, STORAGE & HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store materials protected from exposure to harmful environmental conditions, and at a minimum temperature of 40 degrees F (4 degrees C) and a maximum temperature of 90 degrees F (32 degrees C.)

1.8 PROJECT SITE CONDITIONS

A. Install surfacing system when minimum ambient temperature is 33 degrees F (1 degree C) and maximum ambient temperature is 90 degrees F (32 degrees C.) Do not install in steady or heavy rain.

1.9 WARRANTY

A. Submit manufacturer's standard warranty documentation to Project Manager for approval.

B. Warranty shall be for a minimum of 20 years from date of completion of work.

PART 2 – PRODUCTS

2.1 ENGINEERED WOOD FIBER MATERIAL

A. Material shall be comprised of softwoods and/or hardwoods, consisting of randomly sized wood fibers, the majority of which do not exceed 1.5", and containing 10% to 20% fines.

B. Material must be nontoxic. It shall not contain any recycled wood products or any wood containing paint, chemicals or additives.

C. Material shall have minimal bark and shall be free of twigs, leaf debris and other organic material, and shall be certified as non-flammable.

2.2 GEOTEXTILE/WEED BARRIER

A. 100% polyester, nonwoven geotextile fabric.

B. As specified by manufacturer of engineered wood fiber system.

2.3 UNDERDRAINAGE

A. A drainage system, as specified by the wood fiber system manufacturer and approved by the Engineer, shall be installed at the base of the surfacing system. The underdrainage system shall consist of clean porous stone, geotextile filter fabrics, perforated pipes or perforated drainage panels, and/or any other similar underdrainage product as specified by the wood fiber system manufacturer. The layout of the underdrainage system shall be carefully planned so as to not impact any future playground equipment installation (i.e. footing locations). Coordinate this work carefully.

B. Provide "as-built" plan of the underdrainge system to the Project Manager, including the location and depth of stone, pipes, fabrics, etc… tied to permanent site structures. The Project Manager will forward a copy of the "as-built" plan to the board of education for their records.

2.4 RUBBERIZED MAT

A. Rubberized mats, as specified by manufacturer, shall be installed under all swing sets, slide exits, and sliding poles, and as directed by the Owner and/or play equipment manufacturer.

B. Install rubberized mats per manufacturer specifications.

2.2 MATERIAL STORAGE AND HANDLING

A. Materials shall not be delivered until site and climate are ready for installation.

B. The Contractor shall provide a secure, clean, dry location for storage of materials.
   1. Temperature shall be between 50ºF and 85ºF.

2. Outdoor storage must be fully protected from moisture by covering with 10mil polyethylene film and tarpaulin.
3. All materials stored outside shall be inspected by installer/dealer for moisture contamination before application.

PART 3 – EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with instruction and recommendations of the playground surfacing manufacturer

3.2 REMOVE DEBRIS

A. Contractor shall thoroughly remove all debris within area of playground construction.

B. Remove any tree roots obstructing new construction completely.

C. Removed debris shall be disposed of in a legal manner approved by the owner.

3.3 SUBGRADE PREPARATION COMPACTION

A. Refer to Section 02200 for subgrade construction & subgrade compaction requirements.

B. Construct subgrade to promote positive drainage.

C. Place Filter Fabric over soil subgrade below underdrain system.

3.4 INSTALLATION

A. Do not proceed with playground surface installation until all applicable site work, including subbase preparation, underdrain, fencing, concrete work, playground equipment installation and other relevant work, has been completed.

B. Install wood fiber surface per manufacturer's instruction, guidelines, and specifications.

C. Avoid mixing wood fiber material with other onsite materials, including soil, sand or gravel.

D. Depth of wood fiber material to be certified by contractor and measured as the post-construction compacted depth.

3.5 PROTECTION/REPAIR OF EXISTING IMPROVEMENTS

A. Contractor shall take full responsibility for any site features or areas disturbed by construction, and shall either replace or repair damaged materials or areas to Owner's satisfaction.

B. The Contractor shall securely lock the work site at all times when unattended.

3.6 DISPOSAL OF WASTE MATERIALS

A. All removed or excess materials shall be disposed of in a legal manner off site.

B. Return structure(s) and surfaces to remain to condition existing prior to start of surface installation work. Repair adjacent construction and surfaces soiled or damaged by surface installation to original or better condition.

C. Upon completion of surface installation, remove tools, equipment and excess and debris materials from site. Dispose of all waste material in a legal manner off site. Remove protections and leave work areas broom clean.

3.7 WARRANTY AND MAINTENANCE PERIOD

A. The Contractor shall furnish a written statement of warranty and a maintenance bond as prescribed in the general provisions of the project manual or as otherwise prescribed by the Project Manager.

END OF SECTION 02932

SECTION 033000 – CAST-IN-PLACE CONCRETE

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 drawings.

B. Concrete paving and walks are specified 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:

1. ACI 301 "Specifications for Structural Concrete for Buildings".
2. ACI 318 "Building Code Requirements for Reinforced Concrete".
3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".

B. Concrete Testing Service: 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 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 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:

"Air-Mix"; Euclid Chemical Co.
"Sika Aer"; Sika Corp.
"MB-VR or MB-AE"; Master Builders.
"Darex AEA" or "Daravair"; W.R. Grace.

Or Approved Equal

E. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

"WRDA" Hycol"; W.R.Grace.
"Eucon WR-75" or "Eucon WR-89"; Euclid Chemical Co.
"Pozzolith 322N"; Master Builders.
Or Approved Equal

F. High-Range Water-Reducing Admixture (Super Plasticizer) ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

"Daracem 100" or "WRDA-19"; W.R. Grace.
"Eucon 37"; Euclid Chemical Co.
"Rheobuild 1000"; Master Builders.
"Sika 86"; Sika Corporation.
Or Approved Equal

G. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.024 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

"Accelguard 80"; Euclid Chemical Co.
"Daraset"; W.R. Grace
Or Approved Equal

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D and containing not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

"Pozzolith Retarder"; Master Builders.
"Eucon Retarder 75"; Euclid Chemical Co.
"Daratard 17"; W.R. Grace.
"Plastocrete 161R"; Sika Corporation.
Or Approved Equal

I. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

2.4 RELATED MATERIALS

A. Extruded Polystyrene Board Insulation: Rigid closed-cell extruded, expanded polystyrene insulation board with integral high-density skin, complying with ASTM C-578 Type IV: min. 25 psi compressive strength ASTM D 1621: k value of 0.20 ASTM C 518: 0.30% maximum

water absorption ASTM C272: 1.1 perm/inch max water vapor transmission: manufacturer's standard length and widths.

1. Manufacturer: Subject to compliance with requirements, provide products of one of the following or an approved equal:

   (a) Dow Chemical Co: Midland MI
   (b) VC Industries/V.5 Gypsum: Chicago, IL.
   (c) Or Approved Equal

B. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements provide one of the following:
3. Non-metallic

   "Euco-NS"; Euclid Chemical Co.
   “Duragrout”; L&M Construction Chemicals, Inc.
   "Masterflow 713"; Master Builders
   "Five Star Grout"; U.S. Grout Corporation.
   Or Approved Equal

C. Absorptive Cover: Burlap cloth made from jute or kenaf weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

E. Clear curing and sealing compound (VOC Compliant): The compound shall have 30% solids content minimum, and will not yellow under ultraviolet light after 500 hours of test in accordance with ASTM C-1315 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 <u>not</u> permitted.

1. Product: “Super Aqua-Cure VOX” by Euclid Chemical Co.
2. Product: “Dress & Seal WB30” by L&M Construction Chemicals, Inc
3. Product: “Kure-n-Seal 30 VOC” by Sonneborne
4. Or approved equal.

F. Vapor Barrier: Provide vapor barrier which conforms to ASTM E1745, Class A. The membrane shall have a water-vapor transmission rate no greater than 0.01 gr./ft^2/hr/inch Hg when tested in accordance with ASTM E96. The vapor barrier shall be placed over prepared base material where indicated below slabs on grade. Vapor barrier shall be no less than 15 mil thick. Installation of vapor barrier to comply with ASTM E1643.

1. Product: Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC
2. Product: VaporBlock (15 mil) by Raven Industries

3. Product: Zero Perm by Alumiseal
4. Product: Premoulded Membrane with PLASMATIC CORE by W.R. Meadows.
5. 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 and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

D. 3000 psi 28-day compressive strength; W/C ratio, 0.51 maximum, 3500 psi 28-day compressive strength W/C ratio, 0.47 maximum.

E. 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.

F. Admixtures:

1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
2. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight and concrete with water/cement ratios below 0.50.
3. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
4. 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

G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs and sloping surfaces: Not more than 3".

2. Reinforced foundation systems: Not less than 1" and not more than 3".
3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.
4. Other concrete: Not less than 1" nor more than 4"

2.6 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C94, 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. Provide for openings, offsets, sinkages, keywarp, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features, required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

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.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

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 Division-7 sections of these specifications.

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.

B. Edge Forms and Screed Strips for Slabs: Set edge forms, or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.5 CONCRETE PLACEMENT

A. Preplacement inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

B. General: Comply with ACI 304R "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. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

E. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

F. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

G. Maintain reinforcing in proper position during concrete placement operations.

H. 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.

I. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

J. 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 MONOLITHIC SLAB FINISHES

A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

B. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of Ff18 - Fl15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

D. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - Fl17. Grind smooth surface defects which would telegraph through supplied floor covering system.

E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.

3.7 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 301 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 4" 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 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

G. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.

H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

B. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

3.9 CONCRETE SURFACE REPAIRS

A. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, 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.

E. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The Contractor will employ a testing laboratory to perform the following tests, inspect formwork and reinforcement placement and to submit test reports.

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, Structural Engineer 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 033000

SECTION 03452 - CEMENT BASED SELF-LEVELING UNDERLAYMENT

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. Extent of Cement Based Self Leveling underlayment for application under flooring Work as indicated on Drawings.

B. Related Sections:

1. Section 01455 - Concrete In-Situ Relative Humidity and pH Testing
2. Section 09650 - Resilient Flooring
3. Section 09685 - Carpet Tile

1.3 DEFINITIONS

A. Self- Leveling underlayment for flooring includes systems which consist of materials specially formulated, cementitious self-smoothing, rapid hardening compound to level and repair existing interior concrete slabs.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's Specifications, installation instructions and general recommendations for each major product required. Include data substantiating that products to be furnished comply with requirements of the Bid Documents.

B. Test Reports: Submit results of testing specified.

1. Certificates: Submit manufacturer's test data certifying compliance with specified performance requirements.

2. Test reports: Submit test data for moisture content and hydrostatic pressure of existing concrete slab.

C. Certificates: Submit manufacturer's certification that products comply with requirements of the Bid Documents.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain required products from a single manufacturer.

B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of Work for not less than 5 years.

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C. Installer's Qualifications: All work of this section shall be performed by an experienced applicators, licensed by the manufacturer of the system and successfully completed this type of Work for the last 2 years'.

D. Codes and Standards: Comply with requirements of the Bid Documents or of governing codes and Authorities Having Jurisdiction.

E. Mock-up: Prior to installation of Work of this section, erect sample at location directed by or acceptable to the Architect, using specified materials and workmanship to be expected in the completed Work. Once mock-up has been approved by the Architect, retain until the Work has been completed and accepted.

1. Configuration: Approximately 4 feet by 4 feet.

2. Mock-up may not be incorporated into the final Work; demolish and remove from site when directed by the Architect.

F. Pre-installation Conference: Prior to installation of Work of this section, conduct a meeting at the project site to discuss quality assurance requirements. In addition to the Contractor and the installer, arrange for attendance of the following:

1. Other installers affected by the work of this section.
2. Owner's Representative.
3. Construction Manager.
4. Architect.
4. Manufacturer's Representative.
5. Supplier.

G. Allowable Tolerances:

1. Variation from Level: Do not exceed 1/4 inch in any bay or 10 feet in distance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Keep materials dry at all times. Protect against exposure to weather and against contact with damp or wet surfaces.

B. Store materials on one site to maintain proper separation and grading integrity. Cover materials to prevent excessive accumulation of moisture.

C. Protect materials from excessive moisture in shipment, storage, and handling. Deliver materials in manufacturer's unopened packages, and store in dry place with adequate air circulation.

D. Storage: Stack products of this section carefully to provide air circulation within stacks.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Do not proceed with installation when air temperatures are below 40°F, or above 95°F, unless protective measures acceptable to the manufacturer are taken.

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B. Do not proceed with installation until temperature and relative humidity have been stabilized and will be maintained within values established by the manufacturer for optimum quality control.

C. Provide adequate ventilation to prevent accumulation of hazardous fumes during application of components in enclosed spaces, and maintain ventilation until materials have thoroughly cured.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate Work of this section with Subcontractors and installation of special construction and equipment.

1.9 WARRANTY

A. Special Project Warranty: Submit a written warranty signed by the manufacturer, the Contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the Bid Documents.

1. The warranty shall include responsibility for removing and replacing other Work as necessary to accomplish repairs or replacement of materials covered by the warranty.
   a. Special Warranty Period: **Two (2) years** after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: "Ultraplan Easy" or "Ultraplan 1 Plus", as manufactured by Mapei Corporation; or approved equal.

B. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. "Silflo 230", as manufactured by Silpro, LLC,
2. "K15 ", as manufactured by Ardex, Inc.,
3. Equivalent system from USG,
4. Or approved equal.

2.2 MATERIALS

A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in uniform thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations to 2" in a single lift.

1. Cement Binder: ASTM C 150, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C-219.

2. Compressive Strength: Not less than 4,100 psi at 28 days when tested according to ASTM C109.

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B. PHYSICAL PROPERTIES - (Basis of Design)

1. Provide self-leveling underlayment system in which physical properties of topping including aggregate, which meets or exceeds the following requirements:
   a. Compressive Strength: ASTM C109, greater than 4,100 psi. after 28 days.
   b. Flexural Strength: ASTM C348, greater than 1,070 psi after 28 days.
   c. Final set at 50 - 95°F: 2 - 3 hours.
   d. Time required before installation of stile: Typically 3 hours

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect substrates and conditions under which the Work of this section will be performed, and verify that installation properly may commence. Do not proceed with the Work until unsatisfactory conditions have been resolved fully.

1. 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.

B. Testing: Perform required testing of existing concrete slab, for hydrostatic pressure and moisture content. Follow manufacturer's recommended procedures for testing slab. Do not proceed with the Work until unsatisfactory conditions have been resolved fully.

3.2 PREPARATION

A. Clean substrate, removing projections, all loose material and substances detrimental to the Work; comply with recommendations of manufacturer of products to be installed for proper preparation procedures.

B. Prepare substrate in accordance with recommendations of manufacturer for optimum installed performance.

C. Mask off or otherwise protect adjacent surfaces not scheduled to receive products of this section.

D. Coordinate installation with Subcontractors, report conditions in writing to the Owner, Construction Manager and the Architect. Do not proceed with application Work until any unsatisfactory conditions have been corrected.

3.3 APPLICATION

A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the Work.

1. Apply materials in a featheredge to 2" per lift, thickness, as required to suite actual condition(s).

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3.4 CLEANING

A. Upon completion, clean all surfaces which have become soiled or coated as a result of Work of this section, using proper methods which will not scratch or otherwise damage finished surfaces.

B. For cleaning, use only products and techniques acceptable to manufacturer of products being cleaned.

3.5 PROTECTION

A. General: Institute protective procedures and install protective materials as required to ensure that Work of this section will be without damage or deterioration.

END OF SECTION 03452

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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.

B. Type of masonry Work required includes:

1. Concrete unit masonry.
2. Brick masonry.
3. Datestone.
4. Cast Stone.
5. Concrete masonry lintels and bond beams.
6. Mortar and grout.
7. Reinforcement, anchorage, and accessories.
8. Concealed Flashing.
9. Installation of miscellaneous loose steel lintels, plates and other steel fabrications.

C. Related Work:

1. Section 05120 - Structural Steel.
2. Section 05400 - Miscellaneous Structural Steel.
3. Section 05500 - Metal Fabrications.
4. Section 07200 - Building Insulation.
5. Section 07270 - Fluid Applied Air/Vapor Barriers.
6. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
7. Section 07900 - Joint Sealer Assemblies.
8. Section 08110 - Hollow Metalwork.
9. Section 08410 - Aluminum/FRP Doors.
10. Section 08415 - Aluminum Storefront.
11. Section 08520 - Aluminum Windows.
12. 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 Authorities 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.

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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-ups for the following types of masonry in sizes of approximately 4 feet long by 6 feet high by full thickness, including provisions for 16" wide by 24" high opening with appropriate steel or masonry lintels, face and back-up wythes, cavity, insulation, horizontal reinforcement, ties, through wall flashing, weep holes, air/vapor barrier, mortar net and spandrel steel beam / lintel flashing as well as any other wall components and accessories in accordance with attached sketch and as directed by the Architect in field. **See sketch of sample Mock-Up Panel at the end of this Section.**

1. Typical exterior face brick wall.

2. Where masonry is to match existing, erect panels parallel to existing surface.

E. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and filed, 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 Contractor, masonry Subcontractor (if any), Construction Manager 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. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed Work.

2. 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.

3. Cast Stone samples not less than 12 inch square showing full range of exposed color and texture to be expected in finish Work.

4. 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.

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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 Sills.

3. Datestone.

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.

G. Coordinate delivery and application of air/vapor barrier with the delivery and application of the cavity insulation to ensure the installation of these products are completed within the same construction phase.

H. Deliver air/vapor barrier membranes, adhesives and primers to the jobsite in undamaged and original packaging indicating the name of the manufacturer and product. Store roll materials on end in original packaging. Protect rolls from direct sunlight until ready for use. Store air/vapor barrier membranes, adhesives and primers at temperature of 40°F and rising. Keep solvent away from open flame and excessive heat.

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 Bid Documents, including but not limited to the following:

1. ACI 531 Building Code Requirements for Masonry Structures.

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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).
20. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
21. ASTM E2357 Standard Test Method for Determining the Air Leakage of Air Barrier Assemblies.
22. ASTM E96 Water Vapor Transmission of Materials.
23. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

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 or columns.

C. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

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.

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G. Cold Weather Protection:

1. Do not lay masonry units which are wet or frozen.

2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

3. Remove masonry damaged by freezing conditions.

4. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
   a. For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F.
   b. For units with surface temperature below 32°F (0°C), wet with water heated to above 130°F.

H. Perform the following construction procedures while masonry Work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout.

I. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F.

1. 40 degrees F to 32 degrees F:
   a. Mortar: Heat mixing water to produce mortar temperature between 40°F and 120°F. Setting time will be limited to 60 minutes from initial mixing.
   b. Grout: Follow normal masonry procedures.

2. 32 degrees F to 25 degrees F:
   a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
   b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.

3. 25 degrees F to 20 degrees F:
   a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
   b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
   c. Heat both sides of walls under construction using salamanders or other heat sources.
   d. Use windbreaks or enclosures when wind is in excess of 15 mph.

4. 20 degrees F and below:
   a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F.
   b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
   c. Masonry Units: Heat masonry units so that they are above 20°F at time of laying.
   d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F for 24 hours after laying units.
   e. Do not heat water for mortar and grout to above 160°F.

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J. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40 degrees F to 32 degrees F:
   a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. 32 degrees F to 25 degrees F:
   a. Completely cover masonry with weather-resistive membrane for at least 24 hours.

3. 25 degrees F to 20 degrees F:
   a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

4. 20 degrees F and below:
   a. Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

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 they shall, within such period at their 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, they also agree either that the materials and methods specified herein are such as to insure the results required or that they 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. Multi-flash Stainless Steel Fabric Flashing:

1. Manufacturer shall warrant the flexible 2 mil type 304 stainless steel laminated to a polymer fabric flashing material for **life of the wall**.

2. Begin warranty from the Date of Substantial Completion.

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:

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a. Church Brick Company.
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. Oldcastle APG.
   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. Standard Modular: 2-1/4 inch x 3-5/8 inch x 7-5/8 inch.

C. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

D. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.

E. 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.

F. Efflorescence: Provide brick tested and rated in compliance with ASTM C67.

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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. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

1. Provide bullnose units for outside corners unless otherwise indicated.

C. Concrete Block: Provide units complying with characteristics indicated below for face size, exposed face and under each form of block included, for weight classification.

D. 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.

E. Hollow Loadbearing Block: ASTM C90 and as follows:

1. Weight Classification: Lightweight.

F. Solid Loadbearing Block: ASTM C90 and as follows: (Below grade and wherever else solid CMU is indicated.

1. Weight Classification: Lightweight.

G. Solid 4" CMU (1 Hour Fire Resistance Rated) Loadbearing Block: Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies - ANSI/ACI 216.1-97, TMS-0216-97 and as follows:

1. Construction and material requirements of concrete masonry including units, mortar, grout, control joint materials and reinforcement shall comply with ACI 530/ASCE 5/TMS 402.

2. Concrete masonry units shall comply with ASTM C55, C73, C90 or C129.

3. Weight Classification: Lightweight.

4. Aggregate Type: Expanded clay, expanded shale or expanded slate with a minimum required equivalent thickness of 3.6 inches for 4" CMU.

2.4 CAST STONE SILLS AND DATESTONE

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

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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 Types:

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.

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.

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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.

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4. Panels, soffits 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 100ºF (37.8ºC) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70ºF (21.1ºC) 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 ±1/8 in. from approved dimensions.

2. Length of units shall not deviate by more than length/ 360 or ±1/8 in., whichever is greater, not to exceed ±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 ±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.

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2.5 MASONRY LINTELS

A. 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. 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, water repellent agents, 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.

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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 ½ 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, exterior cavity walls (Masonry back-up), Seismic design:
      1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 270-ML (Mighty-LOK® - Ladder style); or approved equal.

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C. Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.

1. For anchorage to steel framework provide manufacturer's standard anchors with triangular-shaped wire tie section sized to extend within 1inch of masonry face. Coordinate with Steel Subcontractor for type and size required. Provide 3/16 inch diameter, hot-dip galvanized steel.

D. Unit Type Masonry Inserts in Concrete: Furnish cast iron or malleable iron inserts of type and size indicated.

E. Reinforcing Bars: Deformed steel, ASTM A615, Grade 60 for bars No. 3 to No. 18.

2.8 CONCEALED FLASHING MATERIALS

A. **Type 1**: Through Wall Mechanically Keyed Flashing; (At ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior and/or where indicated). Provide end dams where shown or required.

1. Basis of Design: Provide 0.018" (26 gauge) thick 302/304 dead soft stainless steel, as manufactured by Keystone Flashing Co.; or approved equal.
   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) Cheney Flashing Co.,
      2) Or approved equal.

2. Type: Provide three way bond interlocking type, factory formed, 3/16" high undercut sawtooth ribs at 3" intervals to provide a three way mechanical bond in the mortar bed.

3. Extend bottom horizontal leg of flashing out from the outer face of the masonry wall ½" at 30 degree from horizontal, and hem.

4. 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.

B. **Type 2**: Thru-Wall Stainless Steel Flashing: (At the head of window, door and unit ventilator masonry openings, existing columns in masonry cavity wall or where indicated). Provide end dams where shown, or as required.

1. Basis of Design: “Multi-Flash SS”, as manufactured by York Manufacturing, Inc.; or approved equal.
   a. Subject to compliance with requirements of the Bid Documents, manufacturers offering products which may be incorporated in work include the following:
      1) Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing
      2) Prosoco, Inc.; R-Guard SS ThruWall
      3) STS Coatings, Inc.; Wall Guardian Stainless Steel TWF
      4) TK Products, Inc.; TK TWF
      5) Or approved equal.

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2. Characteristics:
   a. Type: Stainless steel core with polymer fabric laminated to the bottom stainless steel face with non-asphalt adhesive. The top face (exposed side) must not be covered with a polymer fabric.
   b. Stainless steel: type 304, ASTM A240. Domestically sourced per DFARS 252.225-7008 and/or DFARS 252.225-7009.
   c. Fabric: polymer fabric; laminated back face (non-exposed side) of stainless-steel core.
   d. Size: Manufacturer's standard width rolls.

3. Size: Manufacturer's standard roll width and length.

4. Accessories:
   a. Mastic/sealant: Product standard of quality is York Manufacturing, Inc.; UniverSeal US100; or approved equal.
      1) Characteristics:
         a) Type: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920-11, Type S, Grade NS, Class 50.
   b. Outside corner and inside corner material; manufacturer's standard available units using:
      1) Multi-Flash SS; or approved equal.
      2) Preformed stainless steel: 26-gauge stainless steel.
   c. End dam: Product may be folded in line with the flashing material or utilize preformed end dams by manufacturer using:
      1) Preformed stainless steel: 26-gauge stainless steel.
   d. Splice material: Product standard of quality is York304 SA by York; or approved equal. Manufacturer's standard self-adhered metal material: material matching system material or use Multi-Flash SS 6"; or approved equal, lap piece and polyether sealant as a splice.
   e. Termination Bar: Product standard of quality is York T-96 termination bar; or approved equal. Manufacturer's standard 1" composite material bar or a 1" 26-gauge stainless steel termination bar with sealant lip.
   f. Weep Vent Protection:
      1) Product standard of quality is York's Weep-Armor; or approved equal. Geotextile drainage fabric at least 12" in height.
      2) Weep-Net A; or approved equal, free draining mesh material that will not degrade in the cavity wall and is made of polymer strands. Dovetailed design, 10" high and the dovetailed slots are 7" deep.
   g. Drip Edge: Stainless-steel with 30-degree 3/8" bent outer edge, hemmed. 3" by 8'.
   h. Weep Vents: Product standard of quality is York's Stainless-steel weep vents; or approved equal. Stainless-steel mesh vent in 2.5 x 3.5 (Standard).
   i. Repair and other materials/accessories: Manufacturer's standard.
   j. Fasteners: Domestic manufactured fastener types and sizes recommended by flashing manufacturer for intended use.

C. **Type 3**: Thru-Wall Two Piece Mechanically Keyed Cap Flashing; (At rising walls above roofs and/or where indicated).

1. Basis of Design: Provide 0.018" (26 gauge) thick 302/304 dead soft stainless steel, as manufactured by Keystone Flashing Co.; or approved equal.

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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) Cheney Flashing Co.,
   2) Or approved equal.

2. Type: Provide three way bond interlocking type, factory formed thru-wall flashing, 3/16" high undercut sawtooth ribs at 3" intervals to provide a three way mechanical bond in the mortar bed, with counterflashing.

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.

E. Mortar Net: Basis of Design: Provide Mortar Net as manufactured by Mortar Net USA, Ltd.; or approved equal.

1. Size: 10 inches high x 1½ inches thick x 5 feet long.

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2. Provide mortar net inside masonry cavity walls to keep weepholes open. Install in accordance with manufacturer's printed instructions.

F. Waterstops: Provide 16 oz. copper waterstops at indicated expansion joints; Catalog # 94-V with Type "A" flange as manufactured by Heckmann Building Products Inc.; or approved equal.

G. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

2.10 CAVITY INSULATION: Refer to Section 07200.

2.11 AIR/ VAPOR BARRIER: Refer to Section 07270.

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 cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

E. Build chases and recesses as shown or required for the Work of Subcontractor(s). Provide not less than 8 inch of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

F. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

G. 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.

H. Pattern Bond:

1. Brick: Running bond, unless otherwise shown.

2. Concrete masonry units: Running bond, unless otherwise shown.

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3. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches.

I. 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 ½ 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 ½ inch in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4 inch in 10 feet, ½ 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 ½ 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 ½ 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 ½ 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 ½ 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 ½-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, build-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.

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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 in all courses of piers, columns and pilasters, 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 CAVITY WALLS

A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.

B. Tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.

C. Provide weep holes in exterior wythe of cavity wall located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.

D. Provide concealed flashing in cavity walls at all required locations and as indicated herein after.

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E. On units of plastic insulation, install small pads of mastic spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

3.6 AIR/ VAPOR BARRIER: Refer to Section 07270.

3.7 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, ½ 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. Cut reinforcement units at walls intersecting and/or abutting firewalls. 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.

3.8 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.

3.9 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.

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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.

3.10 LINTELS

A. Install loose lintels weighing 200 lbs. or less of steel and other materials where shown. Steel lintels weighing more than 200 lbs. will be installed by Structural Steel Subcontractor.

B. Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Precast lintels shall be scored to simulate adjacent blockwork. Cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.

C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.11 FLASHING OF MASONRY WORK

A. **NOTE: When Contractor must remove a portion of the existing masonry wall veneer in order to install through wall flashing or other Work, the Contractor MUST follow the Brick Industry Association (Technical Note #46) and the Concrete Masonry Industry methodology to support and protect the existing adjacent masonry, indicated to remain, which surrounds removal area. The Contractor shall remove the proper length of masonry and leave adjacent masonry in place to support existing masonry above the Work in lengths indicated below.**

1. Refer to BIA, Technical Note #46: "Maintenance of Brick Masonry", www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf, for two recommended methods to properly support existing brickwork when installing new mechanically keyed through wall flashing, and as indicated below:
   a. **Method 1**: Remove alternate sections of masonry in 2'-0" to 5'-0" (610 mm to 1.52m) lengths.
   b. **Method 2**: Temporary braces can be installed to permit the removal of longer sections of masonry.

   Note: The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.

B. General: Provide concealed flashing in masonry Work at, or above, shelf angles, lintels, ledges and the base of perimeter cavity walls and other obstructions 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 concealed flashing in masonry at all required conditions, whether shown or not, and shall be typical and/or similar for all building conditions when details and notes are shown on Drawings.

2. Contractor shall provide mechanically keyed through wall flashings at rising walls above roof conditions and or where indicated in cavity wall construction, whether shown or not. Flashings shall be typical and/or similar for all building conditions when details and notes are shown on Drawings.

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a. Set mechanically keyed through wall flashing in thin layer of mortar. Set masonry course above flashing in light layer of mortar.

C. 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.

D. Extend flashing the full length of lintels and shelf angles and minimum of 4 inches into masonry each end. 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 ½" of the interior face of the wall in exposed Work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches.

1. At heads and sills flashing shall extend 6 inches beyond each side of the opening and to be turned up at the sides/ends not less than 2 inches to form a pan, (end dam). All corners shall be folded, not cut.

E. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer.

F. 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.

G. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

3.12 CAST STONE SILLS, CAPS AND DATESTONE

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.

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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.

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3.13 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.

3.14 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.

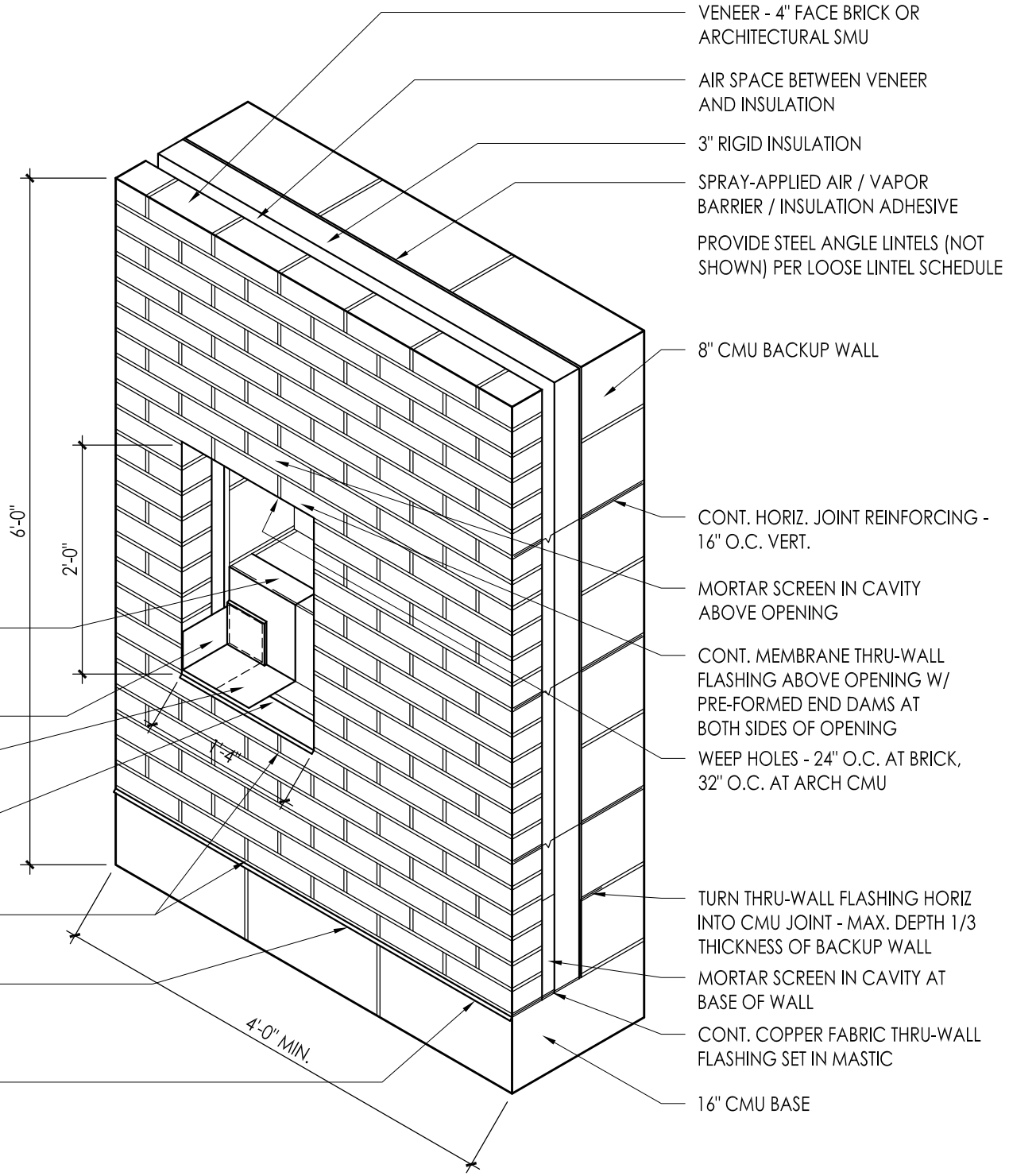
1. Prepare exposed to view CMU surfaces to receive paint coatings in accordance with Section 09900.

END OF SECTION 04200

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NOTES:

1. CONSTRUCT MOCK-UP PANEL IN LOCATION APPROVED BY ARCHITECT.
2. NO MATERIALS ARE TO BE RELEASED UNTIL MOCK-UP PANEL IS APPROVED BY ARCHITECT.
3. MOCK-UP PANEL SHALL REEMAIN INTACT ON PROJECT SITE UNTIL ALL MASONRY WORK IS COMPLETED.
4. COVER MOCK-UP PANEL TO PROTECT FROM WEATHER AFTER APPROVAL.
5. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS INDICATED IN SPECIFICATION SECTION 04200,
6. MASONRY COLORS, SIZES AND COURSING PATTERNS SHALL BE SELECTED BY ARCHITECT IN FIELD TO CONFORM TO EXTERIOR ELEVATIONS.
7. MOCK-UP PANEL IS NOT INTENDED TO DEPICT ACTUAL CONSTRUCTION AT BASE OF EXTERIOR WALL - SEE WALL SECTIONS AND TYPICAL DETAILS FOR BASE OF WALL CONSTRUCTION.



MOCK-UP PANEL

Scale: N.T.S.

SECTION 05450 - COLD-FORMED METAL FRAMING

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. Roof Outrigger Framing.

1.3 PERFORMANCE REQUIREMENTS

A. AISI "Specifications": Calculate structural characteristics of cold-formed metal framing according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members" and the following:

1. Allowable stress design, AISI CFSD-ASD

2. AISI Load and Resistance Factor, AISI CFSD-LRFD

3. Seismic requirements AISI CFSC-LRFD and ASCE 8-SSD-LRFD, for the design based on the load resistance factor design method, and the AISI CFSD-ASDand ASCE 8-SSD-ASD, for the design based on the allowable stress design method which shall meet the design modifications indicated in the International Building Code.

B. Structural Performance: Engineer, fabricate and erect cold-formed metal framing to withstand design loads within limits and under conditions required.

1. Design framing systems to withstand design loads without deflections greater than the following:
   a. Roof Outrigger Framing: Vertical deflection of 1/360 of the span.

2. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120°F (67°C).

3. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

C. Delegated Design:

1. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing and anchors / fasteners by employing a qualified Structural Engineer licensed in the State of New Jersey, to prepare design calculations, signed and sealed shop drawings, and all other structural data.

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1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of cold-formed metal framing, accessory and product specified.

C. Shop drawings showing layout, spacings, sizes, thicknesses, and types of cold-formed metal framing, fabrication, fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, supplemental framing, bracing, bridging, splices, accessories, connection details and attachments to other units of Work.

1. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the a Structural Engineer licensed in the State of New Jersey. Provide shop drawings prepared by cold-formed metal framing manufacturer.

D. Mill certificates by manufacturers of cold-formed metal framing or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, and galvanized-coating thickness.

F. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

G. 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.

H. Product test reports from a qualified independent testing agency evidencing compliance with requirements of the following based on comprehensive testing:

1 Expansion anchors.
2. Powder-actuated anchors.
3. Mechanical fasteners.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

1. ASTM E329 can be used for on-site construction projects.

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C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code–Steel" and AWS D1.3 "Structural Welding Code–Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

D. Structural Engineer Qualifications: A professional Engineer legally authorized to practice in the State of New Jersey and experienced in providing engineering services of the kind indicated that have resulted in the installation of cold-formed metal framing similar to this Project in material, design, and extent and that have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling, as required in AISI's "Code of Standard Practice".

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation, as required in AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:

1. Clark Dietrich Building Systems
2. Marino\WARE; a Div. of WARE Industries, Inc.
3. Super Stud Building Products, Inc.
4. Or approved equal.

2.2 MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Coating Designation: G60 (Z180).
2. Grade: As required by structural performance.

B. Steel Sheet for Vertical Deflection Clips: ASTM A 1003/A 1003M, ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: [50 (340)] [As required by structural performance].
2. Coating: G90 (Z275).

2.3 ROOF OUTRIGGER FRAMING

A. Steel Joist Outriggers: Manufacturer's standard C-shaped steel joist outriggers, unpunched, of web depths indicated, with lipped flanges, and complying with the following:

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1. Design Uncoated-Steel Thickness: To meet structural performance requirements.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Joist hangers and end closures.
5. Reinforcement plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36 (ASTM A 36M), zinc coated by the hot-dip process according to ASTM A 123.

B. Cast-in-Place Anchor Bolts and Studs: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel hex-head bolts and studs; carbon-steel nuts; and flat, unhardened-steel washers. Zinc coated by the hot-dip process according to ASTM A 153.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Powder-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

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2.7 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.

1. Fabricate framing assemblies in jig templates.

2. Cut framing members by sawing or shearing; do not torch cut.

3. Fasten cold-formed metal framing members by welding. Wire tying of framing members is not permitted.

4. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

5. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to manufacturer's recommendations.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.

C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements, including installation tolerances and other conditions affecting performance of cold-formed metal framing. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting masonry construction.

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3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to ASTM C1007, AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions", and to manufacturer's recommendations and the requirements of this Section.

1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding Work.
   b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

C. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.

D. Provide temporary bracing and leave in place until framing is permanently stabilized.

E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

F. Erection Tolerances: Install cold-formed metal framing to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 JOIST INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated or as recommended by the manufacturer.

B. Install joists bearing on supporting framing, level, straight, and plumb, adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm).

2. Reinforce ends of joists with web stiffeners, end clips, joist hangers, steel clip angles, steel-stud sections, or as otherwise recommended by manufacturer.

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C. Space joists not more than 2 inches (51 mm) from abutting walls, as indicated, or if not indicated to meet structural performance requirements.

D. Install bridging at each end of joists and at intervals indicated. Fasten bridging at each joist intersection as follows:

1. Bridging: Combination of flat, steel-sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

E. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

F. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: A qualified independent testing agency employed and paid by the Contractor will perform field quality-control testing.

B. Field and shop welds will be subject to inspection and testing.

C. Testing agency will report test results promptly and in writing to Contractor, Construction Manager and Architect.

D. Remove and replace Work that does not comply with specified requirements.

E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanizing repair paint according to ASTM A 780 and the manufacturer's instructions.

B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing.

1. Touchup painted surfaces with same type of shop paint used on adjacent surfaces.

C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer to ensure that cold-formed metal framing is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 05450

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SECTION 05500 - METAL FABRICATIONS

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. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere and non-ferrous items listed herein.

B. Type of work in this section includes metal fabrications for assemblies which include but are not limited to the following:

1. Rough hardware.
2. Expansion joint covers and column covers.
3. Ladders.
4. Exterior roof ladder.
5. Exterior roof ladder with ladder safety system.
6. Access ladder roof supports.
7. Miscellaneous structural shapes.
8. Aluminum pipe railing and handrails.
9. Stack Jack Flashings.
10. Guy wire roof support.
11. Portable, free-standing guardrail system for roof railings.
12. Cast nosings.
13. Cast iron downspout boots.
14. Post Installed Anchors.

C. Related Work:

1. Section 03300 - Concrete Work.
2. Section 04200 - Unit Masonry.
3. Section 05120 - Structural Steel.
4. Section 05210 - Steel Joists.
5. Section 05300 - Metal Decking.
6. Section 05400 - Miscellaneous Structural Steel.
7. Section 09900 - Painting.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

ASTM A108-99 - Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.

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ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A276-03 - Standard Specification for Stainless Steel Bars and Shapes.

ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A563-00 - Standard Specification for Carbon and Alloy Steel Nuts.

ASTM A569/A569M-91a – Standard Specification for Steel, Carbon (.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality (superseded by A1011).

ASTM A780-01 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

ASTM A786/A786M-00b - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.

ASTM A1011/A1011M-03 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

ASTM F844-00 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

AWS D1.1/D1.1M: Structural Welding Code - Steel, Welding qualification procedures and personnel.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrications might delay work.

C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

D. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC / ANSI A117.1.

E. Delegated Design Engineer Qualifications: A professional Engineer who is legally qualified to practice in New Jersey where Project is located and who is experienced in providing engineering services of the type indicated.

F. Furnish joint cover assemblies and accessories manufactured by one firm for each type of joint cover required.

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1.4 REFERENCE

A. OSHA 1910.28(b)(9)(i)(C): (For Exterior roof ladder with ladder safety system).

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's Specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

1. Expansion joint covers: Include joint cover profiles, joints between joint cover sections, corners or intersection details, and installation in adjacent work.
   a. Layout Drawings: Submit to the Architect Showing full extent of locations of joint and column cover assemblies including intersections, terminations and transitions to different surfaces or substrates.

2. Portable, free-standing guardrail system for Roof Railings: Complete details of entire railing layout, showing member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.

C. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.

D. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

E. Mill test reports: Reports indicating metals to be furnished comply with project requirements.

1.6 WARRANTY

A. Portable, free-standing guardrail system for roof railings: Manufacturer's **two (2) year** warranty against defective materials and workmanship.

1. Warranty does not cover integrity / performance of the paint finish.

2. During the warranty period, if parts are found to be defective they will be replaced or repaired at the manufacturer's discretion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

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B. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work.

1. Alloy and Temper: Provide alloy and temper as recommended by the aluminum producer or finisher, with not less than the strength and durability properties specified in ASTM B 632/B 632 M, alloy 6061-T6.

2. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.

3. Fasteners: Finish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.

4. Bituminous Paint: SSPC-Paint (cold-applied asphalt mastic).

5. Protective Lacquer: Clear non-yellowing, of type recommended by metal producer for protection of the finished metal surfaces.

6. Aluminum Pipe and Tube: ASTM B429, Alloy 6063-T6.

7. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

8. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

9. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

C. Steel

1. Steel Plates, Shapes and Bars: ASTM A36/A 36M.

2. Steel Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.

3. Structural Steel Sheet: Hot-rolled, ASTM A570; or cold-rolled ASTM A611, Class 1; of grade required for design loading.

4. Galvanized Structural Steel Sheet: ASTM A446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

5. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

D. Gray Iron Castings: ASTM A48, Class 30.

E. Malleable Iron Castings: ASTM A47, grade as selected by fabricator.

F. Stainless Steel Sheet, Strip, Plate and Flat Bars: ASTM A666, Type 304, unless otherwise indicated.

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1. Stainless Bars and Shapes: ASTM A276, Type 304.

G. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

H. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

I. Grout:

1. Non-Shrink, Metallic Grout: Pre-mixed, factory-packaged, ferrous-aggregate grout complying with CE CRD-C588, Type M, and ASTM C1107, specifically recommended by manufacturer for heavy-duty loading applications and not to be used in wet areas or on exterior applications.

2. Non-Shrink, Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621, and ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

J. Fasteners:

1. General: Provide zinc-plated fasteners complying with ASTM B633, Class Fe/Zn 5, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A, with hex nuts, ASTM A563; and where needed, flat washers.

3. Weathering Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A325, Type 3, with hex nuts, ASTM A563, Grade C3; and where needed, flat washers.

4. Lag Screws: Square head type, ASME B18.2.1.

5. Machine Screws: Cadmium plated steel, ASME B18.6.3.

6. Wood Screws: Flat head, carbon steel, ASME B18.6.1.

7. Plain Washers: Round, carbon steel, ASME B18.22.1.

8. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

9. Expansion Anchors: Anchor bolt and sleeve assembly; Carbon-steel components zinc-plated to comply with ASTM B633, Class Fe/Zn 5.

10. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as needed.

11. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.

12. Eyebolts: ASTM A 489.

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13. Anchor Bolts: ASTM F 1554, Grade 36, of dimension indicated; with nuts, ASTM A563; and where indicated, flat washers.

K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.

L. Cast-in-Place in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329.

M. Post-Installed Anchors:

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel is indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593 and nuts, ASTM F594.

N. Paint:

1. Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil paint, FS TT-P-86l, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type II.

2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.

3. Galvanizing Repair Paint: High-zinc-dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20 and compatible with paints specified to be used over it.

2.2 FABRICATION, GENERAL

A. Workmanship

1. Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

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3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.

5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

B. Galvanizing:

1. Provide a zinc coating for exterior steel items and those items indicated or specified to be galvanized, as follows:
   a. ASTM A 153 for galvanizing iron and steel hardware.
   b. ASTM A 123 for galvanized rolled, pressed and forged steel angles, corner guards, other indicated shapes, plates, bars, bollards and strip 1/8" thick and heavier.
   c. ASTM A 386 for galvanizing assembled steel products.

C. Shop Painting

1. Shop paint miscellaneous metal work, except members of portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.

2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning", or SSPC SP-7 "Brush-Off Blast Cleaning".

3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".

4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.

5. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.4 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting

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woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items as specified in Division-6 sections.

2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Expansion Joint Covers and Control Joint Covers:

1. Basis of Design: Provide extruded aluminum expansion and control joint covers as manufactured by Balco Inc.; or approved equal.
   a. Other acceptable manufacturers:
      1) CS Construction Specialties,
      2) MM Systems,
      3) Gordon Interior Specialties Division,
      4) Or approved equal.
   b. Aluminum Finish: Provide clear anodized finish or as selected by the Architect to suit adjacent construction conditions, finishes and colors.

2. Provide type and size where shown on Drawings, or as required at all building areas to receive expansion joint and column covers. Where used in rated construction, provide fire rated units.
   a. Submit to the Architect a complete layout Drawing indicating all locations of expansion joint and column covers, type, size and detailed construction conditions.

3. Do not proceed with fabrication and/or installation until you receive Architect's approval.

4. Provide assemblies including manufacturer's available anchors, hardware and accessories.

C. Steel Ladders:

1. Fabricate ladders from galvanized steel for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3, unless otherwise indicated.

2. Unless otherwise indicated, provide ½" x 2-1/2" continuous structural steel flat bar side rails with eased edges, spaced 18" apart.

3. Provide 3/4" diameter solid structural steel bar rungs, spaced 12" o.c.

4. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

5. Support each ladder at top and bottom as shown.

6. Provide non-slip surface on top of each rung, by coating the rung with abrasive material metallically bonded to rung by a proprietary process.
   a. Basis of Design: Subject to compliance with requirements, provide one of the following:
      1) IKG Industries, a Division of Harsco Corp.: Mebac;.

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2) SlipNOT Metal Safety Flooring, a W.S. Molnar Company.
3) Or approved equal.

D. Exterior Roof Access Ladder:

1. Fixed Wall Ladder(s): Galvanized steel; serrated rungs 3/4" inches in diameter, connected to 2½-inch continuous galvanized structural steel flat bar side rails with eased edges, each secured to rails by means of four (min.) solid aircraft rivets.
   a. Provide 3/4" diameter solid galvanized structural steel bar rungs, spaced 12" o.c.
   b. Provide roof ladder support for ladder as per paragraph E below.
   c. Ladder Safety System (OSHA requires ladder safety system for ladders longer than 24 ft.):
      1) Per OSHA (1910.28(b)(9)(i)(B), any ladder which extends more than 24' above a lower level must be equipped with:
         a) Personal Fall Arrest System or;
         b) Ladder Safety System.

2. Flexible Cable Vertical Safety System (Fall Protection):
   a. Provide and install "DBI-SALA® Lad-Saf™ Flexible Cable Vertical Safety System with Rung, 2-User, Stainless Steel #6116613" as manufactured by 3M / DBI SALA; or approved equal.
      1) Provide "Lad-Saf X2 or X3 sleeve" to meet the requirements of ANSI Z359.16 Standard.

E. Access Ladder Roof Support:

1. Basis of Design: Provide "ARS-500" access ladder roof support as manufactured by Thaler Metal Industries; SBC Industries; or approved equal.
   a. Product consists of a urethane insulated, epoxy primed, hollow steel support and mounting plate, adjustable height steel cap and rail post base.
   b. Provide stainless steel stack jack flashing with urethane insulation and EPDM Base seal.
   c. Provide units complete with manufacturer's standard and optional hardware, accessories, adhesive, etc. to suit indicated application.
   d. Provide manufacturer's standard **twenty (20) year** warranty against leaks, condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.
   e. Comply with manufacturer's instructions and recommendations for installation methods.

F. Guy Wire Roof Support:

1. Basis of Design: Provide "ARS-300" guy wire roof support as manufactured by Thaler Metal Industries; SBC Industries; or approved equal.
   a. Product consists of a urethane insulated, epoxy primed, hollow steel support and mounting plate, and galvanized guy wire ring..
   b. Provide stainless steel stack jack flashing with urethane insulation and EPDM Base seal.
   c. Provide units complete with manufacturer's standard and optional hardware, accessories, adhesive, etc. to suit indicated application.
   d. Provide manufacturer's standard **twenty (20) year** warranty against leaks,

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condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.

e. Comply with manufacturer's instructions and recommendations for installation methods.

G. Stack Jack (Vent Pipe) Flashings:

1. Basis of Design: Provide "SJ-37" stack jack vent pipe flashing as manufactured by Thaler Metal Industries; SBC Industries; or approved equal.
   a. Product consists of a stainless steel flashing sleeve with integrated flange, pre-molded urethane insulated liner, EPDM triple pressure grommet seal and EPDM base seal.
   b. Provide manufacturer's standard **twenty (20) year** warranty against leaks, condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.
   c. Comply with manufacturer's instructions and recommendations for installation methods.

H. Miscellaneous Structural Shapes, Framing and Supports, Etc.

1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

2. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricated from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

4. Galvanize exterior miscellaneous frames and supports.

I. Nosing:

1. Provide nosings for edge of slab and similar conditions, fabricated of structural steel shapes as shown, of all welded construction with mitered corners and continuously welded joints. Provide anchors welded to nosings for embedding in concrete or masonry construction, spaced not more than 6" from each curb end, 6" from corners and 24" o.c., unless otherwise shown.

2. Galvanize exterior nosings.

J. Aluminum Pipe Railing and Handrails:

1. Aluminum Railings and Handrails: Basis of Design: "Majestic Series", or as selected by the Architect as manufactured by AVCON; Ameristar Perimeter Security, USA; Integrity Aluminum Products, LLC; or approved equal.

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2. Provide handrails to comply with applicable State and Local Regulatory Requirements and in accordance with minimum requirements indicated in the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC/ ANSI A117.1.

3. Structural Performances: Provide railing and handrail assemblies which, when installed, shall comply ASCE standards for minimum design loads for Handrail assemblies and Guardrail Systems and capable of withstanding the following loads applied as indicated:
   a. To resist a load of 50 pound per linear foot applied in any direction at the top and to transfer this load through the supports to the structure.
   b. To resist a single concentrated load of 200 pounds applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this loading to the building structural assemblies, walls, floors or slabs. This load shall act concurrently with loads indicated in paragraph "a" above.
   c. Guards: Intermediate rails and balusters capable of withstanding a horizontal concentrated load of 200 lb. applied on a one square foot area at any point in system of gross area of guard, including any open areas, of which they are a part. Load need not be assumed to be acting concurrently with uniform horizontal loads on toprails of railing assembly in determining stress on guard supporting members.
   d. Guards shall be designated and constructed for a uniform load of 50 pounds per foot applied horizontally at required guardrail height and a simultaneous uniform load of 100 pounds applied vertically downwards at top of guardrail.
   e. In-fill Area:
      1) Concentrated Load: 200 pounds, horizontal load , applied on a 1square-foot area at any point in the system, including intermediate rail or other elements serving this purpose.
      2) This loading condition shall not be applied simultaneously with loading conditions indicated above, (a. b. and c.).

4. Fabricate pipe railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated, or if not shown, as required to support indicated design loading. Unless otherwise indicated all shown dimensions for pipes, rails and other round shapes are outside diameter.

5. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
   a. At tee and cross intersections provide coped joints.
   b. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radiuses indicated.
   c. Perform welding to comply with applicable AWS Specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

6. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.

7. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.

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8. Close exposed ends of pipe by welding 3/16" thick aluminum plate in place or by use of prefabricated fittings.

9. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

10. Finish: Provide clear anodized finish.

K. Portable, Free-standing Guardrail System for Roof Railings:

1. Basis of Design: Provide “RailGuard 200 Roof Safety Railing”, as manufactured by Garlock Safety Systems; or approved equal.
   a. Subject to compliance with requirements, an acceptable alternate product from one of the following:
      1) “Safety Rail 2000" as manufactured by BlueWater Mfg., Inc.
      2) Or approved equal.
   b. Design Requirements:
      1) Structural Performance: Comply with requirements of applicable local, state, and federal and OSHA codes.
      2) Structural performance of rails and supports:
         a) Meets OSHA requirements: 1910.29(b) and 1926.502 (b).
         b) Capable of withstanding a concentrated load of 200 pounds (90.6 kg), applied to the top rail at any point and in any direction.
         c) Capable of withstanding a uniform load of 50 pounds per linear foot (74.3 kg/m) applied to the top rail horizontally with a simultaneous load of 100 pounds per linear foot (148.6 kg/m) applied vertically downward.
         d) Design need not provide for both concentrated and uniform loads to be applied concurrently.
      3) Structural performance of railing infill:
         a) Capable of withstanding a horizontal concentrated load of 200 pounds (90.6 kg), applied to one foot (30.5mm) square area at any point on the infill.
         b) Infill includes panels, intermediate rails, posts and other elements.
         c) Design need not provide for infill loads to be applied concurrently with top rail loading.
         d) Horizontal members not to exceed 12 inch (305 mm) spacing over lens area of skylight.
      4) Finish: Provide powder coated paint finish to be selected from manufacturer’s standard colors.

2.4 DOWNSPOUT BOOTS

A. Where indicate or required provide heavy duty cast iron downspout boots as following:

1. Basis of Design: Model # R-4929 with clean-out as manufactured by Neenah Foundry Company; or approved equal.
   a. Barry Potter & Foundry,

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b. Jay R. Smith Mfg. Co.,
c. Or approved equal.

2. Size: as indicated on the drawings or as required to suit the existing conditions.
   a. Length: 3 feet minimum, and to suit indicated conditions.

3. Provide manufacturer's standard anchors.

4. Provide proper outlet flexible watertight connection to vertical downspout system and in accordance with applicable plumbing codes.

5. **Paint exposed to view surfaces in accordance with requirements of Section 09900.**

2.5 MISCELLANEOUS MATERIALS

A. Injectable Mortar: Provide and install injectable mortar at all post-installed anchors, as follows:

1. Except where indicated on the Drawings, post-installed anchors shall consist of the following anchor types as provided by Hilti, Inc.; or approved equal.
   a. Anchorage to Concrete
      1) Adhesive anchors for cracked and uncracked concrete:
         a) Hilti HIT-HY 200 Safe Set System with Hilti HIT-Z ROD; or approved equal, per ICC ESR-3187.
         b) Hilti HIT-HY 200 Safe Set System with Hilti Hollow Drill Bit System with HAS-E threaded rod; or approved equal, per ESR-3187.
         c) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System with HAS-E Threaded Rod; or approved equal, per ICC ESR-2322 for slow cure applications.
      2) Medium duty mechanical anchors for cracked and uncracked concrete:
         a) Hilti KWIK HUS-EZ and KWIK HUS EZ-I Screw Anchors; or approved equal, per ICC ESR-3027.
         b) Hilti KWIK BOLT-TZ Expansion Anchors; or approved equal, per ICC ESR-1917.
         c) Hilti KWIK BOLT 3 Expansion Anchors; or approved equal, (uncracked concrete only) per ICC ESR-2302.
      3) Heavy Duty mechanical anchors for cracked and uncracked concrete:
         a) Hilti HDA Undercut Anchors; or approved equal, per ICC ESR 1546.
         b) Hilti HSL-3 Expansion Anchors per ICC ESR 1545.
   b. Rebar Doweling into Concrete
      1) Adhesive anchors for cracked and uncracked concrete use:
         a) Hilti HIT-HY 200 Safe Set System with Hilti Hollow Drill Bit System; or approved equal, with continuously deformed rebar per ICC ESR-3187.
         b) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System; or approved equal, with continuously deformed rebar per ICC ESR-2322.
   c. Anchorage to Solid Grouted Masonry
      1) Adhesive Anchors:
         a) Hilti HIT-HY 70 Masonry Adhesive Anchoring System; or approved equal, (ICC pending).
         b) Steel anchor element shall be Hilti HAS-E Continuously Threaded Rod; or approved equal, or continuously deformed steel rebar.
      2) Mechanical Anchors:

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a) Hilti KWIK HUS-EZ Screw Anchor; or approved equal, per ICC ESR-3056.
b) Hilti KWIK BOLT-3 Expansion Anchors; or approved equal, per ICC ESR-1385.

d. Anchorage to Hollow/Multi-Wythe Masonry
1) Adhesive Anchors:
a) Hilti HIT-HY 70 Masonry Adhesive Anchoring System; or approved equal, per ICC ESR-3342.
b) Steel anchor element shall be Hilti HAS-E Continuously Threaded Rod; or approved equal, or continuously deformed steel rebar.
c) The appropriate size screen tube shall be used per adhesive manufacturer's recommendation.

2. Anchor capacity used in design shall be based on the technical data published by Hilti; or approved equal, or such other method as approved by the Architect/Structural Engineer. Substitution requests for alternate products must be approved in writing by the Architect/Structural Engineer. Contractor shall provide calculations demonstrating that the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by their having an ICC ESR showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions. Adhesive anchor evaluation will also consider creep, in-service temperature and installation temperature.

3. Install anchors per the manufacturer instructions, as included in the anchor packaging.

4. Overhead adhesive anchors must be installed using the Hilti Profi System; or approved equal.

5. The Contractor shall arrange an anchor manufacturer's representative to provide on-site installation training for all of their anchoring products specified. The Architect/Structural Engineer must receive documented confirmation that all of the Contractor's personnel who install anchors are trained prior to the commencement of installing anchors.

6. Anchor capacity is dependant upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the Drawings.

7. Existing reinforcing bars in the concrete structure may conflict with specific anchor locations. Unless noted on the Drawings that the bars can be cut, the Contractor shall review the existing structural drawings (if available) and shall undertake to locate the position of the reinforcing bars at the locations of the concrete anchors, by Hilti Ferroscan, GPR, X-Ray, chipping; or other approved equal means.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

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3.2 INSTALLATION

A. General

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors, as required.

2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

B. Setting Loose Lintels and Plates:

1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

2. Set Loose Lintels, leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 PIPE RAILINGS AND HANDRAILS

A. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

B. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

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1. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.

C. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.

D. Anchor rail ends to steel with aluminum oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.

E. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.

F. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.

G. For hollow masonry anchorage, use toggle bolts having square heads.

3.4 PORTABLE, FREE-STANDING GUARDRAIL SYSTEM FOR ROOF RAILINGS

A. Install in accordance with manufacturer's instructions.

B. Before installation, inspect all parts to insure no damaged parts are used.

C. Railing must be secured to base with securing pins.

D. Where there is a danger of falling materials onto someone below insert a steel Speed Board into the toeboard bracket on the base plate and secure with securing pins to base.

E. Use a Railguard 200 outrigger; or approved equal, at any interruption in continuous railing sections. Outrigger assembly consists of a 5 foot railing (1.52 m) with base plate pinned to railing and placed 90 degrees away from danger side of continuous railing.

3.6 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.8 mils.

B. For galvanize surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint.

END OF SECTION 05500

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SECTION 05510 – PIPE & TUBE RAILINGS

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. Aluminum tube railings.

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
   1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails:
      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Top Rails of Guards:
      a. Uniform load of 50 lbf/ ft. applied in any direction
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   3. Infill of Guards:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
      b. Uniform load of 25 lbf/sq. ft. applied horizontally.
      c. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials. Aluminum shall be coated with an alkaline resistant epoxy paint when inserted into concrete prior to grouting.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Manufacturer's product lines of mechanically connected railings.
   2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include detailed plans, elevations, sections, details, and attachments to other work.
   1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: For products involving selection of color, texture, or design.

D. Samples for Verification: For each type of exposed finish required.
   1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   2. Fittings and brackets.
   3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
      a. Show method of finishing members at intersections.

E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

F. Welding certificates.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

B. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, stairs, and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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:

1. Aluminum Pipe and Tube Railings:
    a. AlumaGuard Corp.
    b. ATR Technologies, Inc.
    c. Blum, Julius & Co., Inc.
    d. Braun, J. G., Company; a division of the Wagner Companies.
    e. CraneVeyor Corp.
    f. Hollaender Manufacturing Company.
    g. Moultrie Manufacturing Company.
    h. Pisor Industries, Inc.
    i. Sterling Dula Architectural Products, Inc.
    j. Superior Aluminum Products, Inc.
    k. Thompson Fabricating, LLC.
    l. Tubular Specialties Manufacturing, Inc.
    m. Tuttle Aluminum & Bronze.
    n. Wagner, R & B, Inc.; a division of the Wagner Companies.
    o. Approved equal

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 ALUMINUM

A. Aluminum, General: Provide 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 properties of alloy and temper designated below for each aluminum form required.

B. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52.

C. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.
   1. Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.

D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.

E. Plate and Sheet: ASTM B 209, Alloy 6061-T6.

F. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.

G. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.4 FASTENERS

A. General: Provide the following:
   1. Aluminum Railings: Type **316** stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:
   1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
   2. Provide tamper-resistant square or hex socket flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Provide torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
   1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections, unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

J. Form changes in direction as follows:
   1. By bending.
   2. By flush bends.
   3. By radius bends of radius indicated.
   4. By inserting prefabricated elbow fittings of radius indicated.

K. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of railing members with prefabricated end fittings.

M. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Mechanical Finish: AA-M12 (Mechanical Finish: nonspecular as fabricated).

C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet .
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement, 20 feet maximum. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 8 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

C. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch buildup, sloped away from post.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.
   2. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.
   3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ANCHORING RAILING ENDS

A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

3.6 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
   1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
   2. Use type of bracket with predrilled hole for exposed bolt anchorage.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:
   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.

3.7 ADJUSTING AND CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.8 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05510

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:

1. Dimensional lumber,
2. Wood nailers and blocking,
3. Rough hardware,
4. Construction panels.

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 as well as plywood and other panels; 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 unforseen 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 and similar supports to allow attachment of other Work.

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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 DIMENSION LUMBER

A. For light framing (2" to 4" thick, 2" to 4" wide) provide the following grade and species:

1. Construction grade: Any species of specified grade.

B. For structural framing (2" to 4" thick, 5" and wider), provide the following grade and species:

1. Any species and grade which meets or exceeds the following values:
   a. Fb (minimum extreme fiber stress in bending); 1500 psi.
   b. E (minimum modulus of elasticity); 1,500,000 psi.

C. For exposed framing lumber provide material complying with the following requirements:

1. Definition: Exposed framing refers to dimension lumber which is not concealed by other Work and is indicated to receive a stained or natural finish.

2. Grading: Hand select material at factory from lumber of species and grade indicated below for compliance with "Appearance" grade requirements of ALSC National Grading Rule; issue inspection certificate of inspection agency for selected material.

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3. Same species and grade as indicated for structural framing.

2.3 MISCELLANEOUS LUMBER

A. Provide wood for support or attachment of other Work including nailers, blocking, furring, stripping and similar members. Provide lumber of sizes indicated, 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.

2.4 CONSTRUCTION PANELS

A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.

B. Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.

C. Concealed APA Performance-Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

D. APA RATED SHEATHING

1. Exposure Durability Classification: EXTERIOR.
   a. Span Rating: As required to suit spacing indicated.

E. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

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4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
    a. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

F. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than 15/32".

2.5 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 ground contact, or 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.

2.6 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 AWPA 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 Bid 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 code requirements.

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PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Foretop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where foretops are not automatically provided by the framing system used, use close-fitted wood blocks of nominal 2" thick lumber of the same width as framing members.

B. 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.

C. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

D. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. 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. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

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.

3.3 INSTALLATION OF CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in Form No. E 30F, "APA Design/Construction Guide - Residential & Commercial," for types of construction panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Sheathing: Screw to framing or substrates.

END OF SECTION 06100

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SECTION 06650 - SOLID POLYMER FABRICATIONS

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. Plastic window stools.
2. Countertops.
3. Wall caps.

1.3 SUBMITTALS

A. Product Data: Written technical information for unit specified. Indicate product description, fabrication information and compliance with specified performance requirements.

B. Shop Drawings:

1. Submit rough-in drawings. Include the following details and all other information necessary to demonstrate compliance with Bid Documents:
   a. Dimensions.
   b. Required clearances.
   c. Methods of assembling components.
   d. Anchorages.
   e. Coordination requirements with adjacent work.

C. Samples: Submit minimum 2 inch by 2 inch samples. Indicate full range of colors and pattern variation. Approved samples will be retained as a standard for Work.

D. Certificates: Submit certification that Work complies with requirements of Bid Documents.

E. Manufacturer's Instructions: Submit for each product specified in this section.

1. Include installation instructions and instructions for examination, preparation and protection of adjacent Work.

F. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions and maintenance video.

1. Provide maintenance kit for indicated finishes. Include in project close-out documents.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver no components to project site until areas are ready for installation. Store indoors.

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B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.5 QUALITY ASSURANCE:

A. Allowable Tolerances: Variation in component size: ±1/8 inch.

1.6 WARRANTY:

A. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.

1. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.

PART 2 - PRODUCTS

2.1 SOLID POLYMER FABRICATIONS:

A. Basis of Design: Corian Surfaces as manufactured by Du Pont De Nemours & Co., Inc.; or approved equal.

B. Subject to compliance with indicated requirements manufacturers offering products which may be incorporated in the work include the following:

1. Meganite Inc.: Manufacturer's Rep: Richelieu Hardware,
2. LG Solid Surfaces,
3. Wilsonart: Manufacturer's Rep: Fessenden Hall Inc.,
4. Avonite Surfaces,
5. Or approved equal.

C. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124 1980, Type Six, and FS WW-P-541E/GEN dated August 1, 1980.

2.2 PERFORMANCE CHARACTERISTICS:

PROPERTY	REQUIREMENT (min/max)	TEST PROCEDURE
Tensile Strength	5000 psi min	ASTM D638
Tensile Modulus	1.0×10^6 psi min	ASTM D638
Flexural Strength	7000 psi min	ASTM D790
Flexural Modulus	1.0×10^6	ASTM D790
Elongation	0.3% min.	ASTM D638
Strain at Break	0.8% min.	ASTM D638

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Hardness	90-Rockwell "M" scale 52-Barcol Impressor min.	ASTM D758
Thermal Expansion	3.5 x 10^{-6} in/in/deg C max 1.95 x 10^{-6} in/in/deg F max	ASTM D696
Color Stability	No change, min. 100 hours	NEMA LD3-3.10
Wear and Cleanability	Passes	ANSI Z124.3
Abrasion Resistance	No loss of pattern Weight loss (1000 cycles)=0.9 g. max.	NEMA LD3-3.01 ANSI Z124.3
Boiling water Surface Resistance	No Change	NEMA LD3-3.05
High Temperature Resistance	No Change	NEMA LD3-3.06
Conductive Heat Resistance	No Change	NEMA LD3-3.08
Impact Resistance		
Notched Izod	0.24 ft.-lbs./in. of notch min.	ASTM D256, Method A
Gardner	9.0 ft-lbs min.	ASTM D3029
Ball drop		NEMA LD3-303
1/4" sheet	36" min. with 1/2 lb ball, no failure	
1/2" sheet	140" min. with 1/2 lb ball, no failure	
3/4" sheet	200" min. with 1/2 lb ball, no failure	
Stain Resistance	Passes	ANSI Z124.3
Weatherability	No change, min. 1000 hours	ASTM D1499-84
Fungi and Bacteria	No Attack	ASTM G21, ASTM G22
Specific Gravity	1.6 min.	

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Water Absorption Weight (% max.)	**24 hrs.** 0.05 (1/4") max. 0.10 (3/4") max.	**Long Term** 0.50 (1/4") max. 0.90 (3/4") max.	ASTM D570

Flammability ASTM E84

Solid Colors

	1/4"	**1/2"**	**3/4"**
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

Particulate Patterns

	1/4"	**1/2"**	**3/4"**
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

Pittsburgh Protocol Toxicity (as used by NY state)	solids-80 grams min. particulate patterns-65 grams min.	"LC50" Test

2.3 ACCESSORY PRODUCTS

A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.

B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, UL listed.

C. Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.

2.4 FABRICATION:

A. Factory fabricate components to greatest extent practical to sizes and shapes indicated, in

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accordance with approved shop drawings and manufacturer's printed Instructions and technical bulletins.

B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints. Reinforce with strip of solid polymer material, 2" wide.

C. Rout and finish component edges with clean, sharp returns. Rout cutouts, radii and contours to template. Smooth edges. Repair or reject defective and inaccurate work.

D. Window Stools: 1/2 inch thick solid polymer material, adhesively joined with inconspicuous seams, having round edge, 1" thick minimum and with 1" minimum projection from face of wall, unless otherwise shown on the Drawings.

1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group - 1 - 5.

E. Countertops: ½-inch thick solid polymer material, adhesively joined with inconspicuous seams, edge as indicated on the Drawings, unless otherwise indicated.

1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group - 1 - 5.

F. Wall Caps: 1-inch thick solid polymer material, adhesively joined with inconspicuous seams, edge as indicated on the Drawings, unless otherwise indicated.

1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group - 1 - 5.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Prior to final approval of shop drawings, erect at project site one full size mock-up of each component required, for Architect's review.

B. Should mock-up not be approved, re-fabricate and reinstall until approval is secured. Remove rejected units from project site.

C. Approved mock-ups may remain as part of finished work.

3.2 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Reinforce joints as required.

C. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the Work.

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3.3 CLEANING

A. Clean shop finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

3.4 PROTECTION

A. Contractor to take all precautions as recommended by the manufacturer for protection of installed window stools and other solid plastic products from damage by work of other Trades.

END OF SECTION 06650

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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 the 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: 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.

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1.4 PROJECT CONDITIONS

A. Occupancy:

1. The Owner will continue to occupy portions of the existing building.

B. Unforeseen Conditions: 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, Construction Manager 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, Construction Manager 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.

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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

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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 the Contract: Contractor shall include all labor, materials, services, installation, equipment, etc., necessary to complete all building insulation (except roof insulation) to achieve complete and tight building thermal barrier to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.

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 types include but are not limited to the following:
   a. Blanket type building insulation with foil facing for concealed application and unfaced for exposed application,
   b. Rigid board type perimeter insulation,
   c. Rigid board type cavity wall insulation,
   d. Blanket Thermal Insulation,
   e. Fire safing insulation with UL approved coating,
   f. Block Insulation Inserts.
   g. Acoustical insulation infill @ metal roof decking

3. Related Work:
   a. Section 03300 - Concrete Work,
   b. Section 04200 - Unit Masonry,
   c. Division 7 - Roofing Work.
   d. Section 07600 - Flashing, Sheet Metal and Roof Accessories,
   e. Section 07840 - Through-Penetration Firestop Systems,
   f. Section 09250 - Gypsum Drywall.

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.

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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 Bid 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. Extruded-Polystyrene Board Insulation:
   a. DiversiFoam Products.
   b. Dow Chemical Company.
   c. Owens Corning.
   d. Tenneco Building Products.
   e. Or approved equal.

2. Glass-Fiber Insulation:
   a. CertainTeed Corporation.
   b. Johns Manville.
   c. Owens Corning.
   d. Guardian Building Products, Inc.
   e. Knauf Insulation.
   f. Or approved equal.

3. Fire Safing Insulation:
   a. Industrial Insulation Group, LLC

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b. Fibrex Insulations.
c. Isolatek International.
d. Owens Corning.
e. Or approved equal.

B. Mineral/Glass Fiber Blanket/Batt Insulation

1. Inorganic fibers formed into flexible resilient blankets or semi-rigid resilient sheets:
   a. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with a max. flame-spread index of 25 and smoke-developed index of 50, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
   b. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

C. Mineral-Wool Board Insulation:

1. Semi-Refractory Fiber Board Fire Safing Insulation: Semi-rigid boards designed for use as a fire stop at openings between edge of slab and exterior wall panels, at top of masonry and wallboard walls/deck interface, and shall be produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders.

2. 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.

3. 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.

D. Rigid, closed-cell polystyrene insulation board; ASTM C578-87A, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.1% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 5 when tested in accordance with ASTM E84.

1. Basis of Design: Provide "Styrofoam Square Edge", by Dow Chemical Co., U.S.A.
   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) DiversiFoam Products.
      2) Owens Corning.
      3) Tenneco Building Products.
      4) Or approved equal.
   b. k-value of 0.20 per inch and an R value of 5.0 per inch.

2. ANSI/ASHRAE/IES Standard 90.1-2019, requires R-15 rigid insulation under all slab on grade conditions along the perimeter of the exterior wall.

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E. Rigid Insulation (cavity wall insulation)

1. Rigid, moisture resistant, closed-cell extruded polystyrene insulation board; ASTM C578, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.3% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 0 and smoke developed of 155, when tested in accordance with ASTM E84.
   a. Basis of Design: Provide "Cavitymate Ultra", by Dow Chemical Co., U.S.A.; or approved equal.
      1) Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
         a) DiversiFoam Products.
         b) Owens Corning.
         c) Tenneco Building Products.
         d) Or approved equal.
   b. R-value based on ASTM C518:
      1) 10.0 @ 75°F
      2) 10.8 @ 40°F
      3) 11.2 @ 25°F
   c. Thickness: 1-3/4", unless indicated otherwise.

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 to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that 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 complete and tight building thermal barrier, to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.

3. Provide indicated types 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.

4. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   a. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

5. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

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C. Batt Insulation

1. General:
   a. Set vapor barrier faced units with vapor barrier to warm side of construction.
   b. Tape joints and ruptures in vapor barriers, and seal each continuous area of insulation to surrounding construction to ensure vapor-tight installation.
   c. Insert and secure insulation to fill voids to create barrier to prevent the pass of air and moisture.

D. Cavity Wall Insulation

1. On units of plastic insulation, install small pads of mortar or mastic spaced approximately 1'-0" on center both ways on inside face, as recommended by manufacturer. Press courses of insulation between wall ties and other confining obstructions in the cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
   a. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 2'-0" on center both ways.

E. Perimeter Insulation

1. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.

F. 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.

G. Acoustical Metal Roof Deck Acoustical Insulation

1. Insert acoustic insulation infills directly into the troughs of the metal deck, ensuring that all joints are tightly butted.

2. Individual acoustic insulation infills can be cut down to shorter lengths using a sharp knife if required.

3. When handling acoustic insulation infills, they should be properly supported along their length.

H. 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

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SECTION 07214 - CLOSED CELL SPRAY FOAM 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 SECTION INCLUDES

A. Closed Cell Spray Foam Insulation.

1.3 RELATED SECTIONS

A. Section 07461 - Fiber Cement Siding.

B. Section 09250 - Gypsum Drywall

1.4 REFERENCES

A. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

C. ASTM C 1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

F. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

G. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

H. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

I. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

J. ASTM D 2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

K. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.

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1.5 PERFORMANCE REQUIREMENTS

A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.

1.6 SUBMITTALS

A. Submit under provisions of AIA A232 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. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a recommended minimum of ten (10) years' experience manufacturing products in this section shall provide all products listed.

B. Installer Qualifications: Products listed in this section shall be installed by a single organization with a recommended five (5) years' experience successfully installing insulation on projects of similar type and scope as specified in this section.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.

2. Do not proceed with remaining Work until workmanship is approved by Architect.

3. Refinish mock-up area as required to produce acceptable Work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Storage: Store materials in dry locations with adequate ventilation, protected from freezing rain, direct sunlight and excess heat and in such a manner to permit easy access for inspection and handling. Store at temperature between 55 and 80°F (12.7 to 26.6°C).

C. Handling: Handle materials to avoid damage.

1.9 PRE-APPLICATION MEETINGS

A. Convene minimum two weeks prior to starting Work of this section.

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1.10 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 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.

B. Do not apply insulation when substrate temperatures are under 40°F (4.4°C) prior to installation.

C. Surfaces must be dry prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure.

D. To avoid overspray, product should not be applied when conditions are windy.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: CertainTeed Corp., Insulation Group; 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. NCFI Polyurethanes, Div. of BMC,
   b. Or approved equal.

B. Requests for substitutions will be considered in accordance with provisions of AIA A232 and Section 00800.

2.2 SPRAY FOAM INSULATION

A. Insulation: HFC-blown type Closed Cell Foam: CertainTeed CertaSpray Closed Cell Foam; or approved equal, is a medium-density, MDI-based polyurethane thermoset rigid foam. When CertaSpray A-side closed cell; or approved equal, is mixed with CertaSpray B-side closed cell; or approved equal, under pressure in a 1:1 volumetric ratio, they react and expand into a medium-density closed cell foam with an in-place core density of 1.9 - 2.2 pcf:

1. Physical and Mechanical Properties:
   a. Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D 1622.
   b. Thermal Resistance (aged): 5.8 less than or equal to 2-1/2 inches / 6.4 when greater than 2-1/2 inches when tested in accordance with ASTM C 518 at 75°F, (h-ft2- degrees F)/Btu.
   c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75°F, (h-ft2- degrees F)/Btu.
   d. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.
   e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM

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D 1621.
f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75°F/95 percent RH, 28 Day.
i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m2.
k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.

2. Fire performance
a. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.
b. Smoke: Less than 450 when tested in accordance with ASTM E 84.

3. Thermal Performance (aged): Tested in accordance with ASTM C 518 and/or ASTM C 177 at 75°F (24°C) mean temperature.
a. Thickness 1 inch (25 mm), R-Value 5.8 (h-ft2-degreesF)/Btu (1.0 (m2-degreesC)/W).
b. Thickness 1-12 inches (38 mm), R-Value 8.7 (h-ft2-degreesF)/Btu (1.5 (m2-degreesC)/W).
c. Thickness 2 inches (51 mm), R-Value 11.6 (h-ft2-degreesF)/Btu (2.0 (m2-degreesC)/W).
d. Thickness 2-12 inches (64 mm), R-Value 16.0 (h-ft2-degreesF)/Btu (2.8 (m2-degreesC)/W).
e. Thickness 3 inches (76 mm), R-Value 19.2 (h-ft2-degreesF)/Btu (3.4 (m2-degreesC)/W).
f. Thickness 3-12 inches (89 mm), R-Value 22.4 (h-ft2-degreesF)/Btu (3.9 (m2-degreesC)/W).
g. Thickness 4 inches (102 mm), R-Value 25.6 (h-ft2-degreesF)/Btu (4.5 (m2-degreesC)/W).
h. Thickness 4-12 inches (114 mm), R-Value 28.8 (h-ft2-degreesF)/Btu (5.1 (m2-degreesC)/W).
i. Thickness 5 inches (127 mm), R-Value 32.0 (h-ft2-degreesF)/Btu (5.6 (m2-degreesC)/W).
j. Thickness 5-12 inches (140 mm), R-Value 35.2 (h-ft2-degreesF)/Btu (6.2 (m2-degreesC)/W).
k. Thickness 6 inches (152 mm), R-Value 38.4 (h-ft2-degreesF)/Btu (6.8 (m2-degreesC)/W).

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction have been completed to the point where the insulation may correctly be installed.

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C. Verify that substrate and cavities are dry and free of any foreign material that will impede application.

D. Verify that mechanical and electrical services in walls have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Mask and protect adjacent surfaces from overspray or dusting.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions. Product must be installed according to local code, and must be applied by a qualified applicator.

B. Apply insulation by spray method, to uniform monolithic density without voids.

C. Apply to minimum cured thickness as indicated on the Drawings or as scheduled at the end of this Section.

D. Apply to minimum cured thickness of **3-5/8-inches**.

E. Apply to achieve thermal resistance **R-Value of 22.4.**

F. Apply insulation to fill voids around doors and windows. Apply insulation to fill voids around accessible service and equipment penetrations.

G. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180°F (82°C) or greater.

H. Where building is designed to meet the specific air tightness standards of the Energy Star Program, apply insulation as recommended by manufacturer to provide airtight construction. Apply sealant to joints between structural assemblies as specified in Division 7.

I. Coordinate installation of protective covering specified in Section 09250.

J. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

A. Inspection will include verification of insulation and density.

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3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 SCHEDULES

A. For the following location(s), apply the average cured thickness indicated.

1. Thermal insulation within exterior walls: 3-5/8-inches.

END OF SECTION 07214

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SECTION 07242 - DIRECT APPLIED FINISH SYSTEM FOR SOFFITS (DEFS)

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 direct applied finish system for soffits is indicated on Drawings.

B. Metal stud system for exterior framing supporting gypsum sheathing behind system is specified in a Section 05450 - Cold Formed Metal Framing.

C. Sealing joints is specified in this section.

1.3 DEFINITIONS

A. System in this section refers to direct applied finish system (DEFS). This System is designed as an exterior finish surface for exterior soffits.

B. System manufacturer refers to the manufacturer's approved application for indicated finish system.

1.4 DESIGN REQUIREMENTS

A. Maximum allowable system deflection, normal to the plane of the soffit, of L/360.

B. Wind load design shall be in conformance with requirements of the International Building Code/2021, NJ ed. requirements.

C. Prevent the accumulation of water behind the finish system, either by condensation in the soffit or leakage through other components of construction, by proper design and detailing of the soffit and related construction.

D. Provide a minimum ½ inch wide expansion joints in the system where they exist in the substrate or supporting construction, at a minimum of every 30 feet (up to a maximum area of 900 sq. ft.), and where the system adjoins dissimilar construction or materials.

E. Provide a minimum 1/4 inch wide sealant joints at penetrations through the system (lights, vents, etc.).

F. Provide compatible backer rod and sealant, or suitable accessories for system terminations or joints.

1.4 PERFORMANCE REQUIREMENTS

A. System Performance:

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1. Impact Resistance: ASTM E 2486 - High impact, 90 to 150 in-lbs with one layer of Sto; or approved equal, Mesh.

2. Adhesion: ASTM C-297, Minimum 10 psi; Passed.

3. Adhesion after 10 Freeze/Thaw Cycles, ASTM C-297, Minimum 10 psi; Passed.

B. Component Performance - Acrylic Based Finishes

1. Accelerated Weathering: ASTM G-153; No deleterious effects(no cracking, checking, crazing, erosion, rusting, blistering, peeling or delamination, at 2000 hours when viewed under 5x magnification; Passed.

2. Freeze/Thaw Resistance: ICC-ES AC 59; No deleterious effects* at 10 cycles; Passed.

3. Mildew Resistance: ASTM D-3273, No growth supported during 28 day exposure period; No growth at 28 days.

4. Surface Burning: ASTM E-84, All Components Flame Spread less than 25, Smoke Developed less than 450; Passed.

1.5 SUBMITTALS

A. Manufacturer's Specifications, details, installation instructions and product data.

B. Applicator's certificate of instruction.

C. Samples for approval as directed by Architect.

D. Manufacturer's standard warranty.

E. A list of minimum five (5) job references.

F. Prepare and submit project-specific details documents.

1.6 QUALITY ASSURANCE

A. Manufacturer requirements

1. Member in good standing of the EIFS Industry Members Association (EIMA).
2. System manufacturer with a recommended ten (10) years.

B. Installer Requirements:

1. Engaged in application of the specified Finish System for Soffits or similar systems for a recommended three (3) years.

2. Knowledgeable in the proper use and handling of the manufacturer’s materials.

3. Employ skilled workers who are experienced and knowledgeable in plastering application for soffits, and familiar with the requirements of the specified work.

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4. Successful completion of recommended minimum 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 Sto's; or approved equal, published Specifications and details and the project plans and Specifications.

1.7 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 32°F (0°C) 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.

1.8 PROJECT / SITE CONDITIONS

A. Note: Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying and may require adjustments in the scheduling of work 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.

1. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24 hours after application of coatings.

2. Provide supplementary heat for installation in temperatures less than 40°F (4°C).

3. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.9 WARRANTY

A. Provide manufacturer's standard labor and material warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Provide “Sto Quik Gold Soffit System”, as manufactured by Sto Corp.; or approved equal.

B. Provide components from single source manufacturer or approved supplier.

2.2 ACCESSORIES

A. Corner bead, casing bead, starter track, expansion and control joint accessories. All accessories shall meet the requirements of ASTM C 1063 and its referenced documents. Accessories shall be vinyl (ASTM D 1784) as selected by Architect.

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2.3 SHEATHING

A. Gypsum Core sheathing in accordance with Section 09250.

B. Minimum ½ inch (13 mm) thick Glass Mat Faced Gypsum Board complying with ASTM C 1177.

2.4 GROUND COAT

A. Sto RFP; or approved equal, a one component acrylic non-cementitious, fiber reinforced acrylic base coat with water repellant additive.

2.5 REINFORCING MESH

A. Sto; or approved equal, Mesh: Nominal 4.5 oz./yd^2 (153 g/m^2), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto; or approved equal, materials.

B. Sto; or approved equal, Corner Mat: Nominal 6.25 oz./yd^2 (212 g/m^2), pre-creased, heavy-duty, open-weave woven glass fiber fabric with alkaline-resistant coating for compatibility with Sto; or approved equal, materials (used for maximum impact protection at inside and outside corners).

2.6 PRIMER

A. StoSilco; or approved equal, Primer

1. Silicone-enhanced primer (Sto; or approved equal), silicone-enhanced finishes.

2.7 FINISH COAT

A. Sto; or approved equal, silicone-based textured finish coating.

2.8 MIXING

A. Mix only as much material as can readily be used and in accordance with manufacturer's instructions.

B. Do not use anti-freeze compounds or other additives.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

A. Pre-qualification under Quality Assurance requirements of this Specification.

3.2 EXAMINATION

A. Inspect structural framing for:

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1. Straightness, trueness and uniformity of dimension.

2. Compliance with tolerances—horizontal alignment within 1/8 inch in 10 feet (3 mm in 3 m) of the soffit length.

3. Framing construction—framing members provided wherever joints in sheathing occur and constructed in accordance with applicable building code requirements.

B. Inspect sheathing surfaces for:

1. Contamination—algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.

2. Cracks—measure crack width and record location of cracks.

3. Damage and deterioration.

4. Moisture content and moisture damage—use a moisture meter to determine if the surface is dry enough to receive the coatings and record any areas of moisture damage.

5. Compliance with specification tolerances—record areas that are out of tolerance (greater than 1/4 inch in 8-0 feet (6mm in 2438 mm) deviation in plane).

C. Inspect sheathing application for compliance with applicable requirement:

1. Glass Mat Faced Gypsum Sheathing — Georgia Pacific Publication #102250; or approved equal.

D. Report deviations from the requirements of project Specifications or other conditions that might adversely affect the installation to the Contractor.

3.3 SURFACE PREPARATION

A. Replace weather damaged sheathing and repair damaged or cracked surfaces.

B. Level surfaces to comply with required tolerances.

3.4 INSTALLATION

A. Accessory Installation:

1. Install appropriate starter accessory.

2. Install appropriate casing bead accessories at system terminations (such as expansion or control joints, lights or vent strips, etc.) in accordance with locations indicated on shop drawings. Maintain a gap of minimum 1/4" (6 mm) between the accessory and the abutment to form a sealant joint.

3. Follow accessory manufacturer's instructions for accessory butt joints to maintain watertightness.

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4. Provide expansion joints in sheathing at minimum intervals of 30 feet (9.1 m) up to a maximum area of 900 square feet (82.8 m^2), wherever the system abuts dissimilar construction or an existing joint occurs in construction. Fit sheathing snugly into accessories prior to attachment.

5. Fasten surface mount accessories (casing beads and surface mount expansion joints) through the sheathing into framing at locations indicated on Architectural Drawings. Where necessary, level surfaces such as outside corners with appropriate leveling material to maintain plumbness and squareness.

B. Base Coat Application:

1. Apply base coat over the sheathing with proper spray equipment or a stainless steel trowel to a uniform thickness of approximately 1/16 inch (1.6 mm). Apply base coat in strips of 40 inches (1 m) and immediately embed reinforcing mesh into the wet base coat by troweling from the center to the edge of the mesh. Avoid wrinkles in the mesh. Overlap the mesh minimum 2-1/2 inches (64 mm) at mesh joints and stagger mesh overlaps minimum 8 inches (200 mm) from sheathing joints.

2. Where surface mount accessories are used, such as deep "V" expansion joint, overlap the mesh from the sheathing onto the perforated accessory flange.

3. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Feather mesh overlaps to avoid reading the mesh through the finish coating. Allow base coat to thoroughly dry before applying primer or finish.

4. Tape joints with a 6 inch (150 mm) wide strip of mesh embedded in base coat, then apply minimum 1/16 inch (1.6 mm) thick base coat over the entire surface of the sheathing. Feather the taped sheathing joints to avoid reading the joints through the finish coating.

C. Finish Coat Application:

1. Apply finish directly over the primed base coat, only after the base coat/primer has thoroughly dried. Apply the finish by spraying, or troweling with a stainless steel trowel, depending on finish specified. General rules for application of finishes are as follows:
   a. Avoid application in direct sunlight.
   b. Apply finish in a continuous application, always working to a wet edge.
   c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying and may require adjustments in the scheduling of work 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 finish on accessories.
   e. Float "R" (rilled texture) with a plastic trowel to achieve their rilled texture.
   f. Do not install separate batches of finish side-by-side.
   g. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the project Specifications.

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D. Sealant Installation:

1. Seal all open joints in the system with appropriate sealant in accordance with sealant manufacturer's recommendations to prevent any water from getting into or behind the system.

END OF SECTION 07242

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SECTION 07270 - FLUID APPLIED AIR / VAPOR BARRIERS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. The General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01- General Requirements shall be read in conjunction with and govern this section.

B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the installing Subcontractor the extent of their Work.

1.02 SUMMARY

A. This Section includes requirements for supplying labor, materials, tools, and equipment to complete the Work, as shown on the Drawings and as specified herein including, but not limited to, the following:

1. Adhesive/Primer
2. Fluid Applied Impermeable Air and Vapor Barrier
3. Air Barrier/Thru-wall Flashing
4. Sealant
5. Insulation Adhesive

1.03 RELATED SECTIONS

A. Section 04200 - Unit Masonry

B. Section 05500 - Metal Fabrications

C. Section 07200 - Building Insulation

D. Section 07500 - Roofing, General

E. Section 07530 - Single-Ply Roofing Membrane System

F. Section 07600 - Flashing, Sheet Metal and Roofing Accessories

G. Section 07900 - Joint Sealer Assemblies

H. Section 08410 - Aluminum/FRP Doors

I. Section 08415 –Aluminum Storefront

1.04 SUBSTITUTIONS

A. Submit requests for substitutions in accordance with AIA A232 and Section 00800.

B. Substitution submission format to include:

1. Evidence that alternate materials meet or exceed performance characteristics of product requirements and documentation from an approved independent testing

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laboratory certifying that the performance of the system including auxiliary components exceed the requirements of the local building code.

2. References clearly indicating that the Air / Vapor Barrier Manufacturer has successfully completed projects of similar scope and nature on an annual basis for a recommended minimum of ten (10) years.

3. Air / Vapor Barrier Manufacturer's guide specification.

4. Air / Vapor Barrier Manufacturer's complete set of technical data sheets for assembly.

5. Air / Vapor Barrier Manufacturer's complete set of details for assembly.

6. Product certification confirming assembly components are supplied and warranted by a single source Air / Vapor Barrier Manufacturer.

7. Air / Vapor Barrier Manufacturer statement that anticipated wall assembly compliance with NFPA 285.

8. Sample warranty, as specified.

C. Submit requests for substitutions to this specification within fourteen (14) days following award date. Include a list of a recommended twenty (20) projects executed over the past five (5) years.

D. Substitute materials not approved in writing shall not be permitted for use on this project.

1.05 REFERENCES

A. American Architectural Manufacturers Association (AAMA):

1. AAMA 711-13 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products
2. AAMA 2400-02 - Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction

B. American Society for Testing and Materials (ASTM):

1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting
2. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure

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Differences Across the Specimen

6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
7. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials
8. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

C. National Fire and Protection Agency (NFPA):

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.06 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation meetings:
1. When required, and with prior notice, an Air / Vapor Barrier Manufacturer representative will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the assembly.

1.07 SUBMITTALS

A. Provide the following requested information in accordance with AIA A232 and Section 00800 - Submittal Procedures.

B. Action Submittals:

1. Product Data:
   a. Air / Vapor Barrier Manufacturer's guide Specification.
   b. Air / Vapor Barrier Manufacturer's complete set of technical data sheets for assembly.
   c. Air / Vapor Barrier Manufacturer's complete set of guide details for assembly.

2. Certificates:
   a. Product certification confirming assembly components are supplied and warranted by a single source Air / Vapor Barrier Manufacturer.
3. Tests and Evaluation Reports:

   a. NFPA 285 wall assembly compliance:
      1) Air / Vapor Barrier Manufacturer statement that anticipated wall assembly complies with NFPA 285.
4. Warranty:
   a. Sample warranty, as specified.

1.08 QUALITY ASSURANCE

A. Single Source Responsibility:
1. Obtain air barrier and auxiliary materials including adhesive/primer, air barrier,

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flashings, and sealants from a single Air / Vapor Barrier Manufacturer regularly engaged in the manufacturing and supply of the specified products.

2. Contactor to verify product compliance with Federal, State, and Local regulations controlling use of Volatile Organic Compounds (VOC).

B. Manufacturer Qualifications:

1. Air / Vapor Barrier Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
   a. Air / Vapor Barrier Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.

C. Installer Qualifications:

1. Perform Work in accordance with the Air / Vapor Barrier Manufacturer's published literature and as specified in this section.
2. Maintain one (1) copy of the Air / Vapor Barrier Manufacturer's installation instructions on site.
3. At all times during the execution of the Work allow access to site by the Air / Vapor Barrier Manufacturer representative.
4. If meeting with the Air / Vapor Barrier Manufacturer during project construction, contact the Air / Vapor Barrier Manufacturer a minimum of two weeks prior to schedule meeting.

1.09 MOCK-UPS

A. Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 04200 for mock-ups and as follows:

1. Where directed by Architect, construct typical exterior wall section, incorporating substrate materials, and adjacent materials including flashing, typical wall opening (door / storefront system), attachment of insulation; showing vapor permeable water resistive air barrier application details.

B. Notify Architect and Construction Manager a minimum seven (7) days prior to mock-up construction.

C. Review and acceptance of mock-ups does not constitute approval of deviations from the Bid Documents contained in mock-ups unless Architect specifically notes such deviations in writing.

D. Once reviewed by Architect and Construction Manager, acceptable mock-up can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.

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E. Remove and replace materials found unacceptable at no additional cost to the Owner.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:
1. Materials shall be delivered to the jobsite in unopened, undamaged and clearly marked containers indicating the name of the Air / Vapor Barrier Manufacturer and product.

B. Storage of Materials:
1. Store materials as recommended by the Air / Vapor Barrier Manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, SDS information, Product Data sheets, product labels, and specific instructions for personal protection.
2. Keep solvents away from open flame or excessive heat.
3. Store materials in original packaging.
4. Protect rolls from direct sunlight until ready for use.
5. Refer to Air / Vapor Barrier Manufacturer's published literature.

C. Handling:
1. Refer to Air / Vapor Barrier Manufacturer's published literature.

1.11 SITE CONDITIONS

A. Environmental Requirements:
1. No Work shall be performed during rain or inclement weather.
2. No Work shall be performed on frost covered or wet surfaces.

B. Protection:

1. It is the responsibility of the installing (Sub)Contractor to protect all surfaces not included in scope of Work from overspray including, but not limited to, windows, doors, adjacent areas, and vehicles.

2. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Do not proceed with the application of the field air barrier until the roof has been installed

C. Ensure all preparation Work is completed prior to installing air barrier.

D. All equipment shall be grounded during operations.

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1.12 WARRANTY

A. Manufacturer's Single Source Warranty:

1. Fluid Applied Air and Vapor Barrier:
   a. Product Warranty: Manufacturer warrants the material against product defect for a period of **five (5) years** from date of purchase.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Air / Vapor Barrier and auxiliary materials must be obtained as a single-source from the Air / Vapor Barrier Manufacturer to ensure total system compatibility and integrity.

B. Basis of Design: Henry® 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. Equivalent by GCP Applied Technologies;
   b. Equivalent by W.R. Meadows;
   c. Or approved equal.

2.02 MATERIALS

A. Air / Vapor Barrier Primary Fluid-Applied, Air and Vapor Barrier - Basis of Design: Henry® Air-Bloc® 16MR, or approved equal:

1. Fluid-applied vapor impermeable air and water barrier consisting of a single component water-based elastomeric formulation that cures to a tough monolithic rubber-like membrane; having the following typical physical properties:
   a. Color: Gray
   b. Water Vapor Permeance (ASTM E96 Method A): 0.03 perms
   c. Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
   d. Air Permeance (ASTM E2178): Pass
   e. Elongation (ASTM D412): 270%
   f. Tensile Strength (ASTM D412): 100 psi (689 kPa)
   g. Surface Burning Characteristics (ASTM E84):
      1) Flame Spread: Class A
      2) Smoke Development: Class A
   h. Minimum Application Temperature: 20℉ (-6℃)
   i. Water Penetration Resistance Around Nails (ASTM D1970): Pass
   j. Maximum VOC:100 g/l

2. Assembly Auxiliary Materials:
   a. Adhesives/Primers:
      1) Low VOC adhesive:
         a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
            (1) Basis of Design: Henry® Blueskin® LVC Adhesive, or approved

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equal.
(2) Color: Blue
(3) Maximum VOC: <240 g/L
(4) Drying time (initial set): 30 minutes
(5) Low Application Temperature: 10°F (-12°C)

2) Quick setting primers:
a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
(1) Basis of Design: Henry® Blueskin® LVC Spray Primer, or approved equal.
(2) Color: Blue
(3) Maximum VOC: 250 g/L
(4) Dry time: 1-3 minutes
(5) Low Application Temperature: 40°F (4.4°C)

b) Polymer emulsion water based quick setting adhesive with low VOC content; having the following typical physical properties:
(1) Basis of Design: Henry® Aquatac™ Primer, or approved equal.
(2) Color: Aqua
(3) Maximum VOC: 50 g/L
(4) Drying time (initial set): 30 minutes
(5) Low Application Temperature: 25°F (-4°C)

b. Liquid-Applied Flashing:
1) Moisture-curing single component elastomeric liquid-applied flashing using a highly advanced Silyl-Terminated Polyether (STPE) polymer curing to a monolithic membrane; having the following typical physical properties:
a) Basis of Design: Henry® Air-Bloc® LF Liquid-Applied Flashing, or approved equal.
b) Color: Blue
c) Air Permeance (ASTM E2178): Pass
d) Water Vapor Permeance (ASTM E96): 21.8 perms @ 25 mils
e) Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
f) Water Resistance (AC212/ASTM D2247): Pass
g) Nail Sealability (AAMA 711): Pass
h) Surface Burning Characteristics (ASTM E84):
(1) Flame Spread: Class A
(2) Smoke Development: Class A
i) Elongation (D412): 264%
j) Low Application Temperature: 20°F (-7°C)

c. Self-Adhered Flashing:

Note: The following product is to be used in conjunction with the stainless steel fabric flashing as specified in Section 04200. The self-adhered flashing shall overlap the stainless steel fabric flashing.

1) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of a synthetic butyl compound integrally laminated to a white

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engineered polypropylene film surface; having the following typical physical properties:

a) Basis of Design: Henry® Blueskin® Butyl Flash, or approved equal.
b) Color: White
c) Thickness: 14 mils (0.36 mm)
d) Water Vapor Permeance (ASTM E96): 0.14 perms
e) Nail Sealability (ASTM D1970): Pass
f) Elongation (ASTM D412): 825% minimum
g) Low Application Temperature: 25°F (-4°C)

2) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a high strength polyethylene with surface layer of metallic aluminum film; having the following typical physical properties:

a) Basis of Design: Henry® Metal Clad® Self-Adhered Water Resistive Air Barrier, or approved equal.
b) Color: Metallic Aluminum
c) Thickness: 45 mils (1.14 mm)
d) Water Vapor Permeance (ASTM E96): 0.014 perms
e) Nail Sealability (ASTM D1970): Pass
f) Elongation (ASTM D412): 85%
g) Low Application Temperature: 20°F (-7°C)

3) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:

a) Basis of Design: Henry® Blueskin® SA Self-Adhered Water Resistive Air Barrier, or approved equal.
b) Color: Blue
c) Thickness: 40 mils (1 mm)
d) Water Vapor Permeance (ASTM E96): 0.86 perms
e) Nail Sealability (ASTM D1970): Pass
f) Elongation (ASTM D412-modified): 200% minimum
g) Low Application Temperature: 41°F (5°C)

4) Low temperature non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:

a) Basis of Design: Henry® Blueskin® SA LT Low Temp Self-Adhered Water Resistive Air Barrier, or approved equal.
b) Color: Blue
c) Thickness: 40 mils (1 mm)
d) Water Vapor Permeance (ASTM E96): 0.86 perms
e) Nail Sealability (ASTM D1970): Pass
f) Elongation (ASTM D412-modified): 200% minimum
g) Low Application Temperature: 10°F (-12°C)

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d. Sealants:
1) Building Envelope Sealant:
a) Moisture cure, medium modulus polymer modified sealing compound; having the following typical physical properties:
(1) Basis of Design: Henry® 925 BES Sealant, or approved equal.
(2) Color: Varies
(3) Elongation: 450 - 550%.

e. Joint Treatment Mesh:
1) Open weave glass fabric yarn saturated with synthetic resins, having the following typical physical properties:
a) Basis of Design: Henry® 183 Repair Fabric Yellow Fiberglass, or approved equal.

3. Additional Materials:
a. Through-Wall Flashing:
1) Non-vapor permeable self-adhered through-wall flashing consisting of an SBS rubberized asphalt compound integrally laminated to a yellow engineered thermoplastic film surface; having the following typical physical properties:
a) Basis of design: Henry® Blueskin® TWF Thru-Wall Flashing, or approved equal.
b) Color: Yellow
c) Thickness: 40 mils (1.0 mm)
d) Water Vapor Permeance (ASTM E96): 0.03 perms
e) High Temperature Stability - Flow Resistance (ASTM D5147): Pass
f) Low Application Temperature: 20°F (-7°C)

b. Insulation Adhesive:
1) Trowel grade solvent-type, synthetic rubber-based insulation contact adhesive; having the following typical physical properties:
a) Basis of Design: Henry® Air-Bloc® 21 Air and Vapor Barrier & Insulation Adhesive, or approved equal.
b) Color: Cream
c) Water Vapor Permeance (ASTM E96): 0.03 perms
d) Maximum VOC: < 250 g/L

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Verify substrates to receive Work and surrounding adjacent surfaces are in accordance with Air / Vapor Barrier Manufacturer published literature prior to installation of self-adhered air barrier assembly.

2. Existing substrate must be continuous and secured prior to application of air barrier.

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3. Sheathing panels must be securely fastened and installed flush to ensure a continuous substrate in accordance with Air Barrier Manufacturer published literature.

4. Fastener penetrations must be set flush with sheathing and fastened into solid backing.

5. Strike masonry joints full and flush.

6. Concrete surfaces shall be smooth and without large voids, spalled areas or sharp protrusions.

7. New concrete should be cured for a minimum of sixteen (16) hours after forms are removed.

8. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

9. Do not install air barrier over saturated substrates.

B. Notify Contractor in writing of any conditions that are not acceptable.

C. The installing Contractor shall examine and determine that surfaces and conditions are ready to accept the Work of this section in accordance with published literature. Commencement of Work or any parts thereof shall mean installer's acceptance of the substrate.

D. Do not apply air barrier until substrate and environmental conditions are in accordance with Air / Vapor Barrier Manufacturer's published literature.

3.02 PREPARATION

A. All surfaces must be sound, dry, clean, and free of oil, grease, dirt, excess mortar, frost, laitance, loose and flaking particles, or other contaminants.

B. Protect adjacent surfaces not included in scope of Work to prevent spillage and overspray.

C. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.

D. Hot weather or direct-sun applications over porous substrates, such as concrete, promote rapid surface drying and can form blisters in the fluid applied membrane air barrier during curing. To aid in blister prevention prepare substrate in accordance with one of the following optional procedures:
   1. Prime Coat:
      a. Apply a thin prime coat of air barrier to substrate.
      b. Allow air barrier to fully cure prior to subsequent application.
      c. Install air barrier to Air / Vapor Barrier Manufacturer minimum recommended mil thickness.

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2. Two Coat:
    a. Apply air barrier to achieve one-half (1/2) of Air / Vapor Barrier Manufacturer minimum recommended mil thickness.
    b. Allow air barrier to fully cure prior to subsequent application.
    c. Apply air barrier to achieve one-half (1/2) of Air / Vapor Barrier Manufacturer minimum recommended mil thickness.
    d. Overall dry mil thickness shall be in accordance with Air / Vapor Barrier Manufacturer published literature.

3.03 INSTALLATION

A. Ensure substrate is ready to receive air barrier in accordance with Air / Vapor Barrier Manufacturer's published literature.

B. Temperature limitation:

C.

1. Primary air barrier:
    a. Substrate temperature must be above 20℉ (-6℃) and rising.

2. Auxiliary products:
    a. Temperature limitations may vary. Refer to Air / Vapor Barrier Manufacturer published literature.

C. Application of Flashing:

1. Self-adhered Flashing:
    a. Where required install adhesive/primer recommended by Air / Vapor Barrier Manufacturer continuously at rate recommended ensuring complete substrate coverage of anticipated flashing installation area.
        1) Allow adhesive/primer to cure to a tacky film prior to application of flashing.
        2) Only apply adhesive/primer to surfaces which will be covered during the same working day. Primed areas not covered by end of day must be re-primed prior to installation of flashing.
    b. Measure and cut self-adhered flashing to ensure adequate length to achieve continuous coverage of desired installation.
    c. Peel protective film from self-adhered flashing and align top of membrane verifying proper positioning prior to complete film removal and flashing placement.
    d. Press self-adhered flashing firmly into place by applying hand pressure to the middle of the membrane and working the pressure to the edges eliminating wrinkles and air bubbles.
    e. Install self-adhered flashings in shingle fashion to eliminate reverse laps.
    f. Where required, prime laps at rate recommended by air barrier manufacture to ensure complete coverage of anticipated lap installation.
    g. Lap adjoining edges a minimum of two (2) inches.
    h. Roll flashing and laps with countertop roller to obtain thorough adhesion.
    i. Seal end of day exposed reverse laps of self-adhered flashing with building envelope sealant.

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D. Detailing/Flashing:

1. Complete detailing and flashing installations per Air / Vapor Barrier Manufacturer's published literature.

2. Refer to Air / Vapor Barrier Manufacturer guide details for further clarification and installation procedures including, but not limited to, the following:
   a. Inside corners
   b. Outside corners
   c. Pipe penetrations
   d. Shelf angles
   e. Wall to foundation transitions
   f. Rough openings:
      1) Install rough opening details per Window Manufacturer's published literature and in accordance with ASTM E2112.
      2) Wall assemblies containing a vapor retarder on the interior wall assembly:
         a) Extend flashing into rough opening to ensure sufficient membrane for connection with vapor retarder and provide a continuous air barrier assembly.
      3) Reverse laps:
         a) Seal permanently exposed reverse laps with sealant:
            (1) Building envelope sealant
            (2) Liquid flashing
      4) Moving Joints:
         a) Contact Air / Vapor Barrier Manufacturer.
      5) Transitions:
         a) Contact Air / Vapor Barrier Manufacturer to coordinate transition of self-adhered air barrier to adjacent areas including, but not limited to, the following:
            (1) Roof to air barrier
            (2) Air barrier to waterproofing
            (3) Fastener penetrations

E. Thru-Wall Flashing: Coordinate with Sections 04200, 07600 and 08415.

E. Application of Primary Fluid-Applied, Air and Vapor Barrier:

1. Apply air barrier in continuous, monolithic application without sags, runs, or voids, transitioning onto flashing membrane and overlapping one (1) inch, to create uniform drainage plane and air barrier.

2. Install air barrier so that subsequent membrane installation laps one (1) inch onto flashing ensuring an air and air barrier assembly.

3. Allow air barrier to fully cure prior to placement of insulation.

4. Total Dry Film Thickness (DFT):
   a. Coverage rates may vary due to surface texture or porosity. Refer to Air / Vapor Barrier Manufacturer Technical Data Sheet for recommended coverage rates.

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F. Insulation Adhesive:

1. Coordinate with Section 07200 for insulating materials.

2. Upon curing of the air barrier apply insulation adhesive in a serpentine pattern.

3. Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.

4. Fully butter all joints of insulation panels with adhesive during installation, with the exception of expansion joints.

G. Fastener Penetrations Through Primary Air Barrier:

1. It is the responsibility of the installer penetrating the air barrier assembly to properly install fasteners and components in accordance with the Air / Vapor Barrier Manufacturer's published literature.

2. Installation requirements:
   a. Drill fasteners and components with sufficient compression to maintain continuity in the air barrier assembly.
   b. Refer to "Self-tapping fasteners" and/or "Pre-drilled fasteners".

3. Supplemental sealant:
   a. Penetrations that do not meet installation requirements require the addition of sealant at point of insertion through the air barrier membrane to maintain continuity in the air barrier assembly.

4. Self-tapping fasteners:
   a. Fastener head must be larger in diameter than the shank.
   b. Drill fasteners perpendicular to the substrate until flush with the air barrier.
   c. Drill fasteners to provide a continuous compression firmly against the air barrier membrane creating a gasketing seal without damaging the membrane.
   d. Do not install fasteners through air barrier over unsupported areas of the substrate such as sheathing joints.
   e. Overdriven fasteners, improperly installed fasteners, defective/broken fasteners, or fasteners not properly fastened into the building structure beyond the air barrier membrane should be removed and the vacated hole sealed with sealant prior to the installation of the cladding or veneer system.

5. Pre-drilled fastening assemblies:
   a. Fastening head or assembly component must be larger in diameter than pre-drilled hole.
   b. Fastening head or assembly component must be mounted flush with the air barrier.
   c. Fastening head or assembly component must provide a continuous compression firmly against the air barrier creating a gasketing seal without damaging the integrity of the air barrier.
   d. Do not install fastening components through air barrier over unsupported areas

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of the substrate such as sheathing joints.

e. Seal improperly drilled and/or vacated holes with sealant prior to the installation of the cladding or veneer system.

3.04 FIELD QUALITY CONTROL

A. Damage to surface by other trades shall not be the responsibility of the installing Subcontractor.

B. Final Observation and Verification:

1. Final inspection of air barrier assembly shall be carried out by the Owner's representative, the Contractor, or Air / Vapor Barrier Manufacturer as required by warranty.

2. Contact Air / Vapor Barrier Manufacturer for warranty issuance requirements.

C. Air barrier assembly is not designed for permanent UV exposure. Refer to Air / Vapor Barrier Manufacturer published literature for product limitations.

3.05 CLEANING

A. Promptly as the Work proceeds, and upon completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.

B. Clean soiled surfaces, spatters, and damage caused by Work of this Section.

C. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

END OF SECTION 07270

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SECTION 07461 – FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fiber cement lap siding, panels, trim and accessories with factory finish and which are engineered for climate siding along with sheet applied weather barrier and related accessories for wall air/moisture barrier system

1.2 SYSTEM DESCRIPTION

A. The airtight components and secondary moisture protection of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness and moisture barrier of the building enclosure are called "the air/moisture barrier system". Services include coordination between the Subcontractor(s), the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include Contract enforcement activities performed by the Architect.

B. Air Barrier Penetrations: All penetrations of the air/moisture barrier and paths of air infiltration / exfiltration through the air/moisture barrier system shall be made air-tight.

C. Moisture Barrier Penetrations: All penetrations of the air/moisture barrier and paths of water migration through the air/moisture barrier system shall be made water shedding.

1.3 RELATED SECTIONS

A. Section 07214 – Closed Cell Spray Foam Insulation.

B. Section 09250 – Gypsum Drywall for metal framing and gypsum sheathing.

1.4 REFERENCES

A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets

B. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.

C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

D. The American Association of Textile Chemists and Colorists (AATCC) 127 - Water Resistance: Hydrostatic Pressure Test.

E. American Society for Testing and Materials (ASTM) E-96 - Standard Test Methods for Water Vapor Transmission of Materials.

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F. American Society for Testing and Materials (ASTM) D1117 - Standard Guide for Evaluating Nonwoven Fabrics.

G. American Society for Testing and Materials (ASTM) D3330 - Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape1.

H. American Society for Testing and Materials (ASTM) D3759 - Standard Test Method for Tensile Strength and Elongation of Pressure-Sensitive Tapes.

I. PSTC-1 - Peel Adhesion of Single Coated Pressure-Sensitive Tapes at 180 Degree Angle.

J. TAPPI T-460 - Porosity - Gurley.

1.5 SUBMITTALS

A. Submit under provisions of AIA A232 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. Shop Drawings: Provide detailed Drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and Specifications provided by the manufacturer.

D. Selection Samples: For each finish product specified, submit two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, submit two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Recommended minimum of 2 years' experience with installation of similar products.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining Work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

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C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local Authorities Having Jurisdiction.

1.8 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.

1.9 WARRANTIES

A. Product Warranty: Limited, non-pro-rated product warranty.
   1. HardiePlank HZ5; or approved equal, lap siding for **thirty (30) years**.

B. Product Warranty: Limited, product warranty.
   1. HardieTrim HZ and HZ5; or approved equal, boards for **fifteen (15) years**.

C. Finish Warranty: Limited product warranty against manufacturing finish defects.
   1. When used for its intended purpose, properly installed and maintained according to the published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology; or approved equal, for a period of **fifteen (15) years** from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

D. Workmanship Warranty: Application limited warranty for **two (2) years.**

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: James Hardie Building Products, Inc.; or approved equal.

B. Requests for approval of equal substitutions will be considered in accordance with the provisions of AIA A232 and Section 00800.

2.2 SIDING

A. HardiePlank HZ5 lap siding; or approved equal, siding requirement for materials:
   1. Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.
   2. Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.
   3. Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
   4. CAL-FIRE, Fire Engineering Division Building Materials Listing - Wildland Urban Interface (WUI) Listed Product.
   5. National Evaluation Report No. NER 405 (ICBO, SBCCI, IBC, IRC).
   6. City of Los Angeles, Research Report No. 24862.
   7. Miami Dade County, Florida Notice of Acceptance 07-0418.04.
   8. US Department of Housing and Urban Development Materials Release 1263d.

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9. California DSA PA-019.
10. City of New York M EA 223-93-M.
11. Florida State Product Approval FL889.
12. Texas Department of Insurance Product Evaluation EC-23.

B. Lap Siding: HardiePlank HZ5; or approved equal, Lap siding with a sloped top, beveled drip edge and nailing line as manufactured by James Hardie Building Products, Inc.; or approved equal.
1. Type: Select Cedarmill" 8-1/4 inches (184 mm) with 7 inches (152 mm) exposure.

C. Trim:
1. HardieTrim HZ5 boards and HardieTrim HZ boards as manufactured by James Hardie Building Products, Inc.; or approved equal.
a) Type: "Smooth" Widths: 2-1/2" & 3-1/2".

2.3 WEATHER BARRIER SYSTEM

A. Moisture Air Barrier Sheet:
1. Product: HardieWrap Weather Barrier as manufactured by James Hardie Building Systems; or approved equal.
2. Composition: Non-woven, non-perforated polyolefin.
3. Film: MicroTech Coating with micropores to balance water holdout and breathability.
4. Thickness: 11 mil (0.28 mm).
5. UV Stability: Up to 180 days.
6. Water Holdout (AATCC127): 128 inches (3250 mm).
7. Breathability/Water Vapor Permeance (ASTM E-96A): 15 perms.
8. Air Resistance (TAPPI T-460): >1800 sec/100 cc.
9. Tear Strength (ASTM D1117): 15 to 18 lb (6.8 to 8.2 kg).
10. Basis Weight: 19.4 lbs/1000 sf (9.5 kgs/100 sm).
11. Sizes: 3 feet by 195 feet (914 mm by 59.4 m), 9 feet by 100 feet (2743 mm by 30.5 m), 9 feet by 150 feet (2743 mm by 45.7 m), 10 feet by 100 feet (3048 mm by 30.5 m), 10 feet by 150 feet (3048 mm by 45.7 m).

B. Self-adhering Flashing: Designed for peel and stick application.
1. Product: HardieWrap Flashing as manufactured by James Hardie Building Systems; or approved equal.
2. Composition: Butyl rubber adhesive non-woven polyolefin backing; coated Kraft paper release.
3. Total Thickness: 25 mil (0.64 mm).
4. UV Stability: Up to 180 days.
5. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
6. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
7. Packaging: Individually shrink-wrapped.
8. Roll Weight: 4 inch (102 mm) = 4.6 lb (2 kg)/roll, 6 inches (152 mm) = 6.9 lb (3 kg) /roll, 9 inches (229 mm) = 9.9 lb (4.5 kg)/roll.
9. Provide Width for Application Required: 4 inches by 100 feet (102 mm by 30.5 m) (2x4 construction), 6 inches by 100 feet (152 mm by 30.5 m) (2x4

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construction), 9 inches by 100 feet (229 mm by 30.5) (2x6 construction).

C. Flexible Flashing:
   1. Product: HardieWrap Flex Flashing as manufactured by James Hardie Building Systems; or approved equal.
   2. Composition: Butyl rubber adhesive; creped cross-laminated polyolefin backing; polyethylene film release.
   3. Total Thickness: 60 mil (1.5 mm).
   4. Tensile Strength (ASTM D3759): 18 lb/inch (3.2kg/cm).
   5. UV Stability: Up to 180 days.
   6. Water Vapor Transfer Rate (ASTM E96-94): <.2g/100 square inches/24hrs.
   7. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
   8. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
   9. Packaging: Each roll is packed in a convenient dispenser box
   10. Roll Weight: 6 inches (152 mm) = 22.2 lb (10kg)/roll, 9 inches (229 mm) = 33.3 lb (15 kg)/roll.
   11. Provide Width for Application Required: 6 inches by 75 feet (152 mm by 23.9 m) (2x4 construction), 9 inches by 75 feet (229 mm by 23.9) (2x6 construction).

D. Seam Tape:
   1. HardieWrap Seam Tape as manufactured by James Hardie Building Systems; or approved equal.
   2. Composition: Polypropylene film coated with acrylic adhesive Total Thickness: 3.0 mil (.08 mm).
   3. Adhesion Peel to HardieWrap (PSTC-1); or approved equal: 22 oz/inch (25 N/100 mm).
   4. Tensile Strength (ASTM D3759): 32 lb/in (.58 kg/mm).
   5. Elongation: 136 percent.
   6. UV Stability: Up to 90 days.
   7. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
   8. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
   9. Packaging: Individually shrink-wrapped.
   10. Roll Weight: 1 lb(0.5 kg)/roll.
   11. Roll Size: 1-7/8 inches (43 mm) by 165 feet (50 m).

2.4 FASTENERS

A. Metal Framing: Provide and install fasteners from the following fasteners based on the recommendation by the manufacturer:
   1. Metal Framing: 1.5 inch (38mm) [AGS-100] .100 inches by 25 inches (2540 mm by 635 mm) ET&F Pin or equivalent pneumatic fastener.

2.5 FINISHES

A. Factory Primer: Provide factory applied universal primer.
   1. Primer: Factory primed by James Hardie; or approved equal.

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2. Topcoat: Refer to Section 09900 and Exterior Finish Schedule.

B. Factory Finish.
1. Product: ColorPlus Technology by James Hardie; or approved equal.
2. Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.
3. Process:
a. Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
b. Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photo spectrometer and verified by third party.
4. Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed
5. Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.

C. Color as selected by the Architect from the manufacturer’s full line of standard factory colors for Trim and Siding.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
1. Install water-resistive barriers and claddings to dry surfaces.
2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
3. Protect siding from Subcontractor(s).

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Install a water-resistive barrier is required in accordance with local building code requirements.

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D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.

E. Install Engineered for ClimateTM HardieWrapTM; or approved equal, weather barrier in accordance with local building code requirements.

F. Use HardieWrapTM, Seam Tape and joint and laps; or approved equal.

G. Install HardieWrapTM flashing, and HardieWrapTM Flex Flashing; or approved equal.

3.3 INSTALLATION - LAP SIDING

A. Install materials in strict accordance with manufacturer's installation instructions.

B. Starting: Install a minimum 1/4 inch (6 mm) thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches (32 mm) wide laps at the top. The bottom edge of the first plank overlaps the starter strip.

C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.

D. Align vertical joints of the planks over framing members.

E. Maintain clearance between siding and adjacent finished grade.

F. Locate splices at least one stud cavity away from window and door openings.

G. Wind Resistance: Where a specified level of wind resistance is required Hardieplank; or approved equal, lap siding is installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.

H. Locate splices at least 12 inches (305 mm) away from window and door openings.

3.4 INSTALLATION - TRIM BOARDS

A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.

B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.

C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.

D. Maintain clearance between trim and adjacent finished grade.

E. Trim inside corner with a single board trim both side of corner.

F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion

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resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.

G. Allow 1/8 inch gap between trim and siding.

H. Seal gap with high quality, paint-able caulk.

I. Shim frieze board, as required, to align with corner trim.

J. Fasten through overlapping boards. Do not nail between lap joints.

K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim; or approved equal, boards to HardieTrim; or approved equal, boards.

L. Shim frieze board, as required, to align with corner trim.

M. Install HardieTrim; or approved equal, fascia boards to rafter tails or to sub fascia.

3.5 INSTALLATION OF WEATHER BARRIER

A. Moisture Air Barrier Sheet:
   1. Weather barrier shall be installed before window and door installation. Do not install on saturated sheathing. Weather barrier can become slippery and should not be used in any application where it may be walked on.
   2. Begin by affixing weather barrier extending at least 6 inches (152 mm) around a building corner. Unroll horizontally (with print side facing out) around the building covering rough window and door openings.
   3. Fasten to studs or nailable sheathing material with galvanized construction grade staples a maximum of 18 inches (457 mm) in the vertical and horizontal direction.
   4. Attach weather barrier so that it is taut and flat. The vertical overlap shall have a minimum of 6 inches (152 mm) and the vertical seam shall be taped.
   5. Assure that the bottom edge of the weather barrier extends over the sill plate and foundation interface by at least 1 inch (25 mm).
   6. Overlap upper layers of weather barrier (in shingle lap fashion) by a minimum of 6 inches below the horizontal edge, and tape the horizontal seam line.
   7. At roof to wall intersection (or wall to deck), affix wrap to the wall such that it overlaps any step flashing already in place on the wall by at least 2 inches (51 mm).

B. Flexible Flashing:
   1. Windows and Doors: Weather barrier is not designed nor guaranteed as a flashing material to prevent moisture or air from intruding behind weather barrier. Verify that flashing has previously been installed around all windows and door openings. Install flexible flashing per manufacturer's instructions.
      a. Use the inverted "Y" cut method at rough window and door openings. Do not place fasteners within 9 inches (229 mm) of the rough opening, door or window heads. This area shall not be fastened to allow for proper head flashing installation. At the top

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corners of the rough opening, cut the weather barrier at 45 degree to extend 9 inches (229 mm) past the joint.

b. Fold the top flap up and out of the way and fasten temporarily.

c. Fold the remaining three flaps in through the opening fastening them inside the opening with staples.

2. Rough Electrical and Plumbing Penetrations: Seal with a double layer of flashing. Install the top flashing piece over the bottom flashing piece overlapping flashing layers to cover flashing cut-out necessary for placement around penetration.

C. Repairs: For minor punctures or tears, less than 3 inches (76 mm), cover and completely seal with seam tape. For larger holes, greater than 3 inches (76 mm), use slit flashing technique.

1. Slit flashing requires making a horizontal slit above the damaged area and placing a cut piece of weather barrier into the slit, covering the damaged area. Tape the perimeter of the patched area.

3.6 FINISHING

A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Finish factory primed siding with a minimum of one coat of high-quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.7 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07461

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SECTION 07500 - ROOFING, GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The requirements of this section apply to the Work specified in the following sections:

1. Section 05300 - Metal Decking,
2. Section 05400 - Miscellaneous Structural Steel,
3. Section 05500 - Metal Fabrications,
4. Section 06100 - Carpentry,
5. Section 07050 - Roof Demolition,
6. Section 07200 - Building Insulation,
7. Section 07530 - Single-Ply Roofing Membrane System,
8. Section 07600 - Flashing and Sheet Metal,
9. Section 07800 - Roof Specialties and Accessories,
10. Section 07900 - Joint Sealer Assemblies,
11. Division 15 - Mechanical Work,
12. Division 16 - Electrical Work.

B. This section includes coordination of existing roofing systems, installation of new warrantied roof system as shown on the Drawings.

1.2 QUALITY ASSURANCE

A. Roofing and associated Work, including Work of all sections listed in 1.1 above, must be included in a Single Overall Contract, so that there will be undivided responsibility for the specified performance of all component parts.

B. Installer Prequalification: Installer must be a recognized Roofing Subcontractor, skilled and experienced in the types of Work required and equipped to perform workmanship in accordance with recognized standards.

1. Minimum Experience: Not less than a recommended five (5) years experience in applications for indicated roofing system and in roofing projects of this 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.
   a. Optional Proximity: At Contractor's option, and with Owner's prior acceptance of Installer's certification that Work of the Maintenance Agreement will be performed by a designated Roofing Subcontractor whose plant is located not more than two hours normal travel time from project site, the above requirements will be waived.

C. Product Bid: The product bid must have past performance of installation on a roof in the state where project is located for a recommended minimum of five (5) years, under the same name of manufacturer as bid.

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D. Alterations to existing roofs: Contractor shall make necessary tie ins and alterations to existing roofs in accordance with details indicated and "Basis of Design" product requirements so as to maintain original warranty on existing roofs and/or achieve complete weather tight conditions.

E. **Independent Roof Inspection Services**: The **Contractor** shall engage and pay for the services of a qualified independent Registered Roof Observer (RRO) or Registerd Roof Consultant (RRC) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.

1. A qualified RRO or/ RRC Subcontractor is to have fulfilled the prerequisite requirements of the International Institute of Building Enclosure Consultants (IIBEC) for the roofing experience and pass the registration exam to be able to offer the services of a Registered Roof Observer (RRO) or Registered Roof Consultant (RRC). The RRO or RRC is hired to observe on-site roof construction. The qualifications and sample report format of the RRO / RRC are to be submitted to and approved by the Architect and Construction Manager. Provide project experience and references noted below.

2. The RRO / RRC is required to be an independent, competent consultant and shall provide roofing observation services meeting the standard of care of a qualified roof consultant operating in the jurisdiction of this Project. The RRO / RRC will be held responsible for the accuracy of all reporting prepared by the RRO / RRC.

3. The RRO / RRC must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation or sales of any roofing or building materials used on this Project. The RRO / RRC shall not be or have been previously been an employee of the Contractor and/or Roof Subcontractor / Installer.

4. The RRO / RRC must provide on-site observation services not less than three (3) days per week during the times of all roof removal and replacement activities are in progress including all associated sheet metal, counterflashing and waterproofing Work and shall document same in a written daily report form acceptable to the Architect.
   a. Roofing projects of less than 10,000 sq. ft.: RRO / RRC must provide daily on-site observations of all roofing and associated Work when in progress.
   b. **The RRO / RRC firm must be on-site and monitor all roofing replacement and restoration Work while the Roofing Subcontractor is performing the Work.**

5. The RRO / RRC inspector(s) for the Work of this Project must have a recommended minimum of three (3) years of experience in monitoring and observing roofing reconstruction with roof systems similar to specified system.

   Note: Past project references including project name, roof Subcontractor and design professional and contact phone numbers for the project are required to be submitted along with the RRO / RRC's qualifications.

6. A computer generated daily field report must be submitted to the Architect's and Construction Manager's office by E-mail (in PDF file format) and facsimile within three (3) days of visit. Hard copy of all reports are required to be submitted with the Contractor's final closeout documents.

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a. Field reports shall include all roofing Work as indicated in this sections, other related roofing Work sections, but not be limited to the following:
   1) Date of visit;
   2) Roofing Subcontractor's company name;
   3) Roofing Subcontractor's Subcontractor's name(s);
   4) Foreman's name;
   5) Extent of roofing Subcontractor's work force, including their Subcontractors, and all tasks that have been performed during the visit (number of workers);
   6) Weather conditions including range of day temperatures;
   7) Record of overnight rain events and presence of moisture upon arrival;
   8) Documentation of materials delivered and/or used by Workers during the RIF presence on-site;
   9) Roof area and locations of roof areas where work in progress is taken place (Roof Key Plan to be provided by the Architect);
   10) Percent of roofing work completed;
   11) Documentation of all fastener type, size, coating and number used by the Roofing Subcontractor prior to allowing concealment of same by other Work.
   Note: Provide digital photographs to document Contract compliance.
   12) Status of Project Schedule;
   13) Punch list items one week before substantial completion date of work and in accordance with Bid Documents;
   14) Items which are deficient and/or not in compliance with Bid Documents;
   15) Status of prior reported deficiencies;
   16) Summary of visual work completed between visits;
   17) Inspector's name and report writer's name, if different.

7. The RRO / RRC is required to provide regular communications through out the project. The RRO / RRC is to contact the Architect and Construction Manager immediately from the project site upon observation of deviations of all the requirements of the Bid Documents by the Roofing Subcontractor and/or other Work forces.

1.3 SUBMITTALS

A. Submit certification that the roof materials furnished for roof alterations and tie-ins is Tested and Approved by Factory Mutual as a Class 1-SH roof system with 1-90 Wind Uplift Requirements, or Listed by Underwriters Laboratories or Warnock Hersey for external fire tests of ASTM E - 108 Class A.

B. Product Data for each type of product specified include manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with specified requirements.

C. Shop Drawings: Submit roofing membrane layout Drawings showing the outline of existing roof and locations of flashings and tie-ins, specific roofing details illustrating relationships with adjacent construction, and flashing details at indicated tie-in conditions.

1. Submit shop drawings of manufactured and/or fabricated sheetmetal Work.

2. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the Bid Document details, the manufacturer shall provide the Roofing Subcontractor with

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acceptable details to be submitted to the Architect for approval. This Project must receive Architect's approval through this process prior to shipment of materials to the project site. All roofing Work required by the roofing system manufacturer shall be included in the Contract at no additional cost to the Owner.

D. Samples: Samples of each material specified, properly labeled.

1. Roof membrane: For project records, submit 8- by 10-inch samples of membrane cut from rolls of each type of material used on the project.

2. Flashing membrane: Submit 12-inch-square samples of sheet material to be used for base flashings.

3. Fasteners: Submit (2) of each type.

4. Adhesives: Submit samples for each type to be used.

1.4 JOB CONDITIONS

A. Roofing Conference: Prior to the installation of the roofing and associated Work, meet at the project site with the Installer, the Installers of each component of associated Work, and the Architect, Construction Manager and other representatives directly concerned with performance of the Work, including, where applicable, product manufacturers and the Owner. Record (by the Contractor) the discussions of the conference and the decisions and agreements, or disagreements reached, and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the roofing Work including, but not necessarily limited to, the following:

1. Review Project requirements (Drawings, Specifications and other Bid Documents).

2. Review status of existing conditions and substrate (by the Roofing Installer), including extent of moisture penetration in existing work, drying and similar considerations.

3. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.

4. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

5. Review regulations concerning Code compliance, environmental protection, health, safety, fire and similar considerations.

6. Establish units of work, including preparation, such that each unit may be completed prior to end of each day's Work.

B. Weather Condition Limitations:

1. During periods of inclement weather, Contractor shall use wet power vacuums, on the day following each rain, to remove standing water so as not to delay their operations.

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2. Proceed with roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control of the Work being installed, complying with the requirements and the recommendations of the roofing materials manufacturers.

3. Proceed only when the Contractor is willing to guarantee the Work as required and without additional reservations and restrictions.

4. Protect existing Work and property from damage during the course of the Work. Be prepared for all weather and other contingencies as prudence may dictate. Maintain on the site at all times sufficient and proper materials for temporary roofing and other protection when weather conditions prevent continuance of Work and do not permit completion of each unit of Work prior to the end of each working day. Temporary protection and roofing Work must be provided at no additional cost to the Owner.

5. Remove and discard materials which have been used for temporary roofs, protection, water seals, and related work. Do not incorporate used materials into the Work.

C. Storage of Materials and Property: Do not overstress roof decks and supporting structures. Avoid placing loads at midspans of framing. All superimposed loads shall be well distributed. Do not store more material on roofs than can be installed in one and one-half working days. Store materials, except membrane, in dry area and protect from water and direct sunlight. Damaged materials shall be replaced at Contractor's expense. Protect adjacent work from damage due to roofing operations and related Work. Provide temporary protection against walls adjacent to roofing Work; remove protection upon completion.

PART 2 - PRODUCTS

2.1 GENERAL ROOFING MATERIALS

A. Refer to other sections for new roofing Work and all requirements of roofing materials, products and systems.

B. **Alterations and Tie-ins to Existing Roofs**

1. Provide Roofing materials, flashings, primers, adhesives and all other required accessories to meet or exceed the following “Basis of Design” minimum performance requirements. All roofing materials shall be UL Class A, FM Class 1-SH listed and shall comply with the International Building Code/2021, NJ ed., and CGSB 37-GP-56M standards.

2. Wood Cants and Curbs: Lumber; #2 grade free from warping and visible decay; fire retardant treated and marked.

3. Mechanical Fasteners: Manufacturer’s standard FM approved fasteners for this type of application.

4. Other Materials and Accessories: Manufacturer’s standard and/or approved products for indicated applications.

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PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Subcontractor shall prepare a plan and submit it to the Architect and Construction Manager for which identifies how the roofing repairs and all associated work will be performed so as to prevent foot traffic on the newly installed roofing system.

B. Coordinate the installation of roofing materials and associated Work so as to provide a complete system complying with the combined recommendations of manufacturers and installers involved in the Work.

C. Protect other Work from spillage of roofing materials, and prevent materials from entering and clogging drains and conductors. Replace or restore other Work which is soiled or otherwise damaged by the performance of the roofing and associated Work.

3.2 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 during rainstorms. After completion of the roofing and associated Work, and either during or immediately after a rainstorm, (and just before final acceptance of the Work) the Installer shall meet with the Contractor at the project and inspect the building for evidence of leaks in the roofing and associated Work. Prepare a written report without delay (by Subcontractor) covering the inspection, and submit to Owner (with copy to Architect and Construction Manager). Should no rain occur between the time the roof is completed and when all punch list items have been corrected, this requirement shall be waived.

B. Repair or replace roofing and associated Work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.

1. Abnormal weather exposure is recognized to include hailstorms, lightning strikes, hurricane and tornadic winds, and other unusual phenomena of the weather as frequently covered by building insurance.

C. **Alterations and Tie-ins to Existing Roofs**

1. Examine substrate surfaces to receive roofing system and associated Work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

2. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.

3. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.

4. Insurance/Code Compliance: Install roofing and flashing Work (and test where required to show) compliance with governing regulations.

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5. Coordinate the installation of roofing sheets, flashings, stripping, coatings and surfacing, so that felts are not exposed to precipitation nor exposed overnights. Provide cut-offs at the end of each day's Work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. Glaze coats installed ply-sheet courses at the end of each day's work where final surfacing has not been installed.

6. Substrate Joint Penetrations: Do not allow adhesive to penetrate substrate joints and enter building or damage existing or new insulation, vapor barriers (retarders) or other construction.

7. General Requirements: Apply roofing membrane in accordance with roofing material manufacturer's instructions. Application of roofing shall immediately follow application of base sheet and/or insulation as a continuous operation.

D. Agreement to Maintain Roofing: See Part 1, Section 01900, Guarantees and Warranties.

END OF SECTION 07500

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PRE-APPROVED INDEPENDENT ROOFING INSPECTION FIRMS

Precision Construction Consulting, LLC
524 Sunset Avenue
Maple Shade, NJ 08502
Phone: 609-560-1361
Contact: John Hoffner, RRO

H.J. Cannon Group
520 Fellowship Road - Suite A-111
Mount Laurel, NJ 08054
Phone: 856-914-0900/800-233-6986
Fax: 856-914-0600
Contact: Chris Cifone, RRO

Sharp Roofing Associates, Inc.
P.O. Box 219
Ironia, NJ 07845
Phone: 973-895-7330
Fax: 973-895-7332
Contact: Steven Sharp

System Design & Analysis, Inc.
640 Herman Road, Suite 4
Jackson, NJ 08527
Phone: 732-833-9766
Fax: 732-833-9733
Contact: Jan Chrostowski

Roof Maintenance Systems
5118 Highway 33-34
Farmingdale, NJ 07727
Phone: 732-938-7373
Fax: 732-938-9646
Contact: Bill Tipton, RRC

James D. Cummins & Co.
35 Broad Street, Suite 4
Keyport, NJ 07735
Phone: 732-203-2008
Fax: 732-203-2009
Contact: Henry Vitale, RRO

Or Approved Equal Inspection Firm

SECTION 07530 - 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 single-ply membrane roofing system is shown on the Drawings.

1. System Type: Fully Adhered System.

B. Section Includes:

1. Substrate preparation;
2. Roof insulation board;
3. Roof recovery board;
4. Roof membrane;
5. Flashings;
6. Vapor Retarder - Loose Laid;
7. Manufactured metal edge and copings;
8. Walkways.

C. Related Sections:

1. Section 05300 – Metal Decking,
2. Section 05400 – Miscellaneous Structural Steel,
3. Section 05500 – Metal Fabrications,
4. Section 06100 - Carpentry for wood blocking and nailers,
5. Section 07070 – Selective Roof Demolition,
6. Section 07600 - Flashing, Sheet Metal and Roof Accessories,
7. Section 07800 - Roof Specialties and Accessories,
8. Section 15000 - Mechanical Work,
9. Section 16000 - Electrical Work.

D. Furnish all labor, materials and incidentals required to complete insulation, roofing, flashing, and all other roofing components supplied by the roofing membrane manufacturer and as shown on the Drawings and/or specified herein.

E. Provide acoustical inserts for existing acoustical metal roof deck, where indicated on the Drawings.

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.

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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 Award roofing 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.
   h. Fastener manufacturer; include brand name and thickness.
   I. Insulation manufacturer; include brand name and thickness.
   j. Manufacturer's warranty type and period.
   k. Acoustical inserts for acoustical metal roof deck.

3. Submit installation diagrams and instructions for installation of roofing system.

4. Submit shop drawings of manufactured and/or fabricated sheet metal Work.

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. Samples:

1. Roof membrane sheet: Submit 12-inch-square samples.
2. Insulation: Submit 12-inch-square samples.
3. Thermal barrier board (If applicable): Submit 12-inch-square samples.

E. Warranty:

1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.

2. Refer to Section 15000 for Roofing Manufacturer's requirement to include warranty information for the inclusion of the new and/or retro-fit roof drains into the overall roof system warranty.

F. Agreement to Maintain Roofing:

1. Submit Roofing Subcontractor's sample of unexecuted agreement to maintain the roof system and related roof sheet metal work in accordance with indicated requirements.

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G. Certifications: The Contractor / Installer / Manufacturer (grantor) shall submit certifications to the Architect that the Bid Documents including the materials, methods and details of Work provided for therein, are adequate to accomplish the specified results.

1. Contractor shall provide manufacturer's "Roof Assembly Letter" confirming each proposed roof system and decking description as follows:
   a. Assembly,
   b. Construction Type,
   c. Maximum Slope,
   d. Deck Type,
   e. Insulation - Layer (1),
   f. Insulation Fastening,
   g. Insulation Attachment Requirements; Field, Perimeter, Corners,
   h. Insulation - Layer (2),
   i. Insulation Attachment; Adhesive,
   j. Membrane.

2. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**

1.4 REFERENCE STANDARDS

A. References in these Specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these Specifications.

1.	ASTM	American Society for Testing and Materials, Philadelphia, PA
2.	FM	Factory Mutual Engineering and Research, Norwood, MA
3.	NRCA	National Roofing Contractors Association, Rosemont, IL
4.	OSHA	Occupational Safety and Health Administration, Washington, DC
5.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
6.	UL	Underwriters Laboratories, Northbrook, IL

1.5 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 (even though some parts may be Subcontracted to others).

1. Roof insulation.
2. Roof recovery board, if applicable.
3. Elastic roofing and base flashing.
4. Sealant.
5. Related sheet metal Work.

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B. Installer: The roofing Subcontract 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 Subcontractor: The roofing Subcontractor 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. Foreperson 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.

3. Optional Proximity: At Subcontractor's option, and with Owner's prior acceptance of installer's certification that Work of the maintenance agreement will be performed by a designated roofing Subcontractor whose plant is located not more than two (2) hours normal travel time from project site, the above requirement will be waived.

D. Definitions:

1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing Work in this Section.

2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Systems", before multiplication by a safety factor.

3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Roofing Systems", after multiplication by a safety factor.

E. Performance Requirements

1. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

3. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7-16.

4. FM Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FM 4450 and FM 4470 as part of a membrane roofing

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system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
   a. Fire/Windstorm Classification: Class 1A-90.

5. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FM, or another testing and inspecting agency acceptable to Authorities Having Jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
   a. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
   b. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

6. 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 rainstorm, (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).
   a. 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.
   b. 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.

F. 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. Special attention is called to the manufacturer's specified: Thirty (30) year Total Roofing System Warranty.
   a. Warranty must be a **NDL (no dollar limit)**.

2. 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 hereinafter specified.

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

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details.

a. There shall be no deviation made from this Specification without prior written approval by the manufacturer and the Architect.

G. Independent Roof Inspection Services: The Contractor shall engage and pay for the services of a qualified independent Registered Roof Observer (RRO) or Registered Roof Consultant (RRC) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.

1. Roofing Inspection Firm to be approved by the Architect / Owner.

2. Inspection firm must be utilized not less than three (3) days per week of roofing activities including all associated metal and waterproofing Work and shall provide written report of same.
   a. Roofing projects of less than 10,000 sq. ft., Roofing Inspection Firm must be utilized every day of roofing and associated Work is performed.

3. Roofing Inspection Firm must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation, sales of any roofing or building materials.

4. Roofing Inspection Firm and its assigned inspector(s) for the Work of this project must have a recommended minimum of five (5) years of experience in monitoring roofing systems similar to specified system.

5. A computer generated daily field report must be submitted to the Architect's office by FAX within three (3) days of visit. Hard copy of reports shall be submitted with closeout documents.
   a. Field reports shall include all roofing Work as indicated in this section, other related roofing Work sections, and include but not limited to the following:
      1) Date of visit;
      2) Contractor's company name;
      3) Contractor's Subcontractor's name(s);
      4) Foreperson's name;
      5) Extent of roofing Subcontractor's Work force, including their Subcontractors, and all tasks that have been performed during the visit;
      6) Weather conditions including day temperatures;
      7) Roof area and locations of roof areas where Work in progress is taken place;
      8) Percent of roofing Work completed;
      9) Status of Project Schedule;
      10) Punch list items one week before substantial completion date of Work and in accordance with Bid Documents;
      11) Items which are deficient and/or not in compliance with Bid Documents;
      12) Status of prior reported deficiencies;
      13) Summary of visual Work completed between visits;
      14) Inspector's name and report writer's name if different.

   b. Issues of non-compliance in the installation of the roofing Work and contrary to the Bid Documents must be communicated with the Architect immediately. The Architect will review and issue a directive of corrective measures.

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H. Roof Code Requirements:

1. Roofing System Design to meet roof covering wind resistance and wind test standards as described in Section 1504 of the IBC/2021, NJ ed., and shall be tested in accordance FM 4474, UL 580 or UL 1897.
   a. Basic wind speed for this project as per the IBC/2021, NJ ed., and must be used to determine the basic Velocity Pressure (Pv) and the building minimum design wind and wind resistance standards required by code (and comply with Table 1504.8).

2. Roofing membrane system shall comply with Rubber Manufacturers Association (RMA), RP-1, or ASTM D4637, or CGSB 37-GP-52M.

3. Roofing Insulation. Above-deck thermal insulation board shall comply with the standards in Table 1508.2, Polyisocyanurate board ASTM C 1289, Type I or Type II.

I. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the Bid Document details, the manufacturer shall provide the Roofing Subcontractor 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 their approval.

J. 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.

K. Warranty:

1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.

2. Provide manufacturers' guarantee on the Work for indicated period of the **thirty (30) years**, extending to flashings, metal edge copings, insulation and including all other materials for a single source warranty, (i.e.: Total System Warranty) signed by an authorized representative of the sheet manufacturer, guaranteeing the roofing materials against failures resulting from normal roof exposure.

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3. Special Manufacturer's Warranty Wind Speed.
    a Warranty Wind Speed, (Maximum Peak Gusts), for this project for fully adhered roofing system shall be a minimum of 90 mph (With 1/2" Securerock Gypsum-Fiber Roof Board); or approved equal.

L. 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 they will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing Work. They further agree that within a reasonable time, they 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 the warranties and at the expense of the Subcontractor, to make any emergency temporary repairs that are required in order to protect the building and its contents from damage due to roof leakage.

1.6 PROJECT CONDITIONS

A. Begin roofing installation when weather conditions are within acceptable limits according to manufacturer's installation instructions.

1.7 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 Roofing Subcontractor, not to damage.

1.8 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

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the installer, the installer of each component of associated Work, Architect, Construction Manager, Roofing Inspection Firm 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 Bid Documents).
   b. Review status of conditions and substrates (by the Roofing Subcontractor), including extent of moisture penetration in existing Work, drying and similar considerations.
   c. Review availability of materials, tradespeople, 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 Roofing Subcontractor (guarantor) shall submit a certification to the Architect that the Bid 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 they 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 Bid Documents.

E. Conditions not as Anticipated: The Roofing Subcontractor 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.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. “Basis of Design”:

1. Fully Adhered System: Provide Versico Roofing Systems., VersiGard White, Design "A"

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Fully Adhered System; or approved equal.

a. Subject to compliance with requirements of the "Basis of Design", products by the following manufacturer may be incorporated in the Work include:
   1) "Sure-Seal White on Black"; Carlisle Syntec Inc.
   2) Elevate, a Holcim Co., (previously Firestone Building Products Co.)
   3) Or approved equal.

B. All Components of the Roofing System shall be products indicated in manufacturer's product data for the Roofing Systems or to be approved materials and components by the indicated manufacturer(s).

2.2 ROOFING MEMBRANE

A. "VersiGard White": .090 inches thick (90 mil), non-reinforced, minimum ten (10) feet wide, length to be determined by job conditions, 6" wide Quick-Applied Tape (QAT), UL Class A, EPDM (Ethylene Propylene Diene Monomer) compound elastomer conforming to the following minimum physical properties:

1. Color: White on Black

2. Tolerance on Nominal Thickness: ASTM D412; +/-10%.

3. Tensile Strength; min..: ASTM D142; 1305 psi.

4. Elongation, Ultimate, min.: ASTM D412; 300%.

5. Tear Strength, min.: ASTM D624; 150 lbf/in.

6. Brittleness Temp.: ASTM D746; -49˚F.

7. Resistance to Heat Aging, Properties after one (1) week at 240˚F; ASTM D573:
   a. Tensile Strength, min.: ASTM D412; 1205 psi.
   b. Elongation, Ultimate, min.: ASTM D412; 200%.
   c. Tear Strength, min.: ASTM D624; 125%.
   d. Linear Dimensional Change, max.: ASTM D1204; +/- 1.0%.

8. Ozone Resistance: Condition after exposure to 100 pphm, Ozone in air for 168 hours at 104˚F, Specimen is at 50% strain.
   a. ASTM D1149; No Cracks.

9. Resistance to Water Absorption: After seven (7) days immersion at 158˚F, Change in mass, max.: ASTM D471; +8% / -2%.

10. Factory Seam Strength, min.: ASTM D816; Membrane Rupture.

11. Resistance to Outdoor (Ultraviolet) Weathering:
    a. Xenon-Arc, 7560kJ/m² total radiant exposure at 0.70 W/m² irradiance, 80˚C black panel temp.: ASTM D4637; No Cracks / No Crazing.

12. Water Vapor Permeance, Max.: ASTM E96; 0.10 perms.

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2.3 ROOF RECOVERY / COVER BOARD

A. THERMAL BARRIER BOARD

1. Basis of Design: “Securerock Gypsum-Fiber” Roof Board, as manufactured by USG; or approved equal.
   a. 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;
      1) Flame Spread: 0
      2) Smoke developed: 0
   b. Board Size: 4' x 4'.
   c. Thickness (Uniform): 1/2", R-Value per ASTM C518 = R.5.
   d. Compressive Strength: 1800 psi.
   e. FM approved for Wind Uplift, tested for 60 and 90 psf.
   f. Stagger all joints with bottom layer.

2.4 INSULATION BOARD

A. Basis of Design: “SecurShield“ Polyisocyanurate Board for Uniform and/or Tapered Insulation (and Tapered Saddles), as manufactured by Versico; or approved equal.

1. A foam core insulation board covered on both sides with a moisture resistant coated glass fiber mat facer.

2. Board Size: 4' x 4' only.

3. Thickness (Uniform): As necessary to achieve the required "R" value. See also minimum thickness and required slopes indicated on Drawings.
   a. See roof assemblies for insulation thicknesses and attachment methods. Bottom layer shall be a minimum of 1½" thick, with staggered joints plus ½" minimum of tapered insulation at the low point, as indicated.
      1) Tapered insulation; 1/4" to the foot slope for the roof area; and ½" to the foot slope for gussets/crickets. Stagger all joints between layers.

4. R-Value (Uniform): Minimum of R=30.0, per 3½“ thick, two layers [R-5.7. per 1"; R-11.4 per 2"; R-17.4 per 3"; R-23.6 per 4"].

5. Density: 1.5 pcf.

6. Surface - Burning Characteristics: Tested in accordance with ASTM E 84 and IBC/2021, NJ ed., 719.2.
   a. Flame Spread: Not more than 25
   b. Smoke - developed: Not more than 450

7. Insulation boards must pass the tests of:
   a. ASTM C1289-06, Type II, Class 2, Grade 3 (25 psi).
   b. FM Class 1 approval for steel roof deck construction: FM 4450 or UL1256.
   c. FM 4470 (subject to the conditions of approval described in www.Roofnav.com.

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2.5 RELATED MATERIALS (All materials to be included in the manufacturer's warranty)

A. Manufactured roof metal edge, gravel stop and copings: Furnished or approved by the membrane manufacturer, to meet FM requirements for I-90, and included in manufacturer's warranty.

1. Basis of Design: "SecurEdge™ 2000" Standard Fascia as manufactured by Versico; or approved equal.
   a. Pre-finished Aluminum Sheet: ASTM B 209, .050 inch thick, manufacturer's standard alloy and temper for indicated applications.
   b. ANSI/SPRI/FM-4435 ES-1 Tested to comply with International Building Code/2021, NJ ed.
   c. Face heights: As indicated.
   d. Finish: 70 percent Kynar® 500 fluoropolymer (polyvinylidene fluoride or PVDF) resin finish over epoxy primer; minimum system thickness 1.0 mil. Provide manufacturer's standard prime coat on underside.
   e. Color(s): Will be selected by Architect, after Contract award, from manufacturer's standard color selection, unless otherwise indicated.
      1) Provide manufacturer's standard **thirty (30) year** warranty for color.
   f. Provide shop-mitered and welded corners. See Section 07600 for additional requirements.

B. Flashing: VersiGard QA Uncured EPDM Flashing; or approved equal: 60-mil (1.5 mm) thick uncured EPDM Flashing laminated to a 30-mil (0.76 mm) pre-applied adhesive tape used in conjunction with VersiGard Primer; or approved equal, as an option to VersiGard Uncured EPDM Flashing; or approved equal.

C. Low VOC Bonding Adhesive: Compatible with materials to which the membrane is to be bonded, furnished by membrane manufacturer.

D. CAV-GRIP 3V; or approved equal: Low-VOC Aerosol Contact Adhesive/Primer: a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: Priming unexposed asphalt prior to applying Flexible DASH Adhesive; or approved equal, adhering VersiGard EPDM; or approved equal.

E. In Seam Sealant: Furnished by membrane manufacturer.

F. Splicing Tape: Furnished by the membrane manufacturer, 3" and 6" wide splicing tape for indicated applications and as per manufacturer's requirements for indicated warranty.

G. Lap Sealant: Compatible with materials with which it is used, shall be trowel or gun consistency furnished by membrane manufacturer.

H. Water Cut-Off Mastic: Compatible with materials with which it is used, furnished by membrane manufacturer.

I. Pourable Sealer Pocket: VersiGard White EPDM Quick-Applied (QA) Pourable Sealer Prefabricated Pockets; or approved equal, consisting of a 2" (50mm) – wide plastic support strip with a QA Seam Tape-backed uncured EPDM flashing.

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J. One-Part Pourable Sealer: Black, single component, moisture curing, elastomeric polyester sealant that is compatible with Versico's EPDM membranes; or approved equal.

- No items requiring maintenance will be allowed.

K. Insulation Fasteners: Furnished by membrane manufacturer.

1. Roofing Subcontractor to provide manufacturer's recommended roof fasteners in required fastening patterns for each of the actual encountered roof deck materials.

L. Insulation Adhesive: Furnished by the membrane manufacturer.

1. Roofing Subcontractor to provide manufacturer's recommended adhesives for required application.
   a. Flexible DASH Adhesive; or approved equal: A spray or extruded applied, two-component polyurethane, low-rise expanding foam adhesive used for attaching approved insulations to compatible substrates (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.
   b. DASH Catalyst; or approved equal: Added to DASH Adhesive; or approved equal (Part B Side) to quicken adhesive reaction time.
   c. Flexible DASH DC or Bag in a Box Adhesive; or approved equal: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
   d. OlyBond 500 BA; or approved equal - A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates using a mechanical dispenser system.
   e. OlyBond Spot Shot; or approved equal - A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
   f. One-Step; or approved equal: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.

2. See roof assembly Drawing for insulation adhesive bead spacing.

M. Wood Nailers: 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 AWPA 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 Bid Documents will be among those considered acceptable:
   a. "Dricon"; Hickson Corporation.

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b. "Flame Proof LHC"; Osmose Wood Preserving, Inc.
c. Or approved equal.

* Treat members indicated on Drawings and/or as required to meet the code requirements.

3. Lumber treated with any of the wood preservatives such as, Creosote, Pentachlorophenol, Copper Naphthenate and Copper 8-qiunolinolate will adversely affect the EPDM membrane when in direct contact and are, therefore, unacceptable.

N. Splice Cleaner or Primer: Furnished by membrane manufacturer.

O. Expansion Joints: Sure-Seal joint supports, as indicated.

P. Walkways:

1. Preformed Walkway Boards: Molded reprocessed rubber manufactured or recommended by the membrane manufacturer, 30 x 30 x 3/4 inch size.
a. Walkway Board Adhesive: As recommended by the membrane manufacturer.

Q. Reinforced Securement Strips: Manufacturer's standard 6 inch or 9 inch wide by 100 feet long reinforced membrane perimeter fastening strip.

R. Seam Fastening Plates: 2 inch diameter FM approved metal plates used in conjunction with reinforced securement strip.

S. All other related roofing materials and accessories supplied by the roofing membrane manufacturer for inclusion under the **Thirty (30) Year** "Total System Roofing Warranty."

1. Seam splice tape, prime, seam joint cover and seam flashing: Manufacturer's standard.

2.6 MANUFACTURED FLASHING MATERIALS:

A. Manufacturer's standard in accordance with their detailed Drawings and printed Specifications and instructions for installation.

PART 3 - EXECUTION

3.1 GENERAL

A. Install all Work in conformance with the manufacturers printed Specifications and 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.

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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. Roofing system may be installed during cold weather. Follow specified precautions for storage of materials and expose only enough cement and adhesives to be used within a four (4) hour period.

8. Roof surface shall be free of ponded water, ice, or snow to eliminate future condensation problems.

9. 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 Roofing Subcontractor'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.

B. <u>The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.</u>

1. The Roofing Subcontractor can start snapping on the manufacturer's pre-finished metal edge, coping, fascia only after the cleats, chairs and anchor plates are inspected and approved by the manufacturer.

3.3 PREPARATION OF SUBSTRATES

A. Roof substrate shall be dry and free of foreign materials. Remove nails, nail heads and other protrusions from deck.

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1. Roof substrate shall be free of ponded water, ice, or snow to eliminate future condensation problems.

3.4 INSTALLATION (GENERAL)

A. Comply with instructions of the primary roofing materials manufacturer, and comply with the requirements for: T**hirty (30) Year Total Roofing System Warranty.**

B. Coordinate with all roof mounted items to facilitate roofing installation.

C. Coordinate with the installation of all metal flashing.

D. Confinement of Materials: Do not allow fluid and plastic to spill or migrate beyond surfaces of intended application.

1. Roofing Subcontractor 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 Roofing Subcontractor 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 materials manufacturer.

H. Insulation Under Roofing: Do not advance the installation of new roof insulation excessively ahead of roofing. Do not install roofing or new insulation over wet insulation; remove and replace with dry insulation before proceeding.

I. Coordinate Roofing with flashing and other adjoining Work to ensure proper sequencing of entire Work.

3.5 PROTECTION

A. Roofing Subcontractor 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.

3.6 INSTALLATION OF ROOFING INSULATION BOARDS

A. Install roofing insulation boards in accordance with instructions of the prime materials manufacturer, use fasteners and accessories approved or supplied by the thermal board manufacturer and approved by the roofing membrane manufacturer.

B. Exposure: Do not install roofing insulation boards each day than will be covered by new roofing by the end of same day. Provide water cut-off as required each day.

C. Provisions shall be made by the Roofing Subcontractor for the completion of roofing and on the area of roofing undertaken each day. No roofing area may be left uncompleted overnight. Roofing Subcontractor shall construct, where necessary, watertight waterstops at

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the completion of each day's Work. Waterstops shall be entirely removed before continuing with the roofing operation.

D. Apply a layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness. Stagger joints in one direction as recommended by the manufacturer.

E. Place roof insulation on substrates as recommended by the roofing systems manufacturers. Ensure that the top surface of all insulation panels are uniformly abutted and without "steps".

F. Fully Adhered Roofing System:

1. Mechanically fasten lower layer of insulation to roof deck with manufacturer's approved insulation fasteners. Pattern of fasteners as per manufacturer's recommendations to achieve the required FM approvals. Quantity shall be a minimum of one (1) fastener for every two (2) square feet of insulation unless otherwise specified by the roofing manufacturer.

2. Secure top layers of insulation and recovery board with manufacturer's approved adhesives and in compliance with manufacturer's instructions and recommended rates for application. Stagger all joints between layers.

3.7 INSTALLATION, MEMBRANE

A. Position roofing membrane over approved substrate without stretching.

B. Allow membrane to relax approximately (½) hour prior to bonding.

C. Fold sheet back so (½) of underside of the sheet is exposed. Sheet fold shall be smooth, with no wrinkles or buckles.

D. Apply bonding adhesive evenly, no globs or puddles, with nine (9) inch plastic core paint roller. Adhesive shall be applied to both sheet and substrate. One (1) gallon of bonding adhesive applied correctly will cover approximately 60 square feet of finished surface. Allow adhesive to dry until tacky but not stringy or sticky to a dry finger touch.

1. Roll coat membrane into adhesive; avoid wrinkles.

2. Brush down bonded half of the sheet with push broom to achieve maximum contact.

3. Fold back the unbonded half of the sheet and repeat bonding procedure.

4. Apply adjoining sheets in same manner lapping edges a minimum of three (6) inches. Do not apply bonding adhesive to the splice area.

E. Join sheets together using 6" Factory – Applied Tape (FAT) whenever possible to properly prepared surfaces following manufacturers' instructions.

1. Set tape in place and roll with 2" seam roller to bond to the seam area of each sheet.

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3.8 MISCELLANEOUS

A. Wood nailers treated with fire-retardant treatment, shall be installed at the gravel stop perimeter of each roof.

1. Anchor wood nailers in accordance with minimum criteria established by FM Loss Prevention Data Sheet 1-49 and to resist a minimum lateral force of 75 pounds per lineal foot.

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.

C. Roof Metal Edge, Coping and Other Roof Accessories: Install in accordance with requirements indicated in other Division 7 - Specification Sections.

D. Walkway Pads (Fully Adhered System):

1. Walkway pads to be adhered to the EPDM membrane with Splicing Cement.

2. Provide Walkway Pads about the entire perimeter of each and every rooftop mechanical equipment item, and where else shown on the Contract Drawings.

END OF SECTION 07530

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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 fascia / metal edge / coping systems.
2. Pre-manufactured metal flashing and counterflashing.
3. Pre-manufactured roof expansion joint covers.
4. Miscellaneous sheet metal accessories.
5. Exposed metal field and shop fabricated sheet trim and fascia units, where indicated.
6. Pipe curb assembly.
7. Pipe-Penetration Flashing.

B. Related Sections:

1. Section 06100 - Carpentry for wood nailers and blocking.
2. Section 07530 - Single Ply EPDM Roofing Membrane System.
3. Section 07800 - Roof Specialties and Accessories.
4. Section 07900 - Joint Sealer Assemblies:

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/2021, NJ ed.

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).

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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. Building control and expansion joints.
   c. Metal edge, fascia, coping.
   d. Base flashing and counterflashing.
   e. Flashing for roof drains and roof penetrations.
   f. All other sheet metal Work requiring fabrication.
   g. Details of all joints for above.
   h. Reglets and wedges.

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.

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NOTE: Metal Coping and Metal Edging 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 fascia, 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 **thirty (30) 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 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. Aluminum Reglets:
   a. Fry Reglet Corporation,
   b. Hickman: W.P. Hickman Co.,
   c. Keystone Flashing Company,
   d. CertainTeed, Saint-Gobain,
   e. or approved equal.

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3. Stainless-Steel Reglets:
    a. Cheney Flashing Company,
    b. Fry Reglet Corporation,
    c. Keystone Flashing Company,

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.

B. Type "D"; Stainless-Steel Sheet: ASTM A 167, Type 304, soft annealed, with No. 2D finish, except where harder temper is required for forming or performance; minimum 0.0187 inch thick, unless otherwise indicated.

2.3 COPINGS, FASCIA, ROOF EDGE

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 and height requirement(s).

2. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the Work.**

B. Provide fascia in shapes and sizes indicated, with shop-mitered and -welded corners.

1. Include water dams formed from at least 0.028-inch- thick, galvanized steel sheet; anchor plates; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.

2.4 REGLETS

A. General: Provide reglets of type, material, and profile indicated, compatible with flashing. Form to securely interlock with counterflashing.

1. Type - 3: Masonry Type: Provide "MA-1.5" (Brick) and "MA-4" (CMU) springlok Reglet by Fry Reglet Corp.; or approved equal.
    a. Aluminum: 3003-H14 alloy, meeting ASTM B209-95, 0.040" thick aluminum, color as selected by Architect from manufacturer's standard colors.
    b. Stainless Steel: Type 304 alloy, meeting ASTM A666-96a, 0.020" thick, 2B finish.
    c. Provide 3" minimum lap joints.
    d. Sawcut joint to receive reglet to a depth of approximately 1/4" greater than the depth of the horizontal back leg of reglet.
    e. Insert reglet into sawcut and wedge in place using lead wedges installed at 12"

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o.c., minimum. Hammer wedges to a depth that will not interfere with sealant or backer rod.

f. Install sealant exterior sealant to form fillet bead minimizing holding of water.

2. Type - 5: Roof Top Equipment Curb: Provide “MA" springlok Reglet by Fry Reglet Corp.; or approved equal.
   a. 0.040" thick aluminum, with 1-1/2" top flange, color as selected by Architect.
   b. Provide 3" minimum lap joints.

3. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing's lower edge.

2.5 COUNTERFLASHING

A. Provide springlok counterflashing by Fry Reglet Corp.; Metal-Era; Xtreme Trim; or approved equal.

1. 0.040" thick aluminum, as indicated on the Drawings.

2. 0.020" thick, type 304 stainless steel, as indicated on the Drawings.

3. Provide inside and outside corners including special angle where required.

2.6 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.

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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.

I. Prefabricated Accessories: Provide prefabricated accessories by Metal-Era, Roof Edge Systems, or approved equal.

1. Exposed Termination Bar: 0.05 x ½" x 1½" x ½" aluminum channel or 1" x 3/16" aluminum bar as manufactured by Metal-Era Inc.; or approved equal. Provide fastening at 8" o.c.

J. Pipe Curb Assembly:

1. Manufacturer: Products of the following manufacturers, provided they comply with requirements of the Bid Documents, will be among those considered acceptable:
   a. Roof Penetration Housings, LLC,
   b. Pipe Portal Systems as manufactured by Portals Plus, Inc.,
   c. The Pate Company,
   d. ThyCurb,
   e. Or approved equal.

2.7 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).

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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.
   a. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

D. SHEET METAL FABRICATIONS

1. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements.

2.8 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; complying with AAMA 605.2.
   a. Color(s): As selected by the Architect from manufacturer’s available full range of colors including custom colors.

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.

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D. Coordinate installation with roofing 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 ½-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 ½-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.

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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. Counterflashing: Except where indicated or specified otherwise, insert counterflashing receiver in horizontal saw cut joints locations, as indicated. Snap counterflashing in receiver and extend down vertical surfaces over upturned vertical leg or base flashings not less than 4 inches. Exposed edges of counterflashing shall be folded ½-inch. End laps in counterflashings shall be overlapped 6", and shall be made weathertight with sealant.

1. Lengths of metal counterflashings shall not exceed 10 feet. The flashings shall be formed to the required shapes before installation. Corners shall be factory-formed with joints not less than 24 inches from the angle.

2. Flashing receivers shall be secured in the horizontal joint with lead wedges spaced not to exceed 12 inches apart; on short runs, wedges shall be placed closer together.

3. Counterflashing receiver joints shall be filled with caulking compound. Caulking is covered in Section 07900 - Joint Sealer Assemblies.

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 stip to a wood nailer at 6 inches maximum on centers.

3. Where fastening is made to masonry, screws spaced 12 inches o.c. shall be used and shall. Be driven in expansion shields set in the 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.

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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.

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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 (Sub)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

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SECTION 07800 - ROOF SPECIALTIES AND 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 and locations of roof accessories is indicated on the Drawings and by provisions of this section.

B. Type of units specified in this section includes the following:

1. Roof hatch rail system.
2. Ladder up safety post.
3. Insulated curb, plastic unit skylights.
4. Prefabricated curb and support units.
5. Pipe and conduit supports.

C. Related Sections:

1. Refer to roofing system sections, for roofing accessories to be built into roofing system (not Work of this section).
2. Section 05500 - Metal Fabrications.
3. Section 06100 - Carpentry.
4. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
5. Section 07900 - Joint Sealer Assemblies.
6. Division 15 - Mechanical Work.

1.3 SUBMITTALS

A. Product Data; Roof Accessories: Submit manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.

B. Samples; Roof Accessories: Submit 2 samples, min. 8" square, of each exposed metal and plastic sheet materials, and 2 samples, min. 24" long, of formed or extruded exposed metal member; color and finish as specified.

C. Coordination Drawings: Submit coordination drawings for items interfacing with or supporting mechanical or electrical equipment, ductwork, piping, or conduit. Indicate dimensions and locations of items provided under this section, together with relationships and methods of attachment to adjacent construction and to mechanical/electrical items.

D. Shop Drawings:

1. Submit plan, section, elevation and perspective Drawings, as necessary, to depict each specified skylight. Include all flashing, connection and termination details necessary for a proper and complete installation.

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2. Submit skylight shop drawings prepared by a licensed Engineer indicating compliance with loading requirements.
   a. Drawings shall be signed and sealed by the Engineer.

1.4 QUALITY ASSURANCE

A. Standards: Comply with SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated. Comply with "NRCA Roofing and Waterproofing Manual" details for installation of units.

B. Code Requirements:

1. Skylight design and installation shall meet the requirements of the International Building Code/2021, NJ ed., for design loads.

2. Unit Skylights: Meet the provisions of the International Energy Conservation Code (IECC), 2015.

C. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

D. Manufacturer: Skylights shall be made by a manufacturer with a minimum of ten (10) years' experience in the fabrication and installation of the skylights specified. Manufacturers that are not named in this section must submit evidence of their ability to meet performance and testing requirements, including a list of similar projects completed within the last 5 years.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS

A. Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

2.2 MATERIALS, GENERAL

A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.

B. Stainless Steel: AISI TYPE 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, temper as required for forming and performance.

C. Aluminum Sheet: ASTM B 209, alloy 3003, temper as required for forming and performance; anodized finish, except mill finish prepared for painting where indicated for field painting.

D. Extruded Aluminum: Manufacturers standard extrusions of sizes and general profiles indicated, alloy 6063 T6, architectural grade aluminum; 0.078 inch minimum thickness for primary framing and curb member legs and 0.062 inch for dome retaining angle.

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E. Insulation: Manufacturer's standard rigid polyisocyanurate or semi-rigid board of glass fiber of thicknesses indicated.

F. Wood Nailers: Softwood lumber, fire retardant treated wood, not less than 1-1/2" thick. Refer to Specification Section 06100.

G. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

1. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.

H. Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

I. Bituminous Coating: FS TT-C-494A or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.

J. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.

K. Elastomeric Sealant: Generic type recommended by unit manufacturer, which is compatible with joint surfaces; comply with FS TT-S-00227E, TT-S-00230C, or TT-S-001543A.

L. Roofing Cement: ASTM D 2822, asphaltic.

2.3 PREFABRICATED ROOF HATCH

A. Basis of Design: “Type F” thermally broken roof hatch units as manufactured by Bilco Co.; or approved equal, of size(s) shown, single-leaf type unless otherwise indicated, for 40 lbs. per sq. ft. external loading and 20 lbs. per sq. ft. internal loading pressure.

1. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5" (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb. Cover insulation: 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m2K), fully covered and protected by an 18 gauge (1mm) aluminum liner.

2. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system; or approved equal,, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place. Curb insulation: 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m2K).

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3. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

4. Hardware:
   a. Heavy stainless steel pintle hinges.
   b. Cover shall be equipped with a spring latch with interior and exterior turn handles
   c. Roof hatch shall be equipped with interior and exterior padlock hasps.
   d. The latch strike shall be a stamped component bolted to the curb assembly.
   e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
   f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].
   g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

5. Finishes: Factory-applied powder coat paint finish.

6. Warranty:
   a. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of **five (5) years** from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

B. Sloping Roofs: Where slope or roof deck exceeds 1/4" per ft., fabricate hatch curbs with height tapered to match slope, to result in level installation of tops of units.

C. Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated roof hatch units which may be incorporated in the Work include the following:

1. The Bilco Co.,
2. Bristol Fiberlite Industries,
3. Or approved equal.

D. Ladder-Up Safety Post: Provide manufacturer’s standard for all (existing) roof hatch ladders.

1. Telescoping post permanently mounts to the top two rungs of any fixed ladder.
   a. Adjustable mounting hardware accommodates virtually any ladder rung size or spacing.

2. Automatically locks into the fully raised position.

3. Release lever allows the post to be lowered to its retracted position.

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4. Provide steel safety post with yellow powder coat finish.

2.4 PREFABRICATED CURBS / EQUIPMENT SUPPORTS

A. Comply with loading and strength requirements as indicated where units support other Work. Coordinate dimensions with rough-in sheets or shop drawings of equipment to be supported. Fabricate of structural quality sheet steel (ASTM A 570, Grade as required) which has been prepared for painting and factory-primed and painted with 2-mil thickness of baked-on synthetic enamel, after fabrication.

1. Fabricate with welded or sealed mechanical corner joints. Provide complete with cant strips and base profile coordinated with roof insulation thickness. Provide preservative-treated wood nailers at tops of curbs, coordinate with thickness of insulation and roof flashing as indicated, tapered as necessary to compensate for roof deck slopes of 1/4" per ft. and less.

2. Except as otherwise indicated or required for strength, fabricate units of minimum 14-gauge (0.0747") metal, and to minimum height of 12".

3. Sloping Roofs: Where slope of roof deck exceeds 1/4" per ft., fabricate curb/support units with height tapered to match slope, to result in level installation of tops of units.

B. Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated thermally broken curbs/equipment supports which may be incorporated in the Work include the following:

1. Custom Curb, Inc.;
2. The Pate Company;
3. ThyCurb Div./ThyBar Corp.;
4. Or approved equal.

2.5 PIPE AND CONDUIT SUPPORTS

A. Comply with loading and strength requirements as indicated where units support other Work.

B. Basis of Design: Pillow Block Pipe stand as manufactured by Miro Industries, Inc.; or approved equal.

1. Roller bearing pipe support designed to absorb thermal expansion and contraction of pipes and conduits. Pipes and conduits rest on self-lubricating roller which is a 304 stainless steel rod and a polycarbonate resin roller. Support base is polycarbonate resin.

2. Load weight may not exceed manufacturer's stated capacity. Spacing of supports may not exceed manufacturer's stated maximum. Adjust all pipe stands so that each unit bears equal weight.

3. For up to 3" I.D. (3.75" O.D.) pipe: Model 3-RAH-12; or approved equal.

4. For 3" I.D. (3.75" O.D.) to 4" I.D. (5" O.D.) pipe: Model 4-RAH-12; or approved equal.

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5. For 4″ I.D. (5″ O.D.) to 6″ I.D. (8.5″ O.D.) pipe: Model 6-RAH-12; or approved equal.

2.6 PREFABRICATED SELF-FLASHING PLASTIC SKYLIGHT UNITS (Fall Protection)

A. Plastic: Lexan XL10 polycarbonate glazing sheet, CC-1 fire rated.

B. Air infiltration requirements in accordance with ASTM E283 shall be <.01 CFM/Cu.Ft @ 6.25 psf negative pressure.

C. Water Penetration requirements in accordance with ASTM E331 shall pass at a negative pressure of 15 psf.

D. OSHA Fall Protection requirements:

1. The OSHA General Industry Standard requires that “every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides” [29 CFR* 1910.23(a)(4)].

2. A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The end of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard [29 CFR 1910.23(e)(1)].

E. Dome Type: Dome shaped double-sheet insulating units with average ¾" minimum air space between sheets, manufacturer's standard edge seal.

F. Outer Dome Color: Clear colorless transparent polycarbonate sheet.

G. Inner Dome Color: White translucent prismatic polycarbonate sheet.

H. Glazing Frame, Dome Retainer: .078" extruded aluminum frame with poured and de-bridged polyurethane thermal break (snap on thermal barriers not acceptable) and .062" extruded aluminum dome retaining angle. Clear Anodized Finish.

J. Curb Construction: Provide units with integral, self-supporting formed mill finish aluminum curb, .063" minimum sheet thickness with minimum 3" roof flanges, with 1" polyisocyanurate insulation, with 1x4 fire retardant treated wood nailer. Welded joints at corners.

1. Curb Heights: Fabricate units with curbs for mounting at heights indicated or, if not otherwise indicated, for height of 9" minimum above line of roofing.

2. Where roof deck slopes more than ¼ inch per foot, provide tapered curb heights to match slope and result in level installation of domes.

K. Glazing System: The skylights are to be completely sealed with neoprene gaskets between domes and frame members, with no weep holes, eliminating air infiltration and ex-filtration.

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Uniform design load capability of composite dome and frame to meet 40-psf snow load.

L. Condensation Control: Fabricate units with integral condensation gutters for permanent control of condensation on inside of domes.

M. Basis of Design: “Tufflite - Model ALT”; or approved equal, double dome polycarbonate pyramids with thermally broken curb frame and integral aluminum curb as manufactured by Kingspan Light + Air; or approved equal.

1. Other Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated plastic skylight units which may be incorporated in the Work include, but are not limited to the following:
   a. Sunoptics Prismatic Skylights,
   b. Or approved equal.

N. Warranty: Provide written warranty signed by the manufacturer, agreeing to repair or replace Work which exhibits defects in materials or workmanship, and guaranteeing weather tight and leak free performance, as indicated below. "Defects" is defined as uncontrolled leakage of water and abnormal aging or deterioration.

1. Skylight Warranty: Warranty period: **Ten (10) years** commencing on the date of Substantial Completion.

2. Special Finish Warranty: Warranty period for Anodized Finish: **Two (2) years** from date of Substantial Completion.

2.7 ALUMINUM FINISH(ES)

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; complying with AAMA 605.2.
   a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the Work

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performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

B. Except as otherwise indicated install roof accessory items in accordance with construction details of "NRCA Roofing and waterproofing Manual".

C. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

D. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.

E. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter-flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

F. Operational Units: Test operation of units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

END OF SECTION 07800

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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 07200 - Building Insulation, for safing insulation and accessories.

2. Division 7 Section "Sprayed Fire-Resistive Materials."

3. Division 15 Sections specifying duct and piping penetrations and firestop systems to be performed by the Plumbing and HVAC work Subcontractors.

4. Division 16 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.

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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 outside wall cavities.

2. Penetrations located outside fire-resistive shaft enclosures.

3. Penetrations located in construction containing fire-protection-rated openings.

4. Penetrating items larger than 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

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 and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.

3. 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.

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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, Construction Manager 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.

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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 Owner’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 Owner’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

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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. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. 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.

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H. 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.

I. Silicone Foams: Multi component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

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.

3. Remove laitance and form-release agents from concrete.

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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 Owner 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.

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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.

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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. Control and expansion joints in cast-in-place concrete.

2. Control and expansion joints in unit masonry.

3. Joints between different materials listed above.

4. Perimeter joints between materials listed above and frames of doors, windows and storefront systems, as applicable.

5. Control and expansion joints in ceiling, soffits and overhead surfaces.

6. 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.

2. Joints between different materials, listed above.

3. Other joints as indicated.

D. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

1. Control and expansion joints on exposed interior surfaces of exterior walls.

2. Perimeter joints of exterior openings, where indicated.

3. 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, windows, storefront systems.
   b. Joints between plumbing fixtures/ countertops and adjoining walls, floors, and counters.
   c. Other joints, as indicated.

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4. Interior joints in the following horizontal traffic surfaces:
    a. Control and expansion joints in cast-in-place concrete slabs.
    b. Other 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.

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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.

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(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.

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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.

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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. Joint Fillers for Concrete Slab on Grade: Provide "Fiber", as manufactured by WR. Meadows Sealtight Ceramar; or approved equal.
   a. Nonextruding bituminous type: ASTM D 1751.

3. Joint Fillers for Interior Concrete Slabs: Provide "Ceramar" flexible foam expansion joint, as manufactured by W.R. Meadows, Inc.; or approved equal.
   a. Flexible foam expansion joint filler composed of a unique synthetic foam of isomeric polymers in a very small, closed-cell structure. Gray in color, Ceramar is a lightweight, flexible, highly resilient material offering recovery qualities of over 99%. The compact, closed-cell structure will absorb almost no water.
   b. Non-impregnated and will not stain or bleed.
   c. Non-gassing.
   d. Complies with:
      (1) ASTM D 5249, Type 2,
      (2) ASTM D 1752, Sections 5.1 - 5.4, with compression requirement modified to 10 psi minimum and 25 psi maximum,
      (3) ASTM D 7174-05.

4. Joint Fillers for Horizontal and Vertical Control and Expansion Joints at Wall Assemblies:
   a. Provide "Backerseal®", polyurethane foam infused with a hydrophobic-acrylic

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impregnation technology, as manufactured by EMSEAL Joint Systems, Ltd., a Division of Sika Corp.; or approved equal.

b. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
   1) Equivalent product by Nystrom,
   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 2**: For sealing exterior joints, provide a Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "Spectrum 1 / Spectrum 800"; Tremco, an RPM Co.
   b. "SikaSil - WS290"; Sika Corporation
   c. "Dowsil 790 Silicone Building Sealant; Dow Corning Corporation
   d. Or approved equal.

C. **Sealant Type 3:** For all interior joints, provide a one-part, non-sag, moisture-curing polyurethane rubber sealant, complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O and as recommended by manufacturer for general use as an interior exposed building construction conditions sealant including floor tiles in Toilets and Kitchens - Section 09300.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "Dynatrol I-XL"; Pecora Corporation.
   b. "Dymonic or Dymonic FC for cold weather"; Tremco, an RPM Co.
   c. "Chem-Calk 900 /915/945"; Bostik Inc.
   d. "Sikaflex 1a or Sikaflex 15LM"; Sika Corporation.
   e. Or approved equal.

D. **Sealant Type 4:** For all joints at plumbing fixtures, provide one-part, neutral-curing, silicone rubber sanitary sealant, complying with ASTM C920; and containing fungicide for mildew resistance recommended by manufacturer for use at joints for plumbing fixtures; sinks countertops, appliances, etc.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. "898 Silicone"; Pecora Corporation.

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b. "Tremsil 200"; Tremco, an RPM Co.
c. "786 Mildew Resistant"; Dow Corning.
d. "Sikasil N-Plus"; Sika Corporation.
e. Or approved equal.

E. **Sealant Type 5**: For all interior joints between drywall partitions, CMU walls, hollow metal framing, cabinet heater, other metal mechanical or electrical assemblies, (sealant work performed by Subcontractors and cross-referenced to the work of this section), etc., where all adjacent surfaces will receive paint:

1. Latex Sealant: Non-elastomeric, one part, non-sag, paintable latex sealant recommended for exposed joints applications, complying with ASTM C 834, Type P (opaque sealants), Grade NF.

2. Products: Subject to compliance with requirements, provide one of the following:
   a. "AC-20 Plus Silicone"; Pecora Corporation.
   b. "Tremflex 834"; Tremco, an RPM Co.
   c. "Sonolastic Sonolac"; Sonneborn Building Products Div., ChemRex, Inc.
   d. Or approved equal.

F. **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, 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) Equivalent by Dow Corning.
      6) Or approved equal.

2. **STPE, S, NS, 25, T, NT**: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.
   a. Uses: Exterior wall assemblies where it functions as a air barrier and water resistive barrier. Seal rough openings and detail joints and bonds to common construction materials .
   b. Products: Subject to compliance with requirements, provide one of the following:
      1) "XL-Flash" as manufactured by Pecora Corporation.
      2) Equivalent by Tremco, an RPM Co.
      3) Equivalent by Sika.
      4) Or approved equal.

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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. Equivalent by Dow Corning.
   e. 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 and 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.

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E. Clean metal, glass, porcelain enamel, glazed surfaces 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

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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 frames is indicated and scheduled on Drawings.

B. Related Sections:

1. Section 04200 - Unit Masonry.
2. Section 07900 - Joint Sealer Assemblies.
3. Section 08211 - Wood Doors.
4. Section 08700 - Finish Hardware.
5. Section 09250 - Gypsum Drywall.
6. Section 09900 - Painting.

1.3 QUALITY ASSURANCE

A. Provide frames 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.

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 frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of frames 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 frames.

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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 frames 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 frames 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 A232 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

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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 units 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 frames, concealed stiffeners and reinforcement 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 frames 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 frame preparation for hardware.

E. Reinforce frames 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 FRAMES

A. Provide metal frames for wood doors of type(s) and style(s) as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated.

1. Fabricate frames of minimum 16-gauge cold-rolled furniture steel at interior locations.
   a. Frames for 90 minute fire-rated doors in Corridors shall be 14-gauge cold-rolled furniture steel.

2. Fabricate frames with mitered and (face welded / full profile welded).

3. Fabricate “Knock-Down” frames.

B. Hardware reinforcing shall be as follows:

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1. All frames are 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 frames 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 frames in masonry walls provide adjustable wire type anchors (0.156" dia.), or strap type anchors (16 gauge), and "DW" Series frames in metal stud / drywall walls field adjustable compression anchors, provide quantities as follows:
      1) Frames up to 7'-6" in height: 3 per jamb.
      2) and one (1) adjustable base anchor per jamb.
   b. At existing masonry wall opening to remain, provide "Butterfly Existing Wall Anchors", 18 gauge galvannealed steel, 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 frames and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

C. **Place frames prior to construction of enclosing walls and ceilings. Set frames 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. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

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F. Install fire-rated frames in accordance with NFPA Std. No. 80.

G. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels, or as indicated. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws. Use indicated anchors and as per manufacturer's recommendations.

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 frames, 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 08110 - Hollow Metalwork
3. Section 08700 - Finish Hardware
4. Section 08800 - Glass and Glazing
5. Section 09900 - Painting (of metal lite kits)

1.2 SUMMARY

A. Extent and location of each 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. Structural Composite Lumber (SCL) with wood edge: Compatible species as face veneer.
2. Solid core 20 min. labeled flush Structural Composite Lumber (SCL) with wood edge: Compatible species as face veneer.
3. Mineral core 60, and 90 min. labeled flush wood doors with wood edge: Compatible species as face veneer.

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

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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' 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 factory-finishing Specifications.

1. Include certifications as may be required to show compliance with Specifications.

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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 ratings, requirements for factory finishing and other pertinent data.

1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.

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: Each type of factory finish required.

3. Metal Frames for Light Openings: Manufacturers product samples or product cut sheets for light frames and color selector guide for each material and 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 Bid 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 Bid 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.

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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 “Heritage Collection” wood doors as manufactured by VT Industries; 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. “Aspiro™ Series I Marshfield-Algoma™”,
   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 A232 and Section 00800.**

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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. Aesthetic Grade: Custom, with Grade A faces

2. Species: Maple or Birch Veneer, as selected by the Owner / Architect.

3. Cut: Quarter sliced.
   a. Plain sliced maple or birch for transparent finish; CS-171, Type II.

4. Match between Veneer Leaves: Book match.
   a. Veneer leaves shall be Grade 'A'.

5. Assembly of Veneer Leaves on Door Faces: Book & Running match.

6. Construction: Extra-Heavy Duty Construction, SCLC-5 Bonded (5-ply, with no added urea-formaldehyde glues).

C. Edges

1. Wood edge, compatible species as face veneer.
   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 non-rated doors in same area of building, unless otherwise indicated.

2. Core Construction
   a. 20 & 45 Min. Doors: Single Leaf - Same Structural Composite Lumber Core as noted above.
   b. 20 & 45 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.
   c. 60 & 90 Min. Doors: Mineral core composite, tested and approved by the Underwriter's or Warnock Hersey Testing Laboratories, for various levels of fire retardation within a total door assembly.

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3. Edge Construction
    a. 20 & 45 Min. Doors: Single Leaf - Same Structural Composite Lumber with wood edge, compatible species as face veneer.
    b. 20 & 45 Min. Doors: Double Leaf - Stiles to match face veneer, with wood edge, compatible species as face veneer.
        1) Manufacturers standard core construction with hardwood outer.
    c. 60 & 90 Min. Doors: WDMA Extra Heavy Duty Construction. Stiles and rails to be made of special laminated material matching the face veneer, and tested for the following tests for performance.
        1) Split Resistance: Not less than 950 load pounds when tested in accordance with ASTM D 143 test specimen, modified to having a 3/4 inch hole in center.
        2) Direct Screw Withdrawal: Not less than 650 load pounds when tested in accordance with ASTM 1037 modified to use a #12 x 1-3/4" steel screw threaded to head with wood threads.
        3) Cycle/Slam: 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with requirements of ANSI A 151.1, Section 2.5.
            a) Stile Thickness: Hinge stile minimum 5/8". Lock stile minimum 3/4 inch.
            b) Rail Thickness: Top: 1/4" (except where required for hardware; reinforcing then to be 5"). Bottom: 1-1/16" minimum.
            c) Provide hardware reinforcing as needed and shall be indicated on the shop drawings to the attachment of surface applied hardware without thru bolts.
    d. All “Category A” doors shall have concealed intumescent seals.

F. Acoustical Doors

1. Faces and WDMA Grade: Provide species and grade to match other doors in building.

2. Core and edge construction shall be considered in any of the above noted types, having been tested as a fully operable door assembly in accordance with ASTM E 90-90 by Warnock Hersey Testing Laboratories.

3. Sound Transmission Class: Minimum STC 41.

4. Provide gasketing and door shoe as required to meet manufacturers tested acoustic rating. Refer to Section 08700.

G. Glazing of Wood Doors:

1. Glazing shall be by the wood door manufacturer.

2. Glass shall be in accordance with requirements of Section 08800.

2.3 LITE FRAMES

A. Metal Lite Frames:

1. Standard Metal Vision Frames:

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a. Basis of Design: Model "LoPro™" as manufactured by Anemostat Door Products.
   1) Equivalent by National Guard Products, Inc.
   2) or approved equal.
b. Material: 20 ga. (1mm) Cold Rolled Steel.
c. Finish: Grey Primer, Beige or Bronze Baked Enamel.
d. Glazing Thickness: Should be 1/4" (6mm), 3/16" (5mm) or 5/16" (8mm) fire and/or safety rated with UL and/or W.H.I classification markings. Nominal glazing space of 3/8" (10mm) allows for glazing tape to be used on both sides of the glass.
e. Fire Ratings with UL & W.H.I Classification markings:
   1) 20* Minute: Approved listing at 3204 sq.in. visible lite, max. width 36", max. height 89".
   2) 45/60* Minute: Approved listing at 2772 sq. in. visible lite, max. width 36", max. height 77".
   3) 90* Minute: Approved listing at 1296 sq. in. visible lite, max. width 36", max. height 54".
   4) 3 Hour: Approved listing at 100 sq. in. visible lite, max. width 12", max. height 33".

   Note: *Must be used with fire glazing tape as indicated in Section 08800. Glazing combination must be used in appropriately tested door assembly.

2.4 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.

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D. Metal Astragals: Metal astragals **will not** be accepted, unless otherwise indicated in Section 08700. Pairs of doors shall be equipped with formed steel edges where required for pairs of fire-rated doors.

E. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

F. Factory Finish and Uniform Range of Veneers

1. Prefinish wood doors at factory only.

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-8, 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 frames in accordance with requirements of NFPA No. 80.

D. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors.

1. Machine doors for hardware. Seal cut surfaces after fitting and machining.

E. Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.

F. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.

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1. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.

2. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.

3. Prefit Doors: Fit to frames for uniform clearance at each edge.

G. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.

H. Manufacturer of wood doors shall install glass in wood doors.

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

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SECTION 08305 - ACCESS 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 SUMMARY

A. Section Includes:

1. Wall access doors.
2. Fire-rated wall access doors.
3. Ceiling access doors.

B. Types of construction in which access doors are installed include:

1. Masonry.
2. Gypsum board.
3. Suspended acoustical tile ceiling.

C. Exact locations and sizes of access doors may not be indicated on the Drawings. Obtain specific locations and sizes for access doors from Subcontractor(s) requiring access to concealed equipment.

D. Products Furnished and Installed under This Section:

1. Installation of anchors for access doors placed in masonry: Division 4.

E. Related Sections:

1. Section 04200 - Unit Masonry.
2. Section 09250 - Gypsum Drywall.
3. Section 09510 - Suspended Acoustical Tile Ceiling
4. Section 09900 - Painting of access doors.
5. General requirements for access doors: Mechanical Work.
6. General requirements for access doors: Electrical Work.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting Drawings, templates, instructions and directions for installation of anchorage devices.

1. Include complete schedule, including types, general locations, sizes, wall, construction details, finishes, latching or locking provisions, and other data pertinent to installation.

B. Verification: Obtain specific locations and sizes for required access doors from Subcontractor(s) requiring access to concealed equipment, and indicate on submittal schedule.

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C. Special Size Access Doors: Use where required or requested; indicate on schedule.

D. Shop Drawings: Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

E. Samples: 3" x 5" minimum size, of each panel face material showing factory-finished color and texture.

1.4 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.; "Building Materials Directory" for rating shown.

1. Attach UL Label on each fire-rated access door.

B. Test Reports: Submit manufacturer's test reports which demonstrate that products comply with required fire ratings.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which are different than actual opening size necessary for access.

D. Coordination: Furnish inserts and anchoring devices which must be built into other Work for installation of access doors. Coordinate delivery with other Work to avoid delay.

1.5 WARRANTY

A. Manufacturer’s standard **five (5) year** warranty against defects in material and workmanship from date of purchase

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the Work include, but are not limited to, the following:

1. Bilco Company.
2. J. L. Industries.
3. Milcor/Lima Register.
4. Bar-Co., Inc.
5. Or approved equal.

2.2 MANUFACTURED UNITS

A. Access Door Assembly 2:

1. Location: Wall.
2. Type: Flush door panel with exposed frame.

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3. Substrate: Masonry.
4. Fire rating: 1-1/2 HR (B).
5. Frame: 16 gauge steel.
6. Door: 20 gauge steel flush panel.
7. Hinge: Continuous type hinge with stainless steel pin.
8. Locking device: Keyed cylinder lock.
9. Finish: Baked-on rust-inhibitive prime coat.

B. Access Door Assembly 3:

1. Location: Wall.
2. Type: Flush door panel with exposed frame.
3. Substrate: Masonry.
4. Frame: 16 gauge steel.
5. Doors: 14 gauge steel flush panel.
6. Hinge: Continuous type hinge with stainless steel pin.
7. Locking Device: Keyed cylinder lock.
8. Finish: Baked-on rust-inhibitive prime coat.

C. Access Door Assembly 4:

1. Location: Wall.
2. Type: Flush door panel with concealed frame.
3. Substrate: Gypsum board.
4. Frame: 16 gage steel.
5. Door: 14 gage steel flush panel.
6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
7. Locking device: Keyed cylinder lock.
8. Finish: Baked-on rust-inhibitive prime coat.

D. Access Door Assembly 6:

1. Location: Ceiling.
2. Type: Flush door panel with concealed frame.
3. Substrate: Acoustic tile ceiling systems.
4. Frame: 16 gauge steel.
5. Door: 14 gauge steel flush panel.
6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
7. Locking device: Keyed cylinder lock.
8. Finish: Baked-on rust-inhibitive prime coat.

2.3 ACCESSORIES

A. Locking Devices:

1. Where locking devices are indicated, provide one lock per access door.
2. Supply four (4) keys with each lock.
3. Key access door locks alike.

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2.4 MATERIALS AND FABRICATION

A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

C. Frames: Fabricate from 16 gauge steel.

D. Fabricate frame with exposed flange nominal 1" wide around perimeter of frame for units installed in the following construction:

1. Exposed masonry.
2. Drywall finish.
3. Acoustic tile ceiling.

E. For gypsum drywall, furnish perforated frames with drywall bead.

F. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.

G. Flush Panel Doors: Fabricate from not less than 14 gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.

H. Flush Panel Doors: Fabricate from not less than 14 gauge stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to #4 satin finish.

I. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

J. Recessed Panel Doors: Fabricate from not less than 18 gauge sheet steel with face of panel formed to provide recess below surface of applied finish. Reinforce panel as required to prevent buckling. Finish with manufacturer's factory-applied prime paint.

K. Furnish recessed panels for concealed installation in acoustic tile ceiling systems.

L. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

M. Provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise scheduled.

N. Where shown or scheduled, provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise indicated.

O. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

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PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's instructions for installation of access doors.

B. Coordinate installation with Work of Subcontractor(s).

C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

D. Where the Plumbing, Mechanical, or Electrical (MEP) Subcontractor(s) require an access door to be installed to provide access to valves, etc., the MEP Subcontractor shall provide the access door and the Contractor shall install the access door.

3.2 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

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SECTION 08340 – OVERHEAD ROLLING GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Electric operated overhead rolling grilles.

B. Related Sections:
1. 05500 Metal Fabrications. Door opening jamb and head members.
2. 06100 Rough Carpentry. Door opening jamb and head members.
3. Division 16. Electrical wiring and conduit, fuses, disconnect switches, connection of operator to power supply, and installation of control station and wiring.

C. Products That May Be Supplied, But Are Not Installed Under This Section:
1. Control Panel and Means of Activation

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Cycle Life:
a. Design grilles of standard construction for normal use of up to 5 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the grille.

1.3 SUBMITTALS

A. Reference AIA A232 and Section 00800 for Submittal Procedures; submit the following items:
1. Product Data
2. Shop Drawings
3. Quality Assurance/Control Submittals:
a. Provide proof of manufacturer ISO 9001:2015 registration.
b. Provide proof of manufacturer and installer qualifications - see 1.4 below.
c. Provide manufacturer's installation instructions.
4. Closeout Submittals:
a. Operation and Maintenance Manual.
b. Certificate stating that installed materials comply with this Specification.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years' experience in producing grilles of the type specified.
2. Installer Qualifications: Manufacturer's approval.

1.5 DELIVERY STORAGE AND HANDLING

A. Reference Section 01600 Product Storage and Handling Requirements.

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B. Follow manufacturer's instructions.

1.6 WARRANTY

A. Standard Warranty: **Two (2) years** from date of shipment against defects in material and workmanship, on mechanical components, operator and control panel.

B. Optional Maintenance Service Agreement: Submit for Owner's consideration and acceptance of a required preventative maintenance schedule and service agreement for installed products.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Model ESG10C – Straight Pattern as manufactured by Cornell, or approved equal.

B. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:

1. Cookson
2. Clopay
3. Or approved equal.

2.2 MATERIALS

A. Curtain:
1. ESG10C - Straight Pattern
   a. Horizontal Rods: Minimum solid 5/16-inch diameter, 5056 H32 aluminum alloy sleeved with horizontal aluminum or stainless-steel tube spacers to separate vertical links on alternate rods with continuous end tube spacers.
   b. Vertical Spacing: 2.5″ to 3.7″ inches on center
   c. Vertical Chains: Solid 1/8″ minimum stainless-steel links, 1/4 inch wide, positioned by aluminum or stainless-steel tube spacers on 9 inch centers. Provide nylon insert nuts threaded on to the end of each rod to secure the chains.

2. Finish: Clear anodized.

B. Bottom Bar:
1. Extruded Aluminum Tubular Section: Minimum 1.5 x 1.5 x .18 inch

2. Finish: Clear anodized

B. Guides Wall or Tube Mounted: Heavy duty (minimum .109 inch thick) extruded aluminum sections Santoprene runners on both sides of curtain. Provide steel tubes, floor saddles and hardware as recommended by manufacturer to support grille.

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1. Finish:
   a. Clear anodized.

D. Counterbalance Shaft Assembly:
   1. Barrel: Minimum 6" steel pipe with a 1-1/2 " inner shaft capable of supporting curtain load with maximum deflection of 0.5125 inches per foot of width.
   2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of grille to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

E. Brackets: Fabricate from minimum 1/4 inch steel plate with cast iron flange mount self-aligning double sealed ball bearing, pre-lubricated with high temperature grease for use in reversing applications, with grease fitting for re-lube and setscrews for locking, at rotating support points to support springless shaft assembly and form end closures.
   1. Finish: Powder Coat: Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils cured film thickness.

F. Hood: 0.040 inch aluminum with reinforced top and bottom edges. Provide minimum 1/4 inch steel intermediate support brackets as required to prevent excessive sag.
   1. Finish: Clear anodized.

2.3 OPERATION

A. Motor – Standard Use – Model MG (Industrial Duty Gear Head) Operator:
   1. The operator must not extend above or below the door coil when mounted front-of-coil.
   2. Rated for a maximum of 20 cycles per hour (not to be used for consecutive hours) listed to comply with UL requirements in the United States.
   3. Totally Enclosed Non-Ventilated gear head operators rated 1/2 hp as recommended by door
      manufacturer for size and type of door, 120 Volts, 1 Phase.
   4. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance-free solenoid actuated brake, and control station.
   5. Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device.
   6. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position.
   7. Operator shall be equipped with an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist.
   8. Operator drive and door-driven sprockets shall be sized for #50 roller chain.
   9. Provide an integral motor mounted interlock system to prevent damage to door and operator when mechanical door locking devices are provided
   10. Operator shall be capable of driving the door at a speed of up to 9" per second or as recommended for door size.
   11. Fully adjustable, driven linear screw-type cam limit switch mechanism shall synchronize the operator with the door.

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12. The electrical contractor shall mount the control station and supply the appropriate disconnect switch, all conduit and wiring per the motor operator wiring instructions.

B. Control Stations:
1. Flush mounted: "Open/Close" key switch with “Best” core cylinder; NEMA 1.

C. Control Operation:
1. Momentary Contact to Close: Fail-safe, UL325-2010 Compliant Entrapment Protection for Motor Operation.
a. SmartSync Wireless Edge Kit – Continuously monitored, wireless sensing/weather edge seal extending full width of door bottom bar. Contact before door fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened position. Wireless edge kit will use Zigbee wireless technology. Radio band wireless sensing edges will not be permitted

2.4 ACCESSORIES

A. Locking:
1. Master keyable cylinder operable from coil side of opening. Provide motor mounted interlock switches.
a. BEST 7-Pin.

B. Interior Aesthetic Covers:
1. Operator and Bracket Mechanism Cover: Aluminum sheet metal cover to enclose exposed operating components at coil area of unit. Finish matching hood.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

A. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Follow manufacturer's installation instructions.

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3.3 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative.

B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION 08340

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SECTION 08410 - ALUMINUM / FRP DOORS AND FIBERGLASS FRAME(S)

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 remove existing frames, doors and hardware as required to install new frames, doors, hardware, glazing, etc. In general, the Work under this section includes the following:

1. The removal of all necessary portions of existing doors, hardware and related entrance material to permit the installation of new material as specified hereafter. Material removed shall be disposed of by Contractor or salvaged as directed by the Architect, Construction Manager and/or Owner.

2. New masonry opening construction will not require removal of existing doors and frame(s).

3. The furnishing and installation of doors, hardware and glazing, as required, for a complete installation including all necessary cleaning and adjustments.

B. The following types of doors and accessories are required:

1. Fiberglass Reinforced Polyester (FRP) Doors.
2. Pebble Grain Fire-Rated Fiberglass Door installed in Fire-Rated Fiberglass Framing.
3. Glazing.
4. Hardware.

C. Related Sections

1. Section 04200 - Unit Masonry.
2. Section 08415 - Aluminum Storefront.
3. Section 08700 - Finish Hardware.
4. Section 08800 - Glass and Glazing.
5. Section 08870 - Security Window Film.

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.

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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.

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28. SFBC 3603.2 (b) (5) - Forced Entry Resistance Test.

29. UL 10B - Standard for Fire Tests of Door Assemblies.

30. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

31. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

32. NFPA 252 - Fire Tests of Door Assemblies.

1.4 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 0.01 cfm per square foot.

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 3.75 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 and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.

6. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.

7. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.

8. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.

9. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.

10. 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.

11. 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).

12. 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.

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13. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-lbs per inch of notch.

14. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.

15. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.

16. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.

17. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.

18. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.

19. 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.

20. 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.

21. 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.

22. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.

23. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.

24. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.

25. 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.

26. Compliance with the International Building Code® (IBC)/2021, NJ ed.

B. Door Assembly.

1. 90 min pp category A door.

1.6 SUBMITTALS

A. Comply with AIA A232 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, and associated components of the Work. Include wall elevations at 1/2" scale, and half-sized detail sections of every typical composite member.

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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.

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/2021, NJ ed., "Barrier-Free" Subcode, and all applicable State or Local Codes.

C. Manufacturer shall have produced Fiberglass Reinforced Polyester (FRP) Doors 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 (not mandatory) 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

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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 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 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 date of shipment.

C. Limited Lifetime:

1. Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.

D. Finish:

1. SpecLite3® face sheets: **Ten (10) years** from the date of shipment.

2. Painted FR frames: **Three (3) years**.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. **FRP Doors and Fire-Rated Fiberglass 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. Equivalent by FRP Architectural Doors Inc.
   b. Equivalent by 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.

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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.

2.3 FIRE-RATED FIBERGLASS DOORS AND FRAMES

A. Fire Rated Door: Model “AF-217FR” Pebble Grain Fire-Rated Fiberglass Door; or approved equal.

1. Door Opening Size.
    a. Size as indicated on the Drawings / Door Finish Schedule.

2. Construction.
    a. Door Thickness.
        1) 1-3/4".

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b. Stiles.
    1) Single Swing.
        a. Hinge and lock stile, 2" minimum tectonite with Palusol P-100 Intumescent and 0.090" thick fiberglass edge painted to match door face.
    2) Standard Pairs.
        a. Hinge stile, 2" minimum tectonite with Palusol P-100 Intumescent and 0.090" thick fiberglass edge painted to match door face.
        b. Meeting edge, 3" minimum with Palusol P-100 Intumescent and 0.090" thick fiberglass edge painted to match door face.

c. Rails.
    1) Top rail, 6" minimum tectonite with Palusol P-100 Intumescent and 0.090" thick fiberglass edge painted to match door face.
    2) Bottom rail, 4" minimum for single swing, 4-1/2" minimum for pairs tectonite with 0.090" thick fiberglass edge painted to match door face.

d. Core.
    1) WSCP-412 proprietary mineral core.
    2) 1-1/2" nominal thickness.
    3) 18 pcf minimum density.

e. Face Sheet.
    1) 0.120" thick, pebble texture, through color with integral surfasel film FRP sheet.
    2) Optional painted finish consult manufacturer.
    3) Bonded to core with adhesive according to manufactures listing.

f. Cutouts.
    1) Manufacture doors with cutouts for required vision lites per the manufacturers listing.

g. Hardware.
    1) Pre-machine doors in accordance with templates from specified hardware manufacturers.
    2) Field apply factory supplied gaskets and seals, full width intumescent and smoke seal required at top of door, smoke seals required on both jambs.

B. Fire Rated Framing
    1. Exterior Framing
        a. “FR-Series Framing”; or approved equal
            1) Materials.
                a) ¼" thick, solid, pultruded, FRP profiles.
                b) No corrosive components or reinforcements.
                c) Solid tectonite filler.
                d) No steel or aluminum filler is allowed.
            2) Perimeter Frame Members.
                a) Factory fabricated.
                b) Integral 5/8" x 2-1/4" doorstop.
                c) Mitered with 4" x 4" x 3/8" pultruded FRP angle reinforcement with interlocking pultruded FRP brackets.
                d) Jamb depth: 5-3/4", 6-3/4", 7-3/4", or 8-3/4", as indicated in the Drawings.
                e) 2" face on jambs.
                f) Header: 2" or 4" face, as indicated on the Drawings.
                g). Knocked down for field assembly.
            3) Anchors
                a) Factory furnished as specified on the drawings.
                b) Category C standard frame.
                c) Category C proprietary frame.

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2.4 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, 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 3BC620), or molded PVC complying with ASTM C 509, Grade 4.

2.5 FABRICATION

A. Sizes and Profiles: The required sizes for door and frame units, and profiles requirements are to be "field verified".

B. Coordination of Fabrication: Check the actual door openings 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.

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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.

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.

3. 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 and fire-rated insulating units (where indicated).

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.

2.8 ALUMINUM FINISH

A. Anodized Finish: Dark Bronze, AA- M10C12C22A44, Class I, 0.7 mils thick (to match the 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.

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3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 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. Install exterior doors to be weathertight in closed position.

D. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

E. 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

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SECTION 08415 - ALUMINUM STOREFRONT

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 pre-engineered, thermally broken center glazed aluminum screw spline storefront and related accessories.

B. Related Sections include the following:

1. Section 04200 - Unit Masonry
2. Section 07900 - Joint Sealer Assemblies.
3. Section 08416 - Aluminum Framed Entrance Doors
4. Section 08800 - Glass & Glazing.
5. Section 08870 - Security Window Film.

1.3 REFERENCES

A. AAMA – Aluminum Storefront and Entrance Manual 1989.

B. ASTM E283 – Standard test method for determining the rate of air infiltration through exterior framing systems under specified pressure differences across the specimen; 1991 (Re-approved 1999).

C. ASTM E331 – Standard test method for water penetration of exterior windows, skylights, doors and curtain walls by uniform static air pressure difference; 2000.

D. ASTM E330 – Standard test method for structural performance of exterior windows, doors, skylights and curtain walls by uniform static air pressure difference; 2001.

E. AAMA 1503/1/98 – Test method for condensation resistance factor (CRF) and test method for thermal transmission coefficient (U Value).

F. AAMA 501.2 – Field check of metal storefronts, curtain walls, and sloped glazing systems for water leakage; 1994 (part of AAMA 501).

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide aluminum storefront capable of withstanding the effects of the following loads as well as the design wind load indicated but in no case less than 30 psf.

1. Uniform Load Deflection Test: No deflection of any unsupported span L of test unit in excess of L/175 at a test pressure of 50 psf (positive and negative) when test in accordance with ASTM E330.

2. Uniform Load Structural Test: Units to be tested at 1.5 times the design pressure (positive and negative) acting normal to the plane of the wall in accordance with ASTM E330.
   a. No glass breakage or permanent set of any main frame member in excess of 0.2% of its clear span.

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1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, attachments to other Work, installation details, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
3. Weather-stripping details.
4. Glazing details.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Maintenance Data: Include cleaning instructions for glass and metal finishes in maintenance manuals.

E. Test Reports and Calculations:

1. Submit certified independent laboratory test reports showing compliance with the specified requirements.

1.6 QUALITY ASSURANCE

A. Engineering Responsibility: Shop drawings and engineering analysis shall be performed by aluminum storefront manufacturer.

B. Product Requirements: For maximum performance, the storefront for this project must meet both the testing requirements as contained herein and the minimum material requirements specified.

C. Installer Qualifications: An installer acceptable to aluminum storefront manufacturer for installation of units required for this Project.

D. Source Limitations: Obtain aluminum storefront and windows through one source from a single manufacturer.

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum storefront and are based on the specific system indicated. Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

G. Preinstallation Conference: If requested, conduct conference at project site to review methods and procedures related to aluminum storefront including, but not limited to, the following:

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

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2. Review, discuss, and coordinate the interrelationship of aluminum storefront with other exterior wall components.

3. Review and discuss the sequence of Work required to construct a watertight and weathertight exterior building envelope.

4. Inspect and discuss the condition of substrate and other preparatory work performed by Subcontractors.

1.7 PROJECT CONDITIONS

A. Field Measurements: For retrofit installations, verify aluminum storefront openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum storefront system without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum storefronts that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure to meet performance requirements.
   b. Structural failures including excessive deflection, water leakage, or air infiltration.
   c. Deterioration of metals or other materials beyond that which is normal.
   d. Failure of insulating glass.

2. Warranty Period(s):
   a. Storefront: **Three (3) years** from date of Substantial Completion.
   b. Insulated Glazing: **Ten (10) years** from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: “Series 1700 Aluminum Storefront” as manufactured by Architectural Window Manufacturing Corporation, or approved equal.

B. Subject to compliance with requirements, manufacturers of products which may be incorporated in the Work include, but are not limited to, the following:

1. Kawneer Company, Inc.,
2. EFCO Corporation,
3. Oldcastle Building Envelope,
4. Tubelite,
5. Or approved equal.

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2.2 MATERIALS

A. Aluminum Extrusions: Extruded aluminum prime billet 6063-T5 recommended by aluminum storefront system manufacturer for strength, and application of required finish to meet the requirements of ASTM B221 and not less than 0.080-inch thickness at any location.

B. Face Dimension/Frame Depth: 2" face dimension; 4½" frame depth.

C. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum storefront members, anchors, and other components.

1. All fasteners must be concealed except where unavoidable for application of hardware.

2. For application of hardware, where required, use non-magnetic stainless steel phillips machine screws.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Framing Gaskets: Comply with ASTM C864-99, Option II; EPDM, in a hardness suitable for its intended use. 70 Shore A Durometer for Preset Gaskets. Black. All corners of glazing gaskets shall be bed in silicone sealant compatible with glazing gaskets.

F. Setting Blocks: EPDM85 Shore A Durometer; minimum 4" long per glass manufacturer's requirements.

G. Sealant: For sealants required for assembly of aluminum storefront, provide manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.3 STOREFRONT

A. Storefront Type: Screw spline.

B. Condensation-Resistance Factor (CRF): Provide aluminum storefront tested for thermal performance according to AAMA 1503, showing a minimum CRF of 69.

C. Thermal Transmittance: Provide aluminum storefront with a whole-window, U-factor maximum indicated at 15-mph (24-km/h) exterior wind velocity and winter condition temperatures when tested using pyrolitic Low-E glass according to AAMA 1503.

1. U-Factor: 0.45 Btu/sq. ft. x h x deg F or less.

D. Air Infiltration: Maximum rate not more than indicated when tested according to ASTM E283, Air Infiltration Test.

1. Maximum Rate: 0.30 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).

E. Water Resistance: No uncontrolled water leakage at a static water test pressure equaling that indicated, when tested according to ASTM E331, Water Resistance Tests.

1. Test Pressure: 15 lbf/sq. ft.

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2.4 INSULATED GLAZING

A. Construction: All storefront (except those receiving insulated panels) shall be field glazed with hermetically sealed 1" insulating glass units with a dual seal of polyisobutylene and silicone and a desicant filled aluminum spacer. Insulated glass shall be dry glazed and held in place with recyclable EPDM gaskets on both the exterior and interior and must be glazed in accordance with GANA Glazing Manual for the specified glass type.

1. Exterior Glazing:
   a. Thickness: 1/4"
   b. Tint: Clear
   c. Type: Tempered Glass

2. Interior Glazing:
   a. Thickness: 1/4"
   b. Tint: Clear
   c. Type: Tempered Glass
   d. Coating: Pyrolitic Low-E (#3 Surface)

2.5 HARDWARE

A. General: Not applicable.

2.7 ACCESSORIES

A. Rescue Labels: Not applicable.

2.8 FABRICATION

A. Shop fabricate screw-spline aluminum storefront per manufacturer's instructions. Include a complete system for assembling components and anchoring storefronts.

B. Thermally Improved Construction: Aluminum storefront framing shall be thermally broken using a concealed, chemically curing two-part high density polyurethane pour and debridged type structural thermal barrier. A non-structural thermal barrier is not acceptable.

C. Weather Stripping: Weather stripping shall be closed cell EPDM installed in integral raceways in framing members and pressure plates.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

2.9 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Exterior & Interior of Storefront:

1. Class I, Color Anodic Finish: AA-M12C22A42/A44 etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker complying with AAMA 611.
   a. Color: Dark Bronze (to match the existing).

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Work. Verify rough opening dimensions and levelness of sill plate. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight storefront installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing storefront, hardware, accessories, and other components.

B. Install storefront level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support.

C. Install storefront and components to drain condensation, water penetrating joints, and moisture migrating within storefront to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FACTORY TESTING

A. General: Not applicable.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Installer shall remove all labels and shipping bumpers from glass.

B. Manufacturer shall clean all aluminum prior to shipment.

C. Protection of newly installed storefront and/or final cleaning of glass and aluminum to remove any accumulations that may have occurred during the construction period is to be the responsibility of the Contractor.

D. Comply with manufacturer's written recommendations for final cleaning and maintenance.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to maintain storefront.

END OF SECTION 08415

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SECTION 08520 - ALUMINUM WINDOWS

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 fixed and/or operable aluminum-framed windows for exterior locations.

B. Related Sections include the following:

1. Section 04200 – Unit Masonry.

2. Section 07461 – Fiber Cement Siding.

3. Section 07900 – Joint Sealer Assemblies.

4. Section 08415 – Aluminum Storefront.

5. Section 08800 – Glass & Glazing.

6. Section 10430 – Dimensional Letters – LTV Series.

1.3 DEFINITIONS

A. Performance class designations according to AAMA/WDMA/CSA 101/I.S.2/A440-08:

1. AW: Architectural.

B. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440-08:

1. Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.

C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.

D. Minimum Test Size: Smallest size permitted for performance class (gateway test size) or as specified elsewhere in this section, whichever is more stringent. Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class. Downsized test reports will not be considered acceptable.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:

1. Double Hung Windows: 60″ x 99″.

2. Project-In Windows: 60″ x 144″ (F/PI/F).

B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units of the minimum test size specified herein that pass AAMA/WDMA/CSA 101/I.S.2/A440-08, Uniform Load Structural and Uniform Load Deflection Tests:

1. Uniform Load Structural Test: 105 psf (positive and negative).
2. Uniform Load Deflection Test: 70 psf (positive and negative).

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, installation details, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
3. Weather-stripping details.
4. Thermal-break details.
5. Glazing details.

C. Samples for Initial Selection: For units with factory-applied color finishes.

1. Include similar samples of hardware and accessories involving color selection.

D. Maintenance Data: For operable window sash, operating hardware and finishes to include in maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

A. Product Qualifications: After project award, the Contractor shall submit the following to confirm that the proposed product(s) conform to the material and performance requirements contained in these Specifications.

1. Bidder’s Acknowledgement: Bidders shall include a letter stating the manufacturer and series (model) number of the product upon which its bid has been based.
2. Product Data: Bidders submitting bids based on products other than the Basis of Design product listed in Paragraph 2.1 must include the following:
    a. Comprehensive test reports not more than four years old prepared by a qualified testing agency for each product type being used on the project demonstrating compliance with the air, water and structural requirements outlined herein. Test reports based on the use of downsized test units will not be accepted.
    b. Thermal simulations prepared by a qualified independent testing agency for each product type being used on the project demonstrating compliance with the thermal transmittance requirements outlined in Paragraph 2.3.
    c. Full size product details showing all frame and sash details, dimensions, thermal break construction, wall thicknesses and joinery. Details must accurately reflect all glazing and hardware options specified herein.

B. Product Requirements: For maximum performance, windows for this project must meet both the testing requirements as contained herein and the minimum material requirements specified. Windows that carry the applicable AAMA rating but do not meet the material thicknesses, depths, etc. shall not be acceptable for use on this project.

C. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

D. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Do not modify size and dimensional requirements.

    1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. Fenestration Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440-08, "Standard/Specification for Windows, Doors, and Unit Skylights” for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

H. Preinstallation Conference: If requested, conduct conference at project site to review methods and procedures related to aluminum windows including, but not limited to, the following:

    1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components.
3. Review and discuss the sequence of Work required to construct a watertight and weathertight exterior building envelope.
4. Inspect and discuss the condition of substrate and other preparatory Work performed by Subcontractor(s).

1.7 PROJECT CONDITIONS

A. Field Measurements:

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Failure to meet performance requirements.
   b. Structural failures including excessive deflection, water leakage, or air infiltration.
   c. Faulty operation of movable sash and hardware.
   d. Deterioration of metals or other materials beyond that which is normal.
   e. Failure of insulating glass.

2. Warranty Period:

   a. Window: **Five (5) y**ears from date of Substantial Completion.
   b. Balances: **Class 6, Ten (10) years** from date of Substantial Completion.
   c. Insulated Glazing: **Ten (10) years** from date of Substantial Completion.
   d. Painted Metal Finishes (Match existing aluminum window / storefront color):
      1) **Twenty (20) years** from date of Substantial Completion for AAMA 2605 Superior Performance Finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The Basis of Design for these Specifications is the the following (as referenced on the Drawings:

1. Series 7000i Double Hung Tilt as manufactured by Architectural Window Manufacturing Corporation; or approved equal.
2. Series 3200i Project-In as manufactured by Architectural Window Manufacturing Corporation; or approved equal.

B. Equivalents: Subject to compliance with all material and performance requirements outlined in these Specifications, "or equal" products by other manufacturers will be considered for use subject to review by the Architect in accordance with AIA A232 and Section 00800. The Architect's decision regarding equivalency is final.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, not less than 16,000-psi (110-MPa) minimum yield strength, and not less than 0.080-inch (1.6-mm) thickness at any location for the main frame and sash members, except the frame sill which shall be a minimum of 0.125-inch.

B. Frame/Sash Depth: 4-¼" minimum frame depth; 1-7/8" minimum sash depth.

C. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.

1. All fasteners must be concealed except where unavoidable for application of hardware.
2. For application of hardware, where required, use non-magnetic stainless steel phillips machine screws.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.

1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/A440-08.

F. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

G. Replaceable Weather Seals: Comply with AAMA 701/702.

H. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.3 WINDOW

A. Window Types:
1. Double Hung,
2. Project-In.

B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440-08.

1. Performance Class and Grade: AW-PG70.

C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested with insulating glass for thermal performance according to AAMA 1503, showing a minimum CRF of 57.

D. Thermal Transmittance: Provide aluminum windows with whole-window U-factor and SHGC maximums indicated when simulated in accordance with NFRC 100 and NFRC 200 at a model size of 48″ x 72″ and glazed with 1″ Argon filled sputter coat Low-E (#2) insulated glass using a warm edge spacer.

1. U-Factor: 0.44 Btu/sq. ft. x h x deg F or less.
2. SHGC: 0.29

E. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08, Air Infiltration Test.

1. Maximum Rate: 0.20 cfm/sq. ft. (5 cu. m/h x sq. m) of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).

F. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.

1. Test Pressure: 20 percent of positive design pressure, but not more than **12** lbf/sq. ft.

G. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.

H. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/WDMA/CSA 101/I.S.2/A440-08.

I. Operating Force and Auxiliary (Durability) Tests: Comply with AAMA/WDMA/CSA 101/I.S.2/A440-08 for operating window types indicated.

2.4 INSULATED GLAZING

A. Construction: All windows shall be factory glazed with hermetically sealed 1″ insulating glass units with a dual seal of polyisobutylene and silicone and a desiccant filled spacer. Insulated glass must be set into a continuous bed of silicone sealant and held in place with removable extruded aluminum snap-in beads. Wrap around (marine) glazing which requires the removal and disassembling of the sash for re-glazing will not be acceptable. Units must be IGCC certified for a CBA rating level.

1. Exterior Glazing:
   a. Thickness: 1/4″
   b. Tint: Clear
   c. Type: Tempered Glass
   d. Coating: Pyrolitic Low-E (#2 Surface)
2. Interior Glazing:
   a. Thickness: 1/4″
   b. Tint: Clear
   c. Type**:** Tempered Glass
3. Interspace Content: Argon
4. Spacer Type: Aluminum

2.5 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals.

B. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.

C. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; 1 pole operator and pole hanger per room that has operable window hardware more than 72 inches (1800 mm) above floor.

D. Double-Hung Windows: Provide the following operating hardware:

1. Counterbalancing Mechanism: Comply with AAMA 902.
   a. Sash Balance: Class 6, concealed Ultralift Extreme spring type capable of lifting 80% of sash weight, of size and capacity to hold sash stationary at any open position.
2. Tilt Lock: Design window and provide with concealed zinc die cast tilt latches (plastic will not be acceptable) and pivot bar hardware to permit tilting of sash inward for cleaning both sides of sash from interior.

3. Handle: Continuous, integral lift rail on bottom rail of lower sash and pull-down rail on top rail of upper sash.
4. Lower Sash Lock: Spring-loaded, snap-type white bronze lock on bottom rail of lower sash (two if window is greater than 48" wide).
5. Upper Sash Lock: Pole-operated snap type white bronze lock on top rail of upper sash.
6. Meeting Rail Lock: Pole-operated, white bronze cam-action lock on meeting rail of windows.
7. Pole Socket: One surface applied pole socket on inside face of top rail of lower sash on windows with meeting rails more than 72 inches (1800 mm) above floor.
8. Limit Device: Continuous extruded aluminum sash stop limit device with rubber bumper; for each operable sash located at jamb; two per sash.

E. Projected Windows: Provide the following operating hardware:

1. Hinge: Concealed Euro-groove hinges (products with exposed hinges will not be acceptable).
2. Lock: One standard color painted **key operated** single handle operator with concealed multi-point locking hardware.

2.6 INSECT SCREENS

A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Locate screens on outside of window. Provide insect screens on all operable sash.

B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Extruded-Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.050-inch (1.3-mm) wall thickness.
2. Finish: Match aluminum window members.

C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.

1. Wire-Fabric Finish: Charcoal gray.

2.7 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this Specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
2. No thermal short circuits shall occur between the exterior and interior.
3. The thermal barrier shall be INSULBAR® or equal and shall consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
4. Poured and debridged urethane thermal barriers **shall not** be permitted.

D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.

E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

F. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch- thick extruded aluminum. Finish to match window units. Provide subframes capable of withstanding design loads of window units.

H. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440-08.

I. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Exterior of Window:

1. High-Performance Organic 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 written instructions.
    a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 50% polyvinylfluoride resin by weight; complying with AAMA 2604.
    b. Color: As selected by Architect from manufacturer's standard non-mica, non-exotic, non-metallic colors. Note: Exterior color may be different from interior color.

D. Interior of Window:
1. High-Performance Organic 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 written instructions.

    a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 50% polyvinylfluoride resin by weight; complying with AAMA 2604.
    b. Color: As selected by Architect from [manufacturer's standard non-mica, non-exotic, non-metallic colors to match the existing building's window color. Note: Exterior color may be different from interior color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

B. Manufacturer shall clean all glass and aluminum prior to shipment.

C. Protection of newly installed windows and/or final cleaning of glass and aluminum to remove any accumulations that may have occurred during the construction period is to be the responsibility of the Contractor.

D. Comply with manufacturer’s written recommendations for final cleaning and maintenance.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system.

END OF SECTION 08520

SECTION 08700 – FINISH HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Hardware for fire-rated doors.

B. Lock cylinders for doors with balance of hardware specified in other sections.

C. Thresholds.

D. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 08110 - Hollow Metal Frames.

B. Section 08211 - Wood Doors.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

C. BHMA A156.1 - Standard for Butts and Hinges; 2021.

D. BHMA A156.2 - Bored and Preassembled Locks and Latches; 2022.

E. BHMA A156.3 - Exit Devices; 2020.

F. BHMA A156.4 - Door Controls - Closers; 2019.

G. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.

H. BHMA A156.6 - Standard for Architectural Door Trim; 2021.

I. BHMA A156.7 - Template Hinge Dimensions; 2016.

J. BHMA A156.13 - Mortise Locks & Latches Series 1000; 2022.

K. BHMA A156.16 - Auxiliary Hardware; 2018.

L. BHMA A156.18 - Materials and Finishes; 2020.

M. BHMA A156.21 - Thresholds; 2019.

N. BHMA A156.22 - Standard for Gasketing; 2021.

O. BHMA A156.25 - Electrified Locking Devices; 2023.

P. BHMA A156.28 - Standard for Recommended Practices for Mechanical Keying Systems; 2018.

Q. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.

R. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

S. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.

T. DHI (KSN) - Keying Systems and Nomenclature; 2019.

U. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

V. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.

W. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

X. ITS (DIR) - Directory of Listed Products; Current Edition.

Y. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

Z. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.

AA. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

BB. UL (DIR) - Online Certifications Directory; Current Edition.

CC. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

DD. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.

C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing Work of this section; require attendance by affected installers and the following:
   1. Architect.
   2. Construction Manager
   3. Installer's Architectural Hardware Consultant (AHC).
   4. Hardware Installer.
   5. Owner's Security Consultant.

D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

E. Keying Requirements Meeting:
   1. Attendance Required:
   2. Agenda:
      a. Establish keying requirements.
      b. Verify locksets and locking hardware are functionally correct for project requirements.
      c. Verify that keying and programming complies with project requirements.
      d. Establish keying submittal schedule and update requirements.
   3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
   4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
   5. Deliver established keying requirements to manufacturers.

1.05 SUBMITTALS

A. See AIA A232 and Section 00800 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Shop Drawings - Door Hardware Schedule: A detailed listing that includes each item of hardware to be installed on each door.
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
   2. Comply with DHI (H&S) using door numbering scheme and hardware set numbers as indicated in Bid Documents.
      a. Submit in vertical format.
   3. Include complete description for each door listed.

D. Shop Drawings - Electrified Door Hardware: Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
   2. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
   3. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.

E. Samples for Verification:
   1. Submit minimum size of 2 by 4 inch (51 by 102 mm) for sheet samples, and minimum length of 4 inch (102 mm) for other products.
   2. Submit one (1) sample of hinge, latchset, lockset, closer, and illustrating style, color, and finish.
   3. Include product description with samples.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Supplier's qualification statement.

J. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

K. Keying Schedule:
   1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

L. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

M. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

N. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01600 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years' of documented experience.

C. Installer Qualifications: Company specializing in performing Work of the type specified for commercial door hardware with at least three years' of documented experience.

D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in Work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

A. See Section 01900 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
   1. Closers: **Five (5) years**, minimum.
   2. Exit Devices: **Three (3) years**, minimum.
   3. Locksets and Cylinders: **Three (3) years**, minimum.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Door Pulls and Push Plates:
   1. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.

D. Closers:
   1. Provide door closer on each exterior door, unless otherwise indicated.
   2. Provide door closer on each fire-rated and smoke-rated door.
   3. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.

E. Drip Guards: Provide at head of outswinging exterior doors unless protected by roof or canopy directly overhead.

F. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
   2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
      a. Self-drilling (Tek) type screws are not permitted.

3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
4. Provide wall grip inserts for hollow wall construction.
5. Fire-Resistance-Rated Applications: Comply with NFPA 80.
    a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
    b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 PERFORMANCE REQUIREMENTS

A. Provide door hardware products that comply with the following requirements:
1. Applicable provisions of federal, state, and local codes.
2. Accessibility: ADA Standards and ICC A117.1.
3. Fire-Resistance-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
4. Hardware on Fire-Resistance-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), testing firm acceptable to Authorities Having Jurisdiction, or as suitable for application indicated.
5. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
6. Hardware Preparation for Steel Door Frames: BHMA A156.115.
7. Hardware Preparation for Wood Doors with Steel Frames: BHMA A156.115W.
8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

2.03 HINGES

A. Manufacturers: Conventional butt hinges.
1. BEST.
2. Dormakaba.
3. Or approved equal.

B. Properties:
1. Butt Hinges: As applicable to each item specified.
    a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
    b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
    c. Template screw hole locations.
    d. Bearing assembly installed after plating.
    e. Bearings: Exposed fully hardened bearings.
    f. Bearing Shells: Shapes consistent with barrels.
    g. Pins: Easily seated, non-rising pins.
        1) Fully plate hinge pins.
        2) Non-Removable Pins: Slotted stainless steel screws.
    h. UL 10C listed for fire-resistance-rated doors.
2. Continuous Hinges: As applicable to each item specified.
    a. Geared Continuous Hinges: As applicable to each item specified.
        1) Non-handed.

2) Anti-spinning through-fastener.
3) UL 10C listed for fire-resistance-rated doors.
(a) Metal Door Installation: Rated up to 90 minutes.
(b) Wood Door Installation: Rated up to 60 minutes.
4) Sufficient size to permit door to swing 180 degrees

C. Sizes: See Door Hardware Schedule.
1. Hinge Widths: As required to clear surrounding trim.
2. Sufficient size to allow 180 degree swing of door.

D. Finishes: See Door Hardware Schedule.
1. Fully polish hinges; front, back, and barrel.

E. Grades:
1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
2. Continuous Hinges: Comply with BHMA A156.26, Grade 1.

F. Material: Base metal as indicated for each item by BHMA material and finish designation.

G. Types:
1. Butt Hinges: Include full mortise hinges.
2. Continuous Hinges: Include geared hinges.

H. Options: As applicable to each item specified.

I. Quantities:
1. Butt Hinges: Three (3) hinges per leaves up to 90 inches (2286 mm) in height. Add one (1) for each additional 30 inches (762 mm) in height or fraction thereof.
a. Hinge weight and size unless otherwise indicated in hardware sets:
1) For doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
2) For doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
3) For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
4) For doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
2. Continuous Hinges: One per door leaf.

J. Applications: At swinging doors.
1. Provide non-removable pins at out-swinging doors with locking hardware and all exterior doors.

K. Products:
1. Butt Hinges:
a. Ball Bearing, Five (5) Knuckle.
2. Continuous Hinges:
a. Aluminum geared hinges.

2.04 BOLTS

A. Manufacturers:
   1. Trimco,
   2. Burns.
   3. Or approved equal.

B. Properties:
   1. Flush Bolts:
      a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
      b. Manual Flush Bolts: Manually latching upon closing of door leaf.
         1) Bolt Throw: 3/4 inch (19 mm), minimum.

C. Products:
   1. Manual flush bolts.

2.05 EXIT DEVICES

A. Manufacturers:
   1. Dormakaba.
   2. BEST.
   3. Or approved equal.

B. Properties:
   1. Touchpads: 'T" style metal touchpads and rail assemblies with matching chassis covers end caps.
   2. Latch Bolts: Stainless steel deadlocking with 3/4 inch (19 mm) projection using latch bolt.
   3. Lever Design: Match project standard lockset trims.
   4. Cylinder: Include where cylinder dogging or locking trim is indicated.
   5. Strike as recommended by manufacturer for application indicated.
   6. Sound dampening on touch bar.
   7. Dogging:
      a. Non-Fire-Resistance-Rated Devices: Cylinder 1/4 inch (6 mm) hex key dogging.
      b. Fire-Resistance-Rated Devices: Manual dogging not permitted.
   8. Touch bar assembly on wide style exit devices to have a 1/4 inch (6.3 mm) clearance to allow for vision frames.
   9. All exposed exit device components to be of architectural metals and "true" architectural finishes.
   10. Handing: Field-reversible.
   11. Fasteners on Back Side of Device Channel: Concealed - exposed fasteners not allowed.
   12. Vertical Latch Assemblies' Operation: Gravity, without use of springs.

C. Grades: Complying with BHMA A156.3, Grade 1.
   1. Provide exit devices tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.

D. Options:
   1. Electrified Devices.
   2. MLR: Motorized latch retraction.
   3. Electrified Device Voltage: 24 VAC.

E. Products:
   1. 2000; or approved equal.

2.06 ELECTRIC STRIKES

A. Manufacturers:
   1. RCI
   2. Dormakaba.
   3. Or approved equal.

B. Properties:
   1. Provide UL (DIR) listed burglary-resistant devices.
   2. Provide UL 1034 compliant devices.
   3. Provide UL 10C compliant devices.
   4. Non-handed devices suitable for door frame material and scheduled lock configuration.
   5. Include transformer and rectifier as necessary for complete installation.
   6. Holding Force: 1,500 lbs (680.4 kg).
   7. Accommodating latch projections of 1/2 inch (13 mm) or 5/8 inch (16 mm).

C. Options: As applicable to each item specified.
   1. Voltage: 12 VAC.

D. Installation: Connect electric strikes into fire alarm where non-rated doors are scheduled to release with fire or sprinkler alarm condition.

E. Products:
   1. 7 Series (7104, 7304, 7105, 7305, 7107, 7108, 7114, 7314, 7119, 7319); or approved equal.

2.07 LOCK CYLINDERS

A. Manufacturers:
   1. BEST.
   2. Schlage.
   3. Or approved equal.

B. Properties:
   1. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
      a. Provide cylinders from same manufacturer as locking device.
      b. Provide cams and/or tailpieces as required for locking devices.
      c. Provide cylinders with appropriate format interchangeable cores where indicated.

C. Grades:
   1. Standard Security Cylinders: Comply with BHMA A156.5.

D. Types: As applicable to each item specified.

E. Applications: At locations indicated in hardware sets, and as follows
   1. As required for items with locking devices provided by other sections, including at elevator controls and cabinets.
      a. When provisions for lock cylinders are referenced elsewhere in the Project Manual to this Section, provide compatible type of lock cylinder, keyed to building keying system, unless otherwise indicated.

F. Products:
   1. Rim/mortise.

2.08 CYLINDRICAL LOCKS

A. Manufacturers:
   1. BEST.
   2. Dormakaba.
   3. Or approved equal.

B. Properties:
   1. Mechanical Locks:
      a. Fitting modified ANSI A115.2 door preparation.
      b. Door Thickness Fit: 1-3/8 inches (35 mm) to 2-1/4 inches (57 mm) thick doors.
      c. Construction: Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
         1) Through-bolted anti-rotational studs.
      d. Cast stainless steel latch retractor with roller bearings for exceptionally smooth operation and superior strength and durability.
      e. Bored Hole: 2-1/8 inch (54 mm) diameter.
      f. Backset: 5 inches (127 mm) unless otherwise indicated.
      g. Latch: Single piece tail-piece construction.
         1) Latchbolt Throw: 9/16 inch (14.3 mm), minimum.
      h. Cylinders:
         1) Cylinder Core Types: Locks capable of supporting manufacturers' cores, as applicable.
            (a) Small format interchangeable.
      i. Lever Trim:
         1) Style: See Door Hardware Schedule.
         2) Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
         3) Strength: Locksets outside locked lever designed to withstand minimum1,400 inch-lbs (158.2 Nm) of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
         4) Independent spring mechanism for each lever.
            (a) Contain lever springs in the main lock hub.
         5) Outside Lever Sleeve: Seamless one-piece construction.
         6) Keyed Levers: Removable only after core is removed by authorized control key.

C. Finishes: See Door Hardware Schedule.
   1. Core Faces: Match finish of lockset.

D. Grades: Comply with BHMA A156.2, Grade 1, Series 4000, Operational Grade 1, Extra Heavy Duty.
   1. Durability: Passing 50 Million cycle tests verified by third party testing agency.

E. Material: Manufacturer's stadard for specified lock.
   1. Critical Latch and Chassis Components: Brass or corrosion-resistance treated steel.
   2. Outside Lever Sleeve: Hardened steel alloy.

F. Products: Cylindrical locks, including mechanical and electrified types.
   1. 9K (Grade 1).

2.09 KEYPAD LOCKS - STAND-ALONE

A. Manufacturers:

1. BEST.
2. Dormakaba.
3. Schlage
4. Or approved equal.

B. Properties:
1. Fit ANSI A115.1 door preparation.
2. One-piece, 9/16 inch (14 mm) throw.
3. Keypad integrated into lockset escutcheon.
4. Weatherproof bezel and gasket provide protection for outdoor use.
5. Interchangeable core key by-pass where specified restricted keyway.
6. 4 AA batteries standard.

C. Grades:
1. Tested and approved for compliance with BHMA A156.2, Series 4000, Operational Grade.
2. UL listed for GYQS single point locks for use on 3 hour fire-resistance-rated, A label single doors (4'x10') GYJB. Listing applies for both U.S. and Canada applications.
3. Tested and approved for compliance with BHMA A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and approved by UL 10C.
4. Complying with BHMA A156.25 and UL GYQS listed.
5. Complying with US FCC, Canadian FCC, and European EMC requirements.

D. Products:
1. E2035; or approved equal.

2.10 DOOR PULLS AND PUSH PLATES

A. Manufacturers:
1. Burns.
2. Or approved equal.

B. Properties:
1. Pull Type: Straight, unless otherwise indicated.
2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
a. Edges: Beveled, unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: Stainless steel, unless otherwise indicated.

2.11 DOOR PULLS AND PUSH BARS

A. Manufacturers:
1. Dormakaba.
2. Burns.
3. Or approved equal.

B. Properties:
1. Pulls and Handles:
a. Tubular Bars:

C. Grades: Comply with BHMA A156.6.

D. Material: Stainless steel, unless otherwise indicated.

E. Products:
1. 258 8" #1 MTG.

2. 54 4 x 16

2.12 CLOSERS

A. Manufacturers:
   1. BEST.
   2. Dormakaba.
   3. Or approved equal.

B. Properties:
   1. Surface Mounted Closers: Manufacturer's standard.
      a. Construction: Cast iron.
      b. Hydraulic Fluid: All-weather type.
      c. Arm Assembly: Standard for product specified.
         1) Include hold-open, integral stop, or spring-loaded stop feature, as specified in Door Hardware Schedule.
         2) Parallel arm to be a heavy-duty rigid arm.
         3) Where "IS" or "S-IS" arms are specified in hardware sets, if manufacturer does not offer this arm provide a regular arm mount closer in conjunction with a heavy-duty overhead stop equal to a dormakaba 900 Series; or approved equal.
      d. Covers:
         1) Type: Standard for product selected.
         2) Material: Plastic.
         3) Finish: Painted.

C. Grades:
   1. Closers: Comply with BHMA A156.4, Grade 1.
      a. Underwriters Laboratories Compliance:
         1) Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.
            (a) UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.

D. Installation:
   1. Mounting: Includes surface mounted installations.
   2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
   3. At outswinging exterior doors, mount closer on interior side of door.
   4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
   5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.

E. Products:
   1. Surface Mounted:
      a. EDH9000; or approved equal.

2.13 PROTECTION PLATES

A. Manufacturers:
   1. Burns.
   2. Or approved equal.

B. Properties:

1. Plates:
    a. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
    b. Mop Plates: Provide along bottom edge of push side of doors to provide protection from cleaning liquids and equipment damage to door surface.
    c. Edges: Beveled, on four (4) unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: As indicated for each item by BHMA material and finish designation.
1. Metal Properties: Stainless steel.

E. Installation:
1. Fasteners: Countersunk screw fasteners

2.14 STOPS AND HOLDERS

A. Manufacturers:
1. Burns.
2. Or approved equal.

B. General: Provide overhead stop/holder when wall or floor stop is not feasible.

C. Grades:
1. Door Holders, Wall Bumpers, and Floor Stops: Comply with BHMA A156.16 and Resilient Material Retention Test as described in this standard.

D. Material: Base metal as indicated for each item by BHMA material and finish designation.

E. Types:
1. Wall Bumpers: Bumper, concave, wall stop.

F. Installation:
1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

G. Products:
1. Wall Bumpers.

2.15 THRESHOLDS

A. Manufacturers:
1. Pemko.
2. Or approved equal.

B. Properties:
1. Threshold Surface: Fluted horizontal grooves across full width.

C. Grades: Thresholds: Comply with BHMA A156.21.

D. Types: As applicable to project conditions. Provide barrier-free type at every location where specified.

2.16 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:
1. National Guard Products, Inc.
2. Or approved equal.

B. Properties:

1. Weatherstripping Air Leakage Performance: Not exceeding 0.3 cfm/sq ft of door opening at 0.3 inches of water pressure differential for single doors, and 0.5 cfm/sq ft of door area at 0.3 inches of water pressure differential for double doors for gasketing other than smoke control, as tested according to ASTM E283/E283M; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

C. Grades: Comply with BHMA A156.22.

D. Products:
   1. Weatherstripping: See Door Hardware Schedule.
   2. Smoke Seals: See Door Hardware Schedule.
   3. Meeting Stile Seals: See Door Hardware Schedule.
   4. Door Bottom Seals:
      a. Door Sweeps: See Door Hardware Schedule.

2.17 MISCELLANEOUS ITEMS

A. Properties:
   1. Coat Hooks: Provide on room side of door, screw fastened.
      a. Material: Brass.
   2. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
      a. Single Door: Provide three on strike jamb of frame.
      b. Pair of Doors: Provide two on head of frame, one for each door at latch side.
      c. Material: Rubber, gray color.

B. Products:
   1. Coat Hooks.
      a. 604; or approved equal.

2.18 ELECTRIFIED HARDWARE

A. Manufacturers:
   1. BEST.
   2. Dormakaba.
   3. RCI.
   4. Or approved equal.

B. Properties:
   1. Door Position Switches: Recessed devices with magnetic contacts.
      a. Power Requirement: 50mA Max, 100 VDC.
      b. SPDT configuration.
   2. Power Supply Units: Manufacturer's standard.
      a. Enclosures: NEMA Type 1, with hinged cover and knockouts.
      b. Power: 24 VAC, 10 Amp; field-selectable.
      c. Emergency Release Terminals: Designed to release devices upon activation of fire alarm system.
      d. Auxiliary contacts for remote signaling.
      e. User-selectable time delay from 0 to 4 minutes.
      f. Fire Alarm System Interface: Standard.
      g. Output Distribution Board with indicator LEDs.
      h. On/Off LED power indicator.
   3. Power Transfers: Manufacturer's standard.

a. Mortised Type:
1) Stainless steel housing and flexible tube.
2) Capacity: Up to 5/16 inch (8 mm) diameter wire bundle (ten (10) 22-gauge Teflon coated wires).
3) Accommodate 120 degree door swing.

C. Products:
1. Door Position Switches:
a. MC-4 Recessed Magnetic Contact/Door Position Switch; or approved equal.
2. Power Supplies:
a. PS 161-6; or approved equal.
3. Power Transfers:
a. EPT-5 BEST; or approved equal.

2.19 KEYS AND CORES

A. Manufacturers:
1. BEST.
2. Or approved equal.

B. Properties: Complying with guidelines of BHMA A156.28.
1. Provide small format interchangeable core.
2. Provide Patented CORMAX keys and cores.
3. Provide keying information in compliance with DHI (KSN) standards.
4. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
5. Keying: Master keyed.
6. Include construction keying and control keying with removable core cylinders.
7. Supply keys in following quantities:
a. Master Keys: 4 each.
b. Construction Master Keys: 6 each.
c. Construction Keys: 15 each.
d. Construction Control Keys: 2 each.
e. Control Keys if New System: 2 each.
8. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
9. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
10. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
11. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and keys to remain property of hardware supplier.

C. Products:
1. Standard.

2.20 KEY CABINETS

A. Manufacturers:
1. Telkee.
2. Or approved equal.

B. Properties:
   1. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.
   2. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.
   3. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
   4. Mounting: Wall surface mounted.
   5. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
   6. Key cabinet lock to facility's keying system.

C. Finishes: Baked enamel, manufacturer's standard color.

D. Material: Sheet steel.

E. Products:
   1. Telkee; or approved equal.

2.21 FINISHES

A. Finishes: Identified in Hardware Sets.

B. Finishes: Provide door hardware of same finish, unless otherwise indicated.
   1. Finish: 630; satin stainless steel, with stainless steel 3000 series base material (former US equivalent 32D), 652; satin chromium plated over nickel, with steel base material (former US equivalent 26D), and 689; aluminum painted, with any base material (former US equivalent US28); BHMA A156.18.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this Work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Correct all defects prior to proceeding with installation.

C. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware using the manufacturer’s fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

C. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

D. Install hardware for smoke and draft control doors in accordance with NFPA 105.

E. Use templates provided by hardware item manufacturer.

F. Do not install surface mounted items until application of finishes to substrate are fully completed.

G. Wash down masonry walls and complete painting or staining of doors and frames.

H. Complete finish flooring prior to installation of thresholds.

I. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on Drawings.

1. For Steel Door Frames: Install in compliance with DHI (LOCS) recommendations.
2. For Steel Door Frames: See Section 08110.
3. For Aluminum-Framed Storefront Doors and Frames: See Sections 08415 and 08416.
4. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
5. Flush Wood Doors: See Section 08211.
6. Mounting heights in compliance with ADA Standards:
    a. Locksets: 40-5/16 inch (1024 mm).
    b. Push Plates/Pull Bars: 42 inch (1067 mm).
    c. Deadlocks (Deadbolts): 48 inch (1219 mm).
    d. Exit Devices: 40-5/16 inch (1024 mm).
    e. Door Viewer: 43 inch (1092 mm); standard height 60 inch (1524 mm).

J. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

K. Include in installation for existing doors and frames any necessary field modification and field preparation of doors and frames for new hardware. Provide necessary fillers, reinforcements, and fasteners for mounting new hardware and to cover existing door and frame preparations.

3.03 PROTECTION

A. Protect finished Work under provisions of Section 01700 - Execution and Closeout Requirements.

B. Do not permit adjacent Work to damage hardware or finish.

Manufacturer List:

Code	Name
BE	Best Access Systems
BU	Burns
BY	By Others
DM	Dorma Door Controls
NA	National Guard
PR	BEST Precision Exit Devices
ST	BEST Hinges and Sliding

Option List

Code	Description
#1 MTG.	THRU BOLT MOUNTING
B4E	BEVEL 4 EDGES (24" HIGH OR LESS)
CSK	COUNTERSUNK HOLES (24" HIGH OR LESS)
EPT Prep	EPT Prep (full mortise)
FL	Fire Exit Hardware
LBR	LESS BOTTOM ROD
MLR	MOTORIZED LATCH RETRACTION
S3	ANSI Strike Package
TS	TOUCHBAR MONITORING SWITCH

Finish List

Code	Description
26D	Satin Chrome
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
AL	Aluminum
GRAY	Gray
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Hardware Sets

Set #1 - EXD-EXT-2D

Doors: 001, 004, 005, 007, 008, CY02A

2	Continuous Hinge	662HD	AL	ST
1	Exit Device	2202 X 1702C LBR	630	PR
1	Exit Device	2203 X 1703C LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
2	Closer	EHD9016 SPA90	689	BE
1	Saddle Threshold	425	AL	NA

NOTE: Weather seals by door manufacturer.

Set #2 - EXD-EXT-2D UL

Doors: 002, 003

2	Continuous Hinge	662HD	AL	ST
1	Exit Device	FL 2202 X 1702C LBR	630	PR
1	Exit Device	FL 2203 X 1703C LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
2	Closer	EHD9016 SPA90	689	BE
1	Saddle Threshold	425	AL	NA

NOTE: Weatherseals by door manufacturer.

Set #3 - EXD-EXT-2D

Doors: 006

1	Continuous Hinge	662HD	AL	ST
1	Exit Device	2203 X 1703C LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
1	Closer	EHD9016 SPA90	689	BE
1	Saddle Threshold	425	AL	NA

NOTE: Weatherseals by door manufacturer.

Set #4 - EXD-EXT-2B

Doors: V06A

2	Continuous Hinge	662HD UL 83" EPT Prep	AL	ST
2	Power Transfer	EPT-5	630	PR
1	Power Supply	PS161-6		PR
1	Exit Device	TS 2201 LBR	630	PR
1	Exit Device	MLR TS 2208 X 4908A LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
1	Card Reader	By Security Contractor		BY
2	Closer	EHD9016 SPA90	689	BE
2	Door Position Switch	MC-4		RU
1	Saddle Threshold	425	AL	NA

NOTE: Weatherseals by door manufacturer. SECURITY NOTES: Doors locked at all times. Presenting authorized credentials to reader retracts latch at active leaf allowing temporary entry. TS Switch in exit devices to shunt alarm for exiting. Free Egress at all times, push side.

Set #5 - EXD-EXT-2B

Doors: V06B

6	Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
2	Push Pull Bar Set	422 x 26B x LAR	US32D	BU
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Dome Stop	520	US26D	BU
2	Door Silencer	500	GRAY	BU

NOTE: Verify Electronic security is not required on a vestibule door.

Set #6 - EXD-2K

Doors: C09, C10

6	Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
2	Exit Device	FL 2201 LBR	630	PR
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA
1	Astragal	672A Set		NA

Set #7 - Courtyard

Doors: CY02B

1	Continuous Hinge	662HD	AL	ST
1	Exit Device	2203 X 1703C LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
1	Closer	EHD9016 AF90	689	BE
1	Wall Stop	565	US26D	BU
1	Saddle Threshold	425	AL	NA

NOTE: Weatherseals by door manufacturer.

Set #8 - EXD–2G

Doors: C13A

6	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Exit Device	FL 2201 LBR	630	PR
1	Exit Device	FL 2208 X 4908A LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
2	Closer	EHD9016 AF90P 180 Deg.	689	BE
2	Magnetic Holder	EM 508-24120	689	DM
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
1	Gasketing	2525 x Head & Jambs		NA

Set #9 - CRS-03 UL Corridor

Doors: C13B

3	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Exit Device	FL 2208 X 4908A LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
1	Closer	EHD9016 AF90P	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

NOTE: Verify exit device is required.

Set #10 - CRS-03

Doors: 16, 17

6	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Lockset	9K3-7T15D STD S3	626	BE
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
2	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA
1	Finger Guard	2248 38" at kindergarten		NA

Set #11 - CRS-03

Doors: 61, 62, 63, 64A, 64B, 65, 66A, 66B

3	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Lockset	9K3-7T15D STD S3	626	BE
1	Closer	EHD9016 AF90P	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
3	Door Silencer	500	GRAY	BU

Set #12 - Restrooms TRS-01

Doors: 54A, 54B

3	Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
1	Pull	25B 8" #1 MTG.	US32D	BU
1	Push Plate	54 4 X 16	US32D	BU
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Mop Plate	MP50 6" x 1" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Coat Hook	604	US32D	BU
3	Door Silencer	500	GRAY	BU

Set #13 - Toilet TRS-04

Doors: 16B, 17B, 64C, 66C

3	Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
1	Privacy Set	9K3-0L15D S3	626	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Mop Plate	MP50 6" x 1" LDW B4E CSK	US32D	BU
1	Base Stop	526	US26D	BU
1	Coat Hook	604	US32D	BU
3	Door Silencer	500	GRAY	BU
1	Finger Guard	2248 38" at kindergarten		NA

Set #14 - TRS-01 UL

Doors: 55A, 55B

3	Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
1	Lockset	9K3-7H15D S3	626	BE
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU

1	Mop Plate	MP50 6" x 1" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

Set #15 - Music EXD-2F

Doors: 44A

3	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
2	Exit Device	2201 LBR	630	PR
2	Closer	EHD9016 AF90P	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Sound Proofing	5050 B		NA
1	Automatic Door Bottom	335 S		NA
1	Saddle Threshold	425	AL	NA

Set #16 - Music EXD-2F UL

Doors: 58A

6	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Exit Device	FL 2201 LBR	630	PR
1	Exit Device	FL 2208 X 4908A LBR	630	PR
1	Rim Cylinder	12E-72 STD	626	BE
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Wall Stop	565	US26D	BU
1	Sound Proofing	5050 B		NA
2	Automatic Door Bottom	335 S		NA
1	Astragal	672A Set		NA
1	Saddle Threshold	425	AL	NA

Set #17 - Music EXD-2F

Doors: 58B

6	Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
2	Flush Bolts	590 UL	US26D	BU
1	Dust Proof Strike	545	US26D	BU
1	Lockset	9K3-7R15D STD S3	626	BE
2	Closer	EHD9016 AF90	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Dome Stop	520	US26D	BU
1	Sound Proofing	5050 B		NA
2	Automatic Door Bottom	335 S		NA
1	Saddle Threshold	425	AL	NA

Set #18 - TRM-01 UL

Doors: 16A, 17A

3	Butt Hinge	FBB179 4.5" x 4.5" NRP	26D	ST
1	Lockset	9K3-7R15D STD S3	626	BE
1	Closer	EHD9016 AF90P	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

Set #19 - STO-01 Janitor

Doors: 67

3	Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
1	Lockset	9K3-7D15D STD S3	626	BE
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Mop Plate	MP50 6" x 1" LDW B4E CSK	US32D	BU
1	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

Set #20 - CRS-03 Office

Doors: 72, 73, 74, 75

3	Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
1	Lockset	9K3-7B15D STD S3	626	BE
1	Wall Stop	565	US26D	BU
3	Door Silencer	500	GRAY	BU

Set #21 - STO-02

Doors: 59A, 59B

6	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
2	Flush Bolts	590 UL	US26D	BU
1	Dust Proof Strike	545	US26D	BU
1	Lockset	9K3-7D15D STD S3	626	BE
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA
1	Astragal	672A Set		NA

Set #22 - TRM-02 Music

Doors: 44B

3	Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1	Lockset	9K3-7R15D STD S3	626	BE
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	KP50 10" x 2" LDW B4E CSK	US32D	BU
1	Sound Proofing	5050 B		NA
1	Automatic Door Bottom	335 S		NA
1	Threshold	425		NA

Set #23 - STO-02

Doors: 69

6	Butt Hinge	FBB179 4.5" x 4.5" NRP	26D	ST
2	Flush Bolts	590 UL	US26D	BU
1	Dust Proof Strike	545	US26D	BU
1	Lockset	9K3-7D15D STD S3	626	BE
2	Closer	EHD9016 AF90P	689	BE
2	Kick Plate	KP50 10" x 1" LDW B4E CSK	US32D	BU
2	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

1	Astragal	672A Set		NA
1	Threshold Handicap	413	AL	NA

Set #24 - Mech.

Doors: 17C, 68

3	Butt Hinge	FBB179 4.5" x 4.5" NRP	26D	ST
1	Lockset	9K3-7D15D STD S3	626	BE
1	Closer	EHD9016 AF90	689	BE
1	Wall Stop	565	US26D	BU
1	Gasketing	2525 x Head & Jambs		NA

Set #25 - Cased Opening

Doors: 28, 76

NOTE: No Hardware required.

Set #26 - Existing

Doors: 71

NOTE: Reuse all existing hardware.

Set #27 - Partition

Doors: 16BL, 17BL, 28L

1	Mortise Cylinder	1E-74 STD	626	BE

NOTE: Verify mortise cylinder is type required. Remaining hardware by door manuf

END OF SECTION 08700

SECTION 08700 – FINISH HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Hardware for fire-rated doors.

B. Lock cylinders for doors with balance of hardware specified in other sections.

C. Mechanical and electrified door hardware

D. Electronic access control system components

E. Thresholds.

F. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 08110 - Hollow Metal Frames.

B. Section 08211 - Wood Doors.

C. Section 13852 – Digital, Addressable Fire-Alarm System

D. Section 16120 – Low-Voltage Electrical Power Conductors and Cables

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

C. BHMA A156.1 - Standard for Butts and Hinges; 2021.

D. BHMA A156.2 - Bored and Preassembled Locks and Latches; 2022.

E. BHMA A156.3 - Exit Devices; 2020.

F. BHMA A156.4 - Door Controls - Closers; 2019.

G. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.

H. BHMA A156.6 - Standard for Architectural Door Trim; 2021.

I. BHMA A156.7 - Template Hinge Dimensions; 2016.

J. BHMA A156.13 - Mortise Locks & Latches Series 1000; 2022.

K. BHMA A156.16 - Auxiliary Hardware; 2018.

L. BHMA A156.18 - Materials and Finishes; 2020.

M. BHMA A156.21 - Thresholds; 2019.

N. BHMA A156.22 - Standard for Gasketing; 2021.

O. BHMA A156.25 - Electrified Locking Devices; 2023.

P. BHMA A156.28 - Standard for Recommended Practices for Mechanical Keying Systems; 2018.

Q. BHMA A156.31 – Electric Strikes and Frame Mounted Actuators, 2024.

R. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.

S. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

T. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.

U. DHI (KSN) - Keying Systems and Nomenclature; 2019.

V. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

W. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.

X. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

Y. ITS (DIR) - Directory of Listed Products; Current Edition.

Z. NFPA 70 – National Electric Code, 2020

AA. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

BB. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.

CC. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

DD. UL (DIR) - Online Certifications Directory; Current Edition.

EE. UL 10B - Fire Test of Door Assemblies

FF. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

GG. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

HH. UL 305 - Panic Hardware

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.

C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing Work of this section; require attendance by affected installers and the following:
   1. Architect.
   2. Construction Manager
   3. Installer's Architectural Hardware Consultant (AHC).
   4. Hardware Installer.
   5. Owner's Security Consultant.

D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

E. Keying Requirements Meeting:
   1. Attendance Required:
   2. Agenda:
      a. Establish keying requirements.
      b. Verify locksets and locking hardware are functionally correct for project requirements.
      c. Verify that keying and programming complies with project requirements.
      d. Establish keying submittal schedule and update requirements.
   3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:

4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
5. Deliver established keying requirements to manufacturers.

1.05 SUBMITTALS

A. See AIA A232 and Section 00800 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Prior to forwarding submittal:
1. Review drawings and Sections from related trades to verify compatibility with specified hardware.
2. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

D. Shop Drawings - Door Hardware Schedule: A detailed listing that includes each item of hardware to be installed on each door.
1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
2. Comply with DHI (H&S) using door numbering scheme and hardware set numbers as indicated in Bid Documents.
a. Submit in vertical format.
3. Include complete description for each door listed.

E. Shop Drawings - Electrified Door Hardware: Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
2. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
3. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.

F. Samples for Verification:
1. Submit minimum size of 2 by 4 inch (51 by 102 mm) for sheet samples, and minimum length of 4 inch (102 mm) for other products.
2. Submit one (1) sample of hinge, latchset, lockset, closer, and illustrating style, color, and finish.
3. Include product description with samples.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

J. Supplier's qualification statement.

K. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

L. Door Hardware Schedule:
   1. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.

M. Keying Schedule:
   1. After keying conference, submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

N. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

O. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

P. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01600 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years' of documented experience.

C. Installer Qualifications: Company specializing in performing Work of the type specified for commercial door hardware with at least three years' of documented experience.

D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in Work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

B. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent. Promptly replace products damaged during shipping.

1.08 GENERAL COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

   1. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
   2. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.09 WARRANTY

A. See Section 01900 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
   1. Closers: **Five (5) years**, minimum.
   2. Exit Devices: **Three (3) years**, minimum.
   3. Locksets and Cylinders: **Three (3) years**, minimum.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Door Pulls and Push Plates:
   1. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.

D. Closers:
   1. Provide door closer on each exterior door, unless otherwise indicated.
   2. Provide door closer on each fire-rated and smoke-rated door.
   3. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.

E. Drip Guards: Provide at head of out swinging exterior doors unless protected by roof or canopy directly overhead.

F. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
   2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
      a. Self-drilling (Tek) type screws are not permitted.
   3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
   4. Provide wall grip inserts for hollow wall construction.
   5. Fire-Resistance-Rated Applications: Comply with NFPA 80.
      a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
      b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 CABLE AND CONNECTORS

A. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.

B. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.

C. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 PERFORMANCE REQUIREMENTS

A. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Fire-Resistance-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   4. Hardware on Fire-Resistance-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), testing firm acceptable to Authorities Having Jurisdiction, or as suitable for application indicated.
   5. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
   6. Hardware Preparation for Steel Door Frames: BHMA A156.115.
   7. Hardware Preparation for Wood Doors with Steel Frames: BHMA A156.115W.
   8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

2.04 HINGES

A. Manufacturers: Conventional butt hinges.
   1. BEST.
   2. Allegion
   3. Or approved equal.

B. Properties:
   1. Butt Hinges: As applicable to each item specified.
      a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
      b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
      c. Template screw hole locations.
      d. Bearing assembly installed after plating.
      e. Bearings: Exposed fully hardened bearings.
      f. Bearing Shells: Shapes consistent with barrels.
      g. Pins: Easily seated, non-rising pins.
         1) Fully plate hinge pins.
         2) Non-Removable Pins: Slotted stainless steel screws.
      h. UL 10C listed for fire-resistance-rated doors.
   2. Continuous Hinges: As applicable to each item specified.
      a. Geared Continuous Hinges: As applicable to each item specified.
         1) Non-handed.
         2) Anti-spinning through-fastener.
         3) UL 10C listed for fire-resistance-rated doors.
            (a) Metal Door Installation: Rated up to 90 minutes.
            (b) Wood Door Installation: Rated up to 60 minutes.
         4) Sufficient size to permit door to swing 180 degrees

C. Sizes: See Door Hardware Schedule.
   1. Hinge Widths: As required to clear surrounding trim.
   2. Sufficient size to allow 180 degree swing of door.

D. Finishes: See Door Hardware Schedule.
   1. Fully polish hinges; front, back, and barrel.

E. Grades:
   1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
   2. Continuous Hinges: Comply with BHMA A156.26, Grade 1.

F. Material: Base metal as indicated for each item by BHMA material and finish designation.

G. Types:
   1. Butt Hinges: Include full mortise hinges.
   2. Continuous Hinges: Include geared hinges.

H. Options: As applicable to each item specified.

I. Quantities:
   1. Butt Hinges: Three (3) hinges per leaves up to 90 inches (2286 mm) in height. Add one (1) for each additional 30 inches (762 mm) in height or fraction thereof.
      a. Hinge weight and size unless otherwise indicated in hardware sets:
         1) For doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
         2) For doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
         3) For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
         4) For doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
   2. Continuous Hinges: One per door leaf.

J. Applications: At swinging doors.
   1. Provide non-removable pins at out-swinging doors with locking hardware and all exterior doors.

K. Products:
   1. Butt Hinges:
      a. Ball Bearing, Five (5) Knuckle.
   2. Continuous Hinges:
      a. Aluminum geared hinges.

2.05 BOLTS

A. Manufacturers:
   1. Ives
   2. Trimco,
   3. Or approved equal.

B. Properties:

1. Flush Bolts:
    a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
    b. Manual Flush Bolts: Manually latching upon closing of door leaf.
        1) Bolt Throw: 3/4 inch (19 mm), minimum.
    c. Provide wrought brass dust-proof strikes at each bottom flush bolt.
    a. Automatic Flush Bolts: an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.

C. Products:
1. Manual flush bolts.
2. Automatic Flush Bolts
3. Dust proof strike

2.06 EXIT DEVICES

A. Manufacturers:
1. Allegion.
2. BEST.
3. Or approved equal.

B. Properties:
1. Touchpads: 'T" style metal touchpads and rail assemblies with matching chassis covers end caps. No plastic inserts are allowed in touchpads.
2. Latch Bolts: Stainless steel deadlocking with 3/4 inch (19 mm) projection using latch bolt.
3. Lever Design: Match project standard lockset trims.
4. Cylinder: Include where cylinder dogging or locking trim is indicated.
5. Strike as recommended by manufacturer for application indicated.
6. Sound dampening on touch bar.
7. Dogging:
    a. Non-Fire-Resistance-Rated Devices: Cylinder 1/4 inch (6 mm) hex key dogging.
    b. Fire-Resistance-Rated Devices: Manual dogging not permitted.
8. Touch bar assembly on wide style exit devices to have a 1/4 inch (6.3 mm) clearance to allow for vision frames.
9. All exposed exit device components to be of architectural metals and "true" architectural finishes.
10. Handing: Field-reversible.
11. Fasteners on Back Side of Device Channel: Concealed - exposed fasteners not allowed.
12. Vertical Latch Assemblies' Operation: Gravity, without use of springs.
13. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.

C. Grades: Complying with BHMA A156.3, Grade 1.
1. Provide exit devices tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.

D. Options:
1. Outdoor Defense Features:

a. Designed to perform in a variety of outdoor conditions, and utilize a series of tests to ensure performance as intended in outdoor applications.
    1) Temperature range: -31 degrees Fahrenheit (-35 degrees Celsius) to 151 degrees Fahrenheit (66 degrees Celsius).
        (a) Evaluated per UL294 Section 81 Variable Ambient Test
        (b) Evaluated per UL1034 Section 34.2 Variable Ambient Test
    2) Moisture Resistance: Rain tested at 4.8 gallons per minute
        (a) Per UL294 Section 79
        (b) Per UL1034 Section 53
    3) Corrosion Resistance: Salt Fog Tested per
        (a) UL294 Section 83.2 Salt Spray (5% salt concentration)
        (b) UL1034 Section 52 Salt Spray Corrosion Test (20% salt concentration)
    4) Dust Resistance: Dust Tested per
        (a) UL294 Section 80 Dust Test
        (b) UL1034 Section 54 Dust Test

2. Electrified Devices:
    a. Electrified options must be engineered to perform in outdoor conditions and must be warrantied for humidity, rain, and temperature.
        1) CX: Provide delayed egress devices, where scheduled, that are UL 294 listed, meet National Fire Protection Association (NFPA) and International Building Code (IBC) governing delayed egress, and/or other local and national fire codes acceptable to authority having jurisdiction as required.
            (a) Provide non-handed and field sizable device with 3/4 (19mm) throw deadlocking latch bolt. Device incorporates an internal RX switch that detects attempt to exit from applying less than 15lbs to the push pad, which causes this switch to start an irreversible alarm cycle. Key switch in device is capable of arming, disarming, or resetting the device; and indicator lamp determines status of the device
            (b) Provide devices capable of standard 15 second release delay and indefinite release delay as required by code, when tied into fire alarm system will release immediately when an alarm condition exists.
            (c) Provide devices with all control inputs – door position input, external inhibit input, fire alarm input; auxiliary locking; nuisance alarm and internal horn; and, remote signaling output self-contained in the device assembly.
    b. QEL Option, quiet electric latch retraction
    c. ALK Option, alarm kit
    d. LX Option, latch bolt monitoring
    e. RX Option, request to exit switch
    f. WH Option, weep holes
3. MLR: Motorized latch retraction.
4. Electrified Device Voltage: 24 VAC.

E. Products:
    1. Interior Panic Devices:
        a. Von Duprin 98/35A series;
        b. Precision APEX 2000 Series;
    2. Exterior Exit Devices:
        a. Von Duprin 98/99 Series Outdoor Defense;
        b. Detex Weatherized Series;

3. Or approved equal.

2.07 LOCK CYLINDERS

A. Manufacturers:
   1. BEST.
   2. Schlage.
   3. Or approved equal.

B. Properties:
   1. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
      a. Provide cylinders from same manufacturer as locking device.
      b. Provide cams and/or tailpieces as required for locking devices.
      c. Provide cylinders with appropriate format interchangeable cores where indicated.

C. Grades:
   1. Standard Security Cylinders: Comply with BHMA A156.5.

D. Types: As applicable to each item specified.

E. Applications: At locations indicated in hardware sets, and as follows
   1. As required for items with locking devices provided by other sections, including at elevator controls and cabinets.
      a. When provisions for lock cylinders are referenced elsewhere in the Project Manual to this Section, provide compatible type of lock cylinder, keyed to building keying system, unless otherwise indicated.

F. Products:
   1. Rim/mortise.

2.08 CYLINDRICAL LOCKS

A. Manufacturers:
   1. Schlage
   2. BEST
   3. Or approved equal.

B. Properties:
   1. Mechanical Locks:
      a. Fitting modified ANSI A115.2 door preparation.
      b. Door Thickness Fit: 1-3/8 inches (35 mm) to 2-1/4 inches (57 mm) thick doors.
      c. Construction: Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
         1) Through-bolted anti-rotational studs.
      d. Cast stainless steel latch retractor with roller bearings for exceptionally smooth operation and superior strength and durability.
      e. Bored Hole: 2-1/8 inch (54 mm) diameter.
      f. Backset: 5 inches (127 mm) unless otherwise indicated.
      g. Latch: Single piece tail-piece construction.
         1) Latchbolt Throw: 9/16 inch (14.3 mm), minimum.
      h. Cylinders:
         1) Cylinder Core Types: Locks capable of supporting manufacturers' cores, as applicable.
            (a) Small format interchangeable.
      i. Lever Trim:
         1) Style: See Door Hardware Schedule.

2) Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
3) Strength: Locksets outside locked lever designed to withstand minimum1,400 inch-lbs (158.2 Nm) of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
4) Independent spring mechanism for each lever.
   (a) Contain lever springs in the main lock hub.
5) Outside Lever Sleeve: Seamless one-piece construction.
6) Keyed Levers: Removable only after core is removed by authorized control key.

C. Finishes: See Door Hardware Schedule.
   1. Core Faces: Match finish of lockset.

D. Grades: Comply with BHMA A156.2, Grade 1, Series 4000, Operational Grade 1, Extra Heavy Duty.
   1. Durability: Passing 50 Million cycle tests verified by third party testing agency.

E. Material: Manufacturer's standard for specified lock.
   1. Critical Latch and Chassis Components: Brass or corrosion-resistance treated steel.
   2. Outside Lever Sleeve: Hardened steel alloy.

F. Products: Cylindrical locks, including mechanical and electrified types.
   1. Schlage ND Series
   2. 9K (Grade 1)
   3. Or approved equal

2.09 KEYPAD LOCKS - STAND-ALONE

A. Manufacturers:
   1. Schlage
   2. BEST
   3. Or approved equal.

B. Properties:
   1. Fit ANSI A115.1 door preparation.
   2. One-piece, 9/16 inch (14 mm) throw.
   3. Keypad integrated into lockset escutcheon.
   4. Weatherproof bezel and gasket provide protection for outdoor use.
   5. Interchangeable core key by-pass where specified restricted keyway.
   6. 4 AA batteries standard.

C. Grades:
   1. Tested and approved for compliance with BHMA A156.2, Series 4000, Operational Grade.
   2. UL listed for GYQS single point locks for use on 3 hour fire-resistance-rated, A label single doors (4'x10') GYJB. Listing applies for both U.S. and Canada applications.
   3. Tested and approved for compliance with BHMA A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and approved by UL 10C.
   4. Complying with BHMA A156.25 and UL GYQS listed.
   5. Complying with US FCC, Canadian FCC, and European EMC requirements.

D. Products:
   1. E2035; or approved equal.

2.10 DOOR PULLS AND PUSH PLATES

A. Manufacturers:
   1. Ives
   2. Burns.
   3. Or approved equal.

B. Properties:
   1. Pull Type: Straight, unless otherwise indicated.
   2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
      a. Edges: Beveled, unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: Stainless steel, unless otherwise indicated.

2.11 DOOR PULLS AND PUSH BARS

A. Manufacturers:
   1. Ives
   2. Burns.
   3. Or approved equal.

B. Properties:
   1. Pulls and Handles:
      a. Tubular Bars:

C. Grades: Comply with BHMA A156.6.

D. Material: Stainless steel, unless otherwise indicated.

E. Products:
   1. 8200 4″ x 16″.
   2. 8302 10″ 4″ x 16″

2.12 CLOSERS

A. Manufacturers:
   1. Allegion
   2. BEST
   3. Or approved equal.

B. Properties:
   1. Surface Mounted Closers: Manufacturer's standard.
      a. Construction: Cast iron.
      b. Hydraulic Fluid: All-weather type.
      c. Arm Assembly: Standard for product specified.
         1) Include hold-open, integral stop, or spring-loaded stop feature, as specified in Door Hardware Schedule.
         2) Parallel arm to be a heavy-duty rigid arm.
      d. Covers:
         1) Type: Standard for product selected.
         2) Material: Plastic.
         3) Finish: Painted.

C. Grades:
   1. Closers: Comply with BHMA A156.4, Grade 1.
      a. Underwriters Laboratories Compliance:

1) Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.
   (a) UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.
   (b) UL 10C passing requirements for the hydraulic fluid.

D. Installation:
   1. Mounting: Includes surface mounted installations.
   2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
   3. At out swinging exterior doors, mount closer on interior side of door.
   4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
   5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.

E. Products:
   1. Surface Mounted:
      a. LCN 4050A series, EDH9000; or approved equal.

2.13 ELECTROMECHANICAL CLOSER/HOLDERS

A. Manufacturers:
   1. LCN
   2. Norton
   3. Or approved equal

B. Properties:
   1. Electromechanical closer/holders:
      a. Single-point or multi-point hold-open as specified. Coordinate voltage requirements with Section 16120 - Low-Voltage Electrical Power Conductors and Cables and provide transformer if necessary.
      b. Surface mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation. See Section 13852 – Digital, Addressable Fire-Alarm System

C. Cover & Housing:
   1. Type: Standard die-cast cover.

D. Grades: Tested and certified by BHMA A156.15, Grade 1
   1. Underwriters Laboratories Compliance
      a. UL 10C – Metal smoke barrier or labeled door

E. Product:
   1. Surface Mounted:
      a. LCN SEM7800 Series or approved equal

2.14 PROTECTION PLATES

A. Manufacturers:
   1. Ives
   2. Burns.
   3. Or approved equal.

B. Properties:
   1. Plates:
      a. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
      b. Mop Plates: Provide along bottom edge of push side of doors to provide protection from cleaning liquids and equipment damage to door surface.
      c. Edges: Beveled, on four (4) unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: As indicated for each item by BHMA material and finish designation.
   1. Metal Properties: Stainless steel, minimum of 0.050 inch (1mm) thickness.

E. Installation:
   1. Fasteners: Countersunk screw fasteners

2.15 OVERHEAD AND DOOR STOPS AND HOLDERS

A. Manufacturers:
   1. Glynn-Johnson
   2. Ives
   3. Or approved equal.

B. General: Provide overhead stop/holder when wall or floor stop is not feasible.

C. Grades:
   1. Door Holders, Wall Bumpers, and Floor Stops: Comply with BHMA A156.16 and Resilient Material Retention Test as described in this standard.

D. Material: Base metal as indicated for each item by BHMA material and finish designation.

E. Types:
   1. Wall Bumpers: Bumper, concave, wall stop.

F. Installation:
   1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

G. Products:
   1. Wall Bumpers.

2.16 THRESHOLDS

A. Manufacturers:
   1. Zero International
   2. Pemko.
   3. Or approved equal.

B. Properties:
   1. Threshold Surface: Fluted horizontal grooves across full width.

C. Grades: Thresholds: Comply with BHMA A156.21.

D. Types: As applicable to project conditions. Provide barrier-free type at every location where specified.

2.17 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:
   1. National Guard Products, Inc.
   2. Or approved equal.

B. Properties:
   1. Weatherstripping Air Leakage Performance: Not exceeding 0.3 cfm/sq ft of door opening at 0.3 inches of water pressure differential for single doors, and 0.5 cfm/sq ft of door area at 0.3 inches of water pressure differential for double doors for gasketing other than smoke control, as tested according to ASTM E283/E283M; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
   2. Door Sweeps or shoes: Apply to the bottom of the door to close the gap between the door bottom and finished floor or saddle threshold. Provide solid neoprene, EPDM, silicone, or nylon brush type of seal as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.
   3. Automatic Door Bottoms: Provide closed cell sponge, bulb neoprene. or EPDM type of seal as specified in hardware sets. Door bottom to be mortised, semi mortised, or surface mount as with a minimum thickness as specified in hardware sets.
   4. Seals and Gasketing: Provide continuous gasketing on exterior openings, to the head and jambs, forming a continuous seal between the door and the frame. Provide smoke, light, or sound gasketing on interior doors where indicated.
   5. Smoke Labeled Gasketing: At all smoke labeled openings, provide smoke listed perimeter gasketing assemblies complying with NFPA 105 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.
   6. Fire Listed Gasketing: Assemblies complying with NFPA 80 that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction for fire ratings indicated based on testing according to UL-10C.

C. Installation: Where frame-applied intumescent seals are required by the manufacturer, provide gaskets that comply with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2, Fire Tests of Door Assemblies.

D. Grades: Comply with BHMA A156.22.

E. Products:
   1. Weatherstripping: See Door Hardware Schedule.
   2. Gasketing, See Door Hardware Schedule.
   3. Smoke Seals: See Door Hardware Schedule.
   4. Meeting Stile Seals: See Door Hardware Schedule.
   5. Door Bottom Seals:
      a. Door Sweeps: See Door Hardware Schedule.

2.18 MISCELLANEOUS ITEMS

A. Properties:
   1. Coat Hooks: Provide on room side of door, screw fastened.
      a. Material: Brass.
   2. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
      a. Single Door: Provide three on strike jamb of frame.
      b. Pair of Doors: Provide two on head of frame, one for each door at latch side.
      c. Material: Rubber, gray color.

B. Products:
   1. Coat Hooks.
      a. 604; or approved equal.

2.19 ELECTRIFIED HARDWARE

A. Manufacturers:
   1. Von Duprin.
   2. BEST.
   3. RCI.
   4. Or approved equal.

B. Properties:
   1. Door Position Switches: Recessed devices with magnetic contacts.
      a. Power Requirement: 50mA Max, 100 VDC.
      b. SPDT configuration.
   2. Power Supply Units: Manufacturer's standard.
      a. Enclosures: NEMA Type 1, with hinged cover and knockouts.
      b. Power: 24 VAC, 10 Amp; field-selectable.
      c. Emergency Release Terminals: Designed to release devices upon activation of fire alarm system.
      d. Auxiliary contacts for remote signaling.
      e. User-selectable time delay from 0 to 4 minutes.
      f. Fire Alarm System Interface: Standard.
      g. Output Distribution Board with indicator LEDs.
      h. On/Off LED power indicator.
   3. Power Transfers: Manufacturer's standard.
      a. Mortised Type:
         1) Stainless steel housing and flexible tube.
         2) Capacity: Up to 5/16 inch (8 mm) diameter wire bundle (ten (10) 22-gauge Teflon coated wires).
         3) Accommodate 120 degree door swing.

C. Products:
   1. Door Position Switches:
      a. MC-4 Recessed Magnetic Contact/Door Position Switch; or approved equal.
   2. Power Supplies:
      a. PS 161-6; or approved equal.
   3. Power Transfers:
      a. EPT-10 Von Duprin; EPT-5 BEST; or approved equal.

2.20 ELECTRONIC ACCESS CONTROL WIRELESS CYLINDRICAL LOCK

A. Manufacturers:
      a. Schlage NDEB series
      b. Or approved equal

B. Properties:
   1. Cylindrical locksets
      a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
      b. Offset lever pull – minimum 1,600-foot pounds without gaining access
      c. Vertical lever impact – minimum 100 impacts without gaining access
      d. Cycle Test - tested to minimum 16 million cycles with no visible lever sag or use of performance aids such as set screws or spacers.
   2. Emergency Override: Provide mechanical key override.
   3. Lever:

a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked.
b. Provide lever trim that operates independently of each other and is field reversible without tools.
c. Style: Rhodes

4. Power Supply: 4 AA batteries
   a. Provide battery powered wireless electronic products with the ability to communicate battery status and battery voltage level by means of a mobile app at door and remotely by Partner integrated software.
5. Features:
   a. Ability to communicate unit's communication status.
   b. Visual LED indicators that indicate activation, operational systems status, system error conditions and low power conditions.
   c. Audible feedback that can be enabled or disabled.
   d. Suitable for both interior and exterior deployment.
   e. Employ Wi-Fi communications to permit remote view of audits and alerts, as well as provide automatic daily updates to lock configuration and user access rights.
6. Adaptability:
   a. Open Architecture: Provide locksets manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology. Can be supported by cloud-based web and mobile apps without the need for an integrated software partner.
7. Switches:
   a. Door Position Sensor – magnet integrated into strike to eliminate additional door prep
   b. Interior Cover Tamper Guard
   c. Battery Status
   d. Request to Exit
   e. Interior Push Button
8. Credentials: Provide integral credential reader modules in the following configurations:
   a. NFC, including peer-peer compatible, operable with both Android and IOS mobile devices
   b. 125 kHz contactless smart cards
      1) Compatibility: Schlage, XceedID, ISONAS, HID, GE/CASI, AWID
   c. 13.56 MHz contactless smart cards
      1) Secure section (multi-technology and smart card) compatibility: Schlage MIFARE Classic, Schlage MIFARE DESFire EV1/EV3
      2) 13.56 MHz Serial number only (multi-technology and smart card) compatibility: DESFire CSN, HID iCLASS CSN, MIFARE CSN, MIFARE DESFire EV1/EV3 CSN
   d. Multi-technology contactless for applications requiring read capability for both 125 kHz proximity and 13.56 MHz contactless smart cards.
   e. BLE
9. Records: Subject to the limitations of the attached access control system, the wireless locks possess enough storage capacity to support 5000 users and 2000 audits.
10. Verification time: less than or equal to 1 second for smart cards and proximity cards

C. Grades: Comply with ANSI/BHMA A156.2 Series 4000, Grade 1.
   1. Underwriters Laboratories Compliance

a. Certified to UL10C 3-hour rating, ULC-S319, FCC Part15
b. UL 294 - The Standard of Safety for Access Control System Units.

2. Compliant with ANSI/BHMA A156.25 Operation and Security interior operating range of 32 degrees F (0 degrees C) to 120 degrees F (49 degrees C) for interior use only.
3. Compliant with ASTM E330 for door assemblies.
4. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80 and IBC Chapter 10 Cylinders:

D. Products:
1. Schlage NDEB series, or approved equal.

2.21 POWER SUPPLIES

A. Manufacturers and Products:
1. Schlage
2. Precision ELR series
3. Or approved equal

B. Properties:
1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
a. 12/24 VDC Output, field selectable.
b. Class 2 Rated power limited output.
c. Universal 120-240 VAC input.
d. Low voltage DC, regulated and filtered.
e. Polarized connector for distribution boards.
f. Fused primary input.
g. AC input and DC output monitoring circuit w/LED indicators.
h. Cover mounted AC Input indication.
i. Tested and certified to meet UL294.
j. NEMA 1 enclosure.
k. Hinged cover w/lock down screws.
l. High voltage protective cover.

C. Products:
1. Von Duprin PS900 Series

2.22 ELECTROMECHANICAL AUTOMATIC OPERATORS

A. Manufacturers and Products:
1. Schlage
2. Stanley Access Technologies
3. Or approved equal

B. Properties:
1. Opening: Powered by DC motor working through reduction gears.
2. Closing: Spring force.

3. Manual, hydraulic, or chain drive closers: Not permitted.

C. Features/Materials:
   1. Variable adjustments, including opening and closing speed adjustment.
   2. Cover: Aluminum.
   3. Unit features:
      a. Manual off/auto/hold-open switch,
      b. push and go function to activate power operator,
      c. vestibule interface delay,
      d. electric lock delay,
      e. hold-open delay adjustable from 1 to 32 seconds
      f. logic terminal to interface with accessories, mats, and sensors.
   4. Drop plates, brackets, and adapters for arms as required to suit details.
   5. Motion sensors and/or actuator switches, and receivers for operation as specified.
   6. Weather-resistant actuators at exterior applications.
   7. Key switches:
      a. with LED's, recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets.
   8. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf.

D. Installation:
   1. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect.
   2. Locate actuators, key switches, and other controls as directed by shop or contract drawings.

E. Grades: Low energy automatic operator units that are electromechanical design complying with ANSI/BHMA A156.19.

F. Products:
   1. LCN Senior Swing

2.23 KEYS AND CORES

A. Manufacturers:
   1. BEST.
   2. Or approved equal.

B. Properties: Complying with guidelines of BHMA A156.28.
   1. Provide small format interchangeable core.
   2. Provide Patented CORMAX keys and cores.
   3. Provide keying information in compliance with DHI (KSN) standards.
   4. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
   5. Keying: Master keyed.
   6. Include construction keying and control keying with removable core cylinders.
   7. Supply keys in following quantities:
      a. Master Keys: 4 each.
      b. Construction Master Keys: 6 each.
      c. Construction Keys: 15 each.

d. Construction Control Keys: 2 each.
e. Control Keys if New System: 2 each.

8. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
9. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
10. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
11. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and keys to remain property of hardware supplier.

C. Products:
1. Standard

2.24 KEY CABINETS

A. Manufacturers:
1. Telkee.
2. Or approved equal.

B. Properties:
1. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.
2. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.
3. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
4. Mounting: Wall surface mounted.
5. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
6. Key cabinet lock to facility's keying system.

C. Finishes: Baked enamel, manufacturer's standard color.

D. Material: Sheet steel.

E. Products:
1. Telkee; or approved equal.

2.25 FINISHES

A. Finishes: Identified in Hardware Sets.

B. Finishes: Provide door hardware of same finish, unless otherwise indicated.
1. Finish: 630; satin stainless steel, with stainless steel 3000 series base material (former US equivalent 32D), 652; satin chromium plated over nickel, with steel base material (former US equivalent 26D), and 689; aluminum painted, with any base material (former US equivalent US28); BHMA A156.18.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this Work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Correct all defects prior to proceeding with installation.

C. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware using the manufacturer's fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

C. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

D. Install hardware for smoke and draft control doors in accordance with NFPA 105.

E. Use templates provided by hardware item manufacturer.

F. Do not install surface mounted items until application of finishes to substrate are fully completed.

G. Wash down masonry walls and complete painting or staining of doors and frames.

H. Complete finish flooring prior to installation of thresholds.

I. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on Drawings.
   1. For Steel Door Frames: Install in compliance with DHI (LOCS) recommendations.
   2. For Steel Door Frames: See Section 08110.
   3. For Aluminum-Framed Storefront Doors and Frames: See Sections 08415 and 08416.
   4. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
   5. Flush Wood Doors: See Section 08211.
   6. Mounting heights in compliance with ADA Standards:
      a. Locksets: 40-5/16 inch (1024 mm).
      b. Push Plates/Pull Bars: 42 inch (1067 mm).
      c. Deadlocks (Deadbolts): 48 inch (1219 mm).
      d. Exit Devices: 40-5/16 inch (1024 mm).
      e. Door Viewer: 43 inch (1092 mm); standard height 60 inch (1524 mm).

J. 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.
   1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
   2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
   3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

K. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

L. Include in installation for existing doors and frames any necessary field modification and field preparation of doors and frames for new hardware. Provide necessary fillers, reinforcements, and fasteners for mounting new hardware and to cover existing door and frame preparations.

3.03 PROTECTION

A. Protect finished Work under provisions of Section 01700 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

Manufacturer List:

Code	Name
BES	Best Access Systems
BY	By Others
DM	Dorma Door Controls
GLY	Glynn-Johnson
IVE	IVES
LCN	LCN
NA	National Guard
SCH	Schlage
ZER	Zero International
VON	Von Duprin

Option List

Code	Description
B4E	BEVEL 4 EDGES (24" HIGH OR LESS)
CSK	COUNTERSUNK HOLES (24" HIGH OR LESS)
EPT Prep	EPT Prep (full mortise)
FL	Fire Exit Hardware
LBR	LESS BOTTOM ROD
MLR	MOTORIZED LATCH RETRACTION
S3	ANSI Strike Package
TS	TOUCHBAR MONITORING SWITCH

Finish List

Code	Description
A26D	Satin Chrome
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum
A	Aluminum Mill Finish
AL	Aluminum
AA	Aluminum Clear Anodized
ANCLR	Aluminum Clear Anodized
BK	Black GRAY Gray
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Hardware Sets

Set #1.1 - EXD-EXT-2D

Doors: 001A, 005

2	Continuous Hinge	112XY EPT	628	IVE
2	Power Transfer	EPT10 CON	689	VON
1	Exit Device	LD-RX-9847-EO-CON	626	VON
1	Exit Device	RX-QEL-9847-NL-OP-110MD-CON 24 VDC	626	VON
1	Rim Cylinder	1E72	626	BE
2	Closer	4050A SCUSH	689	LCN
1	Saddle Threshold	545A	AL	ZER
2	Door Sweep	8197AA	AA	Zer
1	Card Reader	By Security Contractor		BY
2	Door Contact	By Security Contractor		BY
1	Power Supply	PS902 900-4RL 120/240 VAC	LGR	SCH

NOTE: Weatherseals and Flush Pulls by door manufacturer. Card Reader and Door Contacts by Owner's security vendor security NOTES: Doors locked at all times. Presenting authorized credentials to reader retracts latch at active leaf allowing temporary entry. TS Switch in exit devices to shunt alarm for exiting. Free Egress at all times, push side.

Set #1.2 - EXD-EXT-2D

Doors: CY02A

2	Continuous Hinge	112XY	628	IVE
2	Power Transfer	EPT10	689	VON
2	Mortise Cylinder	1E74	626	BES
1	Elec Panic Hardware	CD-WPRX-9847-EO-WH	626	VON
1	Elec Panic Hardware	CD-WPRX-9847-NL-OP-110MD-WH	626	VON
1	Rim Cylinder	1E72	626	BES
2	Surface Closer	4050	689	LCN
2	Door Sweep	8197AA	AA	ZER
1	Threshold	545A	A	ZER

NOTE: Flush Pulls, overhead stop, and weather seals by door manufacturer. Closer is top jamb mounted.

Set #1.3 - EXD-EXT-2D

Doors: 004, 008

2	Continuous Hinge	112XY	628	IVE
1	Panic Hardware	LD-9847-EO	626	VON
1	Panic Hardware	LD-9847-NL-OP-110MD	626	VON
1	Rim Cylinder	1E72	626	BES
2	Surface Closer	4050A SCUSH	689	LCN
2	Door Sweep	8197AA	AA	ZER
1	Threshold	545A	A	ZER

NOTE: Flush pull and weather seals by door manufacturer.

Set #2 - EXD-EXT-2D UL

Doors: 002, 003, 007

2	Continuous Hinge	112XY	628	IVE
1	Exit Device	9847-EO-F-SNB	626	VON

1	Exit Device	9847-NL-OP-F-110MD-SNB	626	VON
1	Rim Cylinder	1E72	626	BE
2	Closer	4050A SCUSH TBSRT	689	LCN
1	Saddle Threshold	545A	AL	ZER
2	Door Sweep	8197AA	AA	ZER

NOTE: Flush pull and weather seals by door manufacturer.

Set #3 - EXD-EXT-2D

Doors: 006

1	Continuous Hinge	112XY	628	IVE
1	Exit Device	LD-98-NL-OP-110MD	626	VON
1	Rim Cylinder	12E-72 STD	626	BE
1	Closer	4050A SCUSH	689	LCN
1	Saddle Threshold	545A	AL	ZER
1	Door Sweep	8197AA	AA	ZER

NOTE: Flush pull and weather seals by door manufacturer.

Set #4 - EXD-EXT-2B

Doors: V06A,

2	Continuous Hinge	112XY EPT	628	IVE
2	Power Transfer	EPT10 CON	689	VON
1	Power Supply	PS902 900-4RL 120/240 VAC	LGR	SCE
1	Exit Device	LD-RX-9847-EO-CON	626	VON
1	Exit Device	RX-QEL-9847-NL-OP-110MD-CON 24 VDC	626	VON
1	Surf. Auto Oper.	9542 AS REQ (120/240 VAC)	ANCLR	LCN
2	Actuator, Touch	8310-818T		LCN
2	Mount Box	8310-819F		LCN
2	Door Sweep	8197AA	AA	ZER
2	Wire Harness	CON-XX-P Length As Required For Use W/ Door		SCH
2	Wire Harness	CON-6W		SCH
1	Rim Cylinder	1E72	626	BE
1	Card Reader	By Security Contractor		BY
1	Closer	4050A SCUSH	689	LCN
2	Door Position Switch	By Security Contractor		BY
1	Saddle Threshold	545A	AL	ZER

NOTE: Weatherseals and Flush Pulls by door manufacturer. Card Reader and Door Contacts by Owner's security vendor security NOTES: Doors locked at all times. Presenting authorized credentials to reader retracts latch at active leaf allowing temporary entry. TS Switch in exit devices to shunt alarm for exiting. Free egress at all times, push side.

Set #5 - EXD-EXT-2B

Doors: V06B, 001B,

2	Continuous Hinge	112XY	628	IVE
2	Exit Device	LD-9827-L-BE-LBR-06	626	VON
2	Closer	4050A SCUSH	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Dome Stop	520	US26D	BU
2	Door Silencer	500	GRAY	BU

1	Gasketing Set	328AA-S	AA	ZER
2	Door Sweep	39A	A	ZER
1	Threshold	545A	A	ZER

Set #6 - EXD-2K

Doors: C09

2	Continuous Hinge	112XY	628	IVE
1	Exit Device	9827-EO-F-LBR-499F	626	VON
1	Exit Device	9827-EO-F-LBRAFL-499F	626	VON
2	Closer	4050A 90 Degree	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Magnetic Holder	SEM 7800	689	LCN
1	Gasketing	2525 x Head & Jambs		NA
1	Astragal	672A Set		NA

NOTE: Closer to be Top Jamb Mounted

Set #6A - EXD-2K

Doors: C10

2	Continuous Hinge	112XY	628	IVE
1	Exit Device	9827-EO-F-LBR-499F	626	VON
1	Exit Device	9827-EO-F-LBRAFL-499F	626	VON
2	Closer	**4050A 90/180 Degree**	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Magnetic Holder	SEM 7800	689	LCN
1	Gasketing	188SBK PSA	BK	NA
1	Gasketing Set	328AA-S	AA	ZER
1	Astragal	672A Set		NA

NOTE: Closer to be Top Jamb Mounted

Set #7 - Courtyard

Doors: CY02B

1	Continuous Hinge	112XY	628	IVE
1	Power Transfer	EPT10	689	VON
1	Mortise Cylinder	1E74	626	BES
1	Elec Exit Device	CD-WPRX-OUT-98-NL-OP-110MD-WH	626	VON
1	Rim Cylinder	1E72	626	BES
1	Closer	4050A	689	LCN
1	Door Sweep	8197AA	AA	ZER
1	Saddle Threshold	545A	AL	ZER

NOTE: Flush Pulls, overhead stop, and weather seals by door manufacturer. Closer is top jamb mounted.

Set #8 - EXD–2G

Doors: C13A

2	Continuous Hinge	112XY	628	IVE
1	Exit Device	9827-L-BE-F-LBR-06-499F	626	VON
1	Exit Device	9827-L-BE-F-LBRAFL-06-499F	626	VON
1	Rim Cylinder	12E-72 STD	626	BES
2	Closer	4050A EDA 180 Deg.	689	LCN

2	Magnetic Holder	SEM 7800	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
1	Gasketing	188SBK PSA	BK	ZER
1	Gasketing Set	328AA-S	AA	ZER
1	Threshold	545A	A	ZER

Set #9 - CRS-03 UL Corridor

Doors: C13B

1	Continuous Hinge	112XY	628	IVE
1	Exit Device	98-L-F-2SI-06	626	VON
1	Rim Cylinder	12E-72 STD	626	BE
1	Rim Cyl Thumbturn	XB11-979	626	SCH
1	Closer	4050A EDA	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	BK	ZER
1	Gasketing Set	328AA-S	AA	ZER

NOTE: Verify exit device is required.

Set #10 - CRS-03

Doors: 16, 17

2	Continuous Hinge	112XY	628	IVE
1	Lockset	ND50HD RHO IS-LOC	626	SCH
2	Closer	4050A RW/PA	689	LCN
2	Kick Plate	8400 10" X 2" LDW B-CS	US32D	IVE
2	Wall Stop	WS406/407CCV	US26D	IVE
1	Gasketing	188SBK PSA Head & Jambs		ZER
1	Finger Guard	2248 38" at kindergarten		NA

Set #11 - CRS-03

Doors: 30, 32, 34, 36, 37, 39, 41, 61, 62, 63, 64A, 64B, 65, 66A, 66B

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND50HD RHO IS-LOC	626	SCH
1	Closer	4050A RW/PA	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	US32D	IVE
1	Wall Stop	WS406/407CCV	US26D	IVE
1	Gasketing	188SBK PSA Head & Jambs		ZER
3	Door Silencer	500	GRAY	BU

Set #12 - Restrooms TRS-01

Doors: 54A, 54B

1	Continuous Hinge	112XY	628	IVE
1	Pull Plate	8302 10" 4" X 16"	630	IVE
1	Push Plate	8200 4" X 16"	630	IVE
1	Closer	4050A	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Mop Plate	8400 4" X 1" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
3	Door Silencer	SR64	GRAY	IVE

NOTE: Closer to be Top Jamb Mounted

Set #13 - Toilet TRS-03

Doors: 64C, 66C

1	Continuous Hinge	112XY	628	IVE
1	Privacy Set	ND40S RHO OS-OCC	626	SCH
1	Closer	4050A	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Mop Plate	8400 4" X 1" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Coat & Hook	571	A26D	IVE
3	Door Silencer	SR64	A26D	IVE

NOTE: Closer to be Top Jamb Mounted

Set #14 - TRS-01 UL

Doors: 55A, 55B

1	Continuous Hinge	112XY	628	IVE
1	Lockset	9K3-7H15D S3	626	BE
1	Closer	4050A	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Mop Plate	8400 4" X 1" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Coat & Hat Hook	571	A26D	IVE
3	Silencer	SR64	GRY	IVE
1	Gasketing	2525 x Head & Jambs		NA

NOTE: Closer to be Top Jamb Mounted

Set #15 – Music EXD-2F

Doors: 44A

1	Continuous Hinge	112XY	628	IVE
2	Exit Device	LD-9827-L-2SI-LBR-06	626	VON
2	Rim Cylinder	1E72	626	BES
2	Rim Cyl Thumb Turn	XB11-979	626	SCH
2	Closer	4050A SCUSH	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Wall Stop	565	US26D	BU
1	Sound Proofing	5050 B		NA
2	Automatic Door Bottom	335 S		NA
1	Saddle Threshold	545A	A	ZER
2	Silencer	SR64	GRY	IVE

Set #16 - Music EXD-2F UL

Doors: 58A

2	Continuous Hinge	112XY	628	IVE
1	Exit Device	9827-L-F-2SI-LBR-06-499F	626	VON
1	Exit Device	9827-L-F-2SI-LBRAFL-06-499F	626	VON
1	Rim Cylinder	1E72	626	BE
1	Rim Cyl Thumb turn	XB11-979	626	SCH

2	Closer	4050A EDA	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Wall Stop	WS406/407CCV	630	IVE
1	Sound Proofing	5050 B		NA
2	Automatic Dr Bottom	364AA		ZER
1	Astragal	672A Set		NA
1	Saddle Threshold	545A	AL	ZER

Set #17 - Toilet TRS-04

Doors: 16B, 17B

1	Continuous Hinge	112XY	628	IVE
1	Passage Set	ND10S ATH	626	SCH
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Mop Plate	8400 4" X 1" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Coat & Hook	571	A26D	IVE
3	Door Silencer	SR64	A26D	IVE
1	Finger Guard	2248 38" at kindergarten		NA

NOTE: Closer to be Top Jamb Mounted

Set #18 - TRM-01 UL

Doors: 16A, 17A

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND50HD RHO IS-LOC	626	SCH
1	Closer	4050A EDA	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	BK	ZER

Set #19 - STO-01 Janitor

Doors: 67

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND80HD RHO	626	SCH
1	Closer	4050A	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Mop Plate	MP50 6" x 1" LDW B4E CSK	US32D	BU
1	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	AL	ZER
1	Threshold	545A	A	ZER

NOTE: Closer to be Top Jamb Mounted

Set #20 - CRS-03 Office

Doors: 72, 73, 74, 75

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND50HD RHO IS-LOC	626	SCH
1	Surface Closer	4050A	689	LCN
1	Wall Stop	WS406/407CCV	630	IVE
3	Door Silencer	SR64	GRAY	IVE

NOTE: Closer to be Top Jamb Mounted

Set #21 -STO-02

Doors: 59A, 59B

2	Continuous Hinge	112XY	628	IVE
2	Auto Flush Bolts	FB31P	630	IVE
1	Dust Proof Strike	DP2	626	IVE
1	Electronic Lockset	NDEBHD ATH Battery Operated By Security Integrator	626	SCH
1	Coordinator	COR X FL	628	IVE
2	Surface Closer	4050A EDA	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	BK	ZER
1	Gasketing Set	328AA-S	AA	ZER
1	Astragal	672A Set		NA

Set #22 - TRM-02 Music

Doors: 44B

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND50HD RHO IS-LOC	626	SCH
1	Surface Closer	4050A EDA	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Sound Proofing	870AA-S		ZER
1	Automatic Dr Bottom	335 S		NA
1	Threshold	425		NA

Set #23 - STO-02

Doors: 69

2	Continuous Hinge	112XY	628	IVE
2	Auto Flush Bolts	FB31P	630	IVE
1	Dust Proof Strike	DP2	626	IVE
1	Lockset	NDEBHD ATH Battery Operated By Security Integrator	626	SCE
1	Coordinator	COR X FL	628	IVE
2	Surface Closer	4050A EDA	689	LCN
2	Kick Plate	8400 10" X 1" LDW B-CS	630	IVE
2	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	BK	ZER
1	Gasketing Set	328AA-S	AA	ZER
1	Astragal	672A Set		NA
1	Threshold	545A	AL	ZER

Set #24.1 - Mech.

Doors: 17C

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND80HD RHO	626	SCH
1	Surface Closer	4050A RW/PA	689	LCN

1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA	BK	ZER

Set #24.2 - Mech.

Doors: 68

1	Continuous Hinge	112XY	628	IVE
1	Lockset	ND80HD RHO	626	SCH
1	Overhead Stop	90S	630	GLY
1	Closer	4050A	689	LCN
1	Kick Plate	8400 10" X 2" LDW B-CS	630	IVE
1	Wall Stop	WS406/407CCV	630	IVE
1	Gasketing	188SBK PSA		ZER
1	Threshold	545A	A	ZER
3	Silencer	SR64	GRY	IVE

NOTE: Closer to be Top Jamb Mounted

Set #25 - Cased Opening

Doors: 2B, 76

NOTE: No Hardware required.

Set #26 - Existing

Doors: 71, 45, 47, 49, 76,

NOTE: Reuse all existing hardware.

Set #27 - Partition

Doors: 16BL, 17BL, 28L

NOTE: Hardware required

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 08211 - Wood Doors.
2. Section 08410 - Aluminum/FRP Doors.
3. Section 08415 - Aluminum Storefront.
4. Section 08416 - Aluminum Framed Entrance Doors.
5. Section 08520 - Aluminum Windows.
6. Section 08870 - Security Window Film.

1.2 SUMMARY

A. Extent of glass and glazing Work is indicated on Drawings and schedules.

B. Types of Work or locations requiring glass and glazing include, but are not limited to, glass types scheduled herein and on the Drawings.

1. Aluminum Windows.
2. Wood Doors.
3. Aluminum Storefronts.
4. Aluminum Entrance Doors.

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. Fire-Rated Door Assemblies: 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 NFPA 252.

C. 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).

D. Insulating Glass Seal Standard: Comply with ASTM E 774, Class C.

1. Comply with International Building Code/2021, NJ ed., for insulated tempered glass.
2. Label each unit permanently on spacer or on one pane.
3. Certification agency:

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a. Insulating Glass Certification Council (IGCC).
b. Associated Laboratories, Inc. (ALI).

E. 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.

F. 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.

G. All glass shall bear the Label of the manufacturer.

H. 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.

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.

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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 Limited Warranty on Fire-Rated / Impact Gazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of **five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.

1. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.

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. Standard Glass, Insulating Glass and Spandrel Glazing Products:
   a. Pilkington, Libbey-Owens-Ford, (LOF)
   b. Vitro Architectural Glass (formally PPG Glass)
   c. Guardian Industries Corp.
   d. Or approved equal.

2. Fire Rated Glass Assemblies:
   a. Pyran® Platinum F by Schott Glass Products.
   b. Or approved equal.

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2.2 PRIMARY GLASS PRODUCTS

A. Clear Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1 (clear), Quality-Q3 (glazing select).

B. 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.

C. 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 **clear**, with visible light transmittance of 70% and shading coefficient of 0.44 for 1/4" thick glass.

D. Energy Advantage Low-E Glass: Manufacturer's standard clear color Low-E glass, coated on third surface with light transmittance:

1. Clear: 33% and shading coefficient of .44 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, 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.

2.4 FIRE-RATED / IMPACT GLAZING AND FRAMING ASSEMBLIES

A. Fire protection rated and impact safety rated glazing material with a thickness (indicated below), made from a patented directional specialty tempered glazing or laminated glass ceramic with a transparent appearance.

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1. Units are tested listed and labeled by Underwriters Laboratories Inc., UL, for the following applications and comply with the following Agencies:
    a. Classified and labeled by Underwriters Laboratories, Inc.®. Test report number for labeled fire-rated assemblies is UL File No. R22036.
    b. All above tests performed in accordance with UL 9, UL 10B, UL 10C, NFPA 257, NFPA 80, ASTM E2010-01, ASTM E2074-00.
    c. This product is not considered a barrier to radiant heat and has not met the ASTM E-119 or UL 263 test standards.
    d. Fire rated for up to 90 minutes with required hose-stream test.
    e. Fire-rated for up to 180 minutes in doors with required hose-stream test.
    f. Withstands thermal shock.

3. Impact rating: ANSI Z97.1 (Class A) and CPSC 16CFR1201 (Cat. I and II).

4. Passes positive pressure test standard UL 10C.

5. Laminated floated glass-ceramic.

6. Clear and colorless without the distracting amber tint associated with competitive glass-ceramics. Microfloat process allows for smooth surface and distortion-free mirror finish.

7. Approved for use with any fire-rated frame.

8. Sound Transmission Class (STC): 36

9. The panel must be placed on calcium silicate or hardwood setting blocks and glazed using PYRAN® Platinum classified glazing tape, such as closed cell PVC, Fiberfrax tape or Pemko FG3000S90; or approved equal.

B. Subject to compliance with requirements, provide fire-rated impact glazing, as follows:

1. FRIG-1: Fire-Rated / Impact Gazing - Provide Pyran® Platinum F (filmed) by Schott Glass Products; or approved equal.
    a. Doors with fire rating requirements of up to 90 minutes.
        1) Doors, Non-Temperature Rise - Maximum exposed area of glazing = 3,708 sq. in.
            a) Maximum: Width = 37-3/4" & Height = 94-1/4".
        2) Thickness: 3/16"
        3) Provide 5/8" glazing stops.
    b. Doors, Temperature Rise and Non-Temperature Rise of up to 180 minutes.
        1) Maximum exposed area of glazing = 100 sq. in.
            a) Maximum: Width = 12" & Height = 33".
        2) Thickness: 3/16"
        3) Provide 5/8" glazing stops.
    c. Other than Doors with fire rating requirements of up to 90 minutes.
        1) Maximum exposed area of glazing = 4,933 sq. in.
            a) Maximum: Width = 98-1/4" & Height = 98-1/4".
        2) Thickness: 3/16"
        3) Provide 5/8" glazing stops.

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2.5 INSULATING LAMINATED GLAZING - (ACOUSTICAL):

A. Provide insulating laminated acoustical glass for applications in interior wood doors where acoustical glass is indicated. Assemblies shall comply with the following:

1. Overall thickness: 1-inch.

2. Air Space: 1/2-inch.

3. Glass Pane: 1/4 inch thick laminated:
   a. Basis of Design: 1/8" - Salflex SilentGlass Technology 0.030 PVB interlayer by Viracon; or approved equal.

4. STC Rating: 42 Minimum; ASTM E90.

5. Provide manufacturer's standard pliable mastic for holding in place units.

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. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape. 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weatherometer; either plain or pre-shimmed as required for proper installation of glass.

2.7 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

A. 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.

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2.8 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.

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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.

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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 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

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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

B. Section 08415 - Aluminum Storefronts

C. 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 Spectophotometry 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.

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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 A232 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.

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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 90.1-2019 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 (Sub)Contractor is a <u>certified installer</u>.**

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.**

<u>Note</u>: 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. **<u>Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.</u>**

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. **<u>Window Security Film Pre-Installation Meeting:</u>** Prior to installation of the Security Window Film, there shall be a Pre-Installation Meeting with the 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.

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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); or approved equal, 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

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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 Bid 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 A232 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.

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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.

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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; or approved equal, 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 faculties.
    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:

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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.

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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.

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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

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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. Impact resistance gypsum wallboard
3. Exterior gypsum core sheathing and accessories
4. Drywall finishing (joint tape and compound treatment)
5. Vinyl trim and accessories.

C. Related Sections:

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. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to Authorities Having Jurisdiction.

1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to Authorities Having Jurisdiction.

C. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

D. Fireblocking and Draftstopping: Comply with the International Building Code/2021, NJ ed., 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.

E. Provide self extinguishing vinyl trim accessories which do not support combustion once flame source is removed.

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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 C1396/C1396M Gypsum Wallboard (Standard, Type X, Flexible, Ceiling, Foil-Backed, Mold-Resistant)

C. ASTM C1178/C1178M Standard for Glass Mat Water-Resistant Gypsum Backing Panel

D. ASTM C754 Steel Framing Standard - Comply with applicable requirements for installation of steel framing for gypsum board)

E. ASTM C11 Gypsum and Related Building Materials and Systems

F. ASTM C1396/C1396M Impact Resistance Gypsum Wallboard and tested in accordance with ASTM C1629/C1629M

G. ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds

H. ASTM C475/C475M Joint Treatment Materials

I. ASTM D3678 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions

J. ASTM C1047 Interior Trim

K. 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. Shop drawings: Submit shop drawings for wall metal stud framing for structural heavy gauge wall studs supporting other equipment, items, cabinets, etc.

1. Show layout, spacings, sizes, thicknesses, and types of metal framing, fabrication, fastening and anchorage details, including mechanical fasteners.

2. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachments to other units of Work.

3. Indicate manufacturer’s design thickness to meet structural performance requirements for each wall mounted item, equipment, cabinet, etc.

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C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.6 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 form 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.

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5. United States Gypsum Co. (USG)
6. Or approved equal.

C. Gypsum Boards and 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. Gypsum Core Sheathing:

1. Georgia-Pacific Corp.
2. United States Gypsum Co. (USG)
3. Continental Building Products
4. CertainTeed Gypsum.
5. Or approved equal.

E. 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.

F. 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: 3-5/8 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

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mounted items, equipment, cabinets, etc. coordinate with Subcontractor(s) for weight requirements and mounting locations.

2. Hemmed Leg Furring Channel Members: ASTM C645, 25 gauge hat-shaped.

3. Fasteners for Stud Members: Provide fasteners of type, material, size, recommended by furring manufacturer for the substrate and application indicated.

D. Metal Furring Support Materials

1. Roll-formed, hat-shaped sections made of 20-ga. Corrosion-resistant steel. Designed for screw attachment of gypsum panels. Size 7/8" x 2-9/16"; length 12', 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; or approved equal.

2.3 GYPSUM BOARD

A. General: ASTM C1396, in maximum lengths available to minimize end to end joints.

1. Type: Type X for fire resistance rated assemblies, unless otherwise (where indicated).

2. Edges: Tapered.

3. Thickness: 5/8 inch, unless otherwise indicated.

B. Impact Resistance Gypsum Wallboard: ASTM C1629 level 3 (highest) for hard- and soft-body impact, and tested in accordance with ASTM C473 for moisture and mold resistance and ASTM D3273 for resistance to growth of mold on the surface of interior coatings. Mold Defense per ASTM D3273. Provide Type X; tapered edge, 5/8 inch thick, unless otherwise indicated. (Paintable)

1. Basis of Design: “Mold Tough VHI Firecode Core” High-Impact-Resistant Panels with Moisture and Mold Resistance; United States Gypsum Co.; or approved equal.

2. Where two layers of gypsum wallboard application is indicated, provide impact resistance type gypsum wallboard only for the exposed to view gypsum wallboard layer.

3. Subject to compliance with requirements of the Bid Documents, manufacturers offering products which may be incorporated in Work include the following:
   a. “Hi-Impact XP”, by National Gypsum.
   b. “Extreme Impact Resistant Gypsum Drywall, by CertainTeed Gypsum.
   c. Or approved equal.

2.4 GYPSUM CORE SHEATHING SYSTEM

A. Manufacturer:

1. The following system indicated, is the "Basis of Design", other manufacturer's will be considered, provided they comply with AIA A232 and Section 00800:

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a. Basis of Design: "Dens-Glass Gold, Firestop Type X"; Georgia-Pacific Corp.; or approved equal.
b. Subject to compliance with requirements of the Bid Documents, manufacturers offering products which may be incorporated in Work include the following:
1) "Securock Glas-Mat Sheathing, Firecode Core Type "X"; by United States Gypsum Comp.
2) "DensGlass Gold" by Georgia-Pacific.
3) "DensElement" Barrier System by Georgia-Pacific.
4) Exp Sheathing, by National Gypsum.
5) Or approved equal.

B. Sheathing: Gypsum sheathing, complying with ASTM C1396.

1. Type X, noncombustible gypsum sheathing board core with fiberglass mattes both sides.
a. Fire resistance: ASTM E136
1) Flame Spread: 0, as per ASTM E84.
2) Smoke Developed: 0, as per ASTM E84.

2. Edges and ends: Manufacturer's standard.

3. Thickness: 5/8 inch.

4. Size: 4 feet by 9 feet, or 4 feet by 10 feet, as required for coordination with framing.

5. Fasteners: ASTM C 954; self-drilling, self-tapping, bugle head galvanized or cadmium-plated steel screws.

6. Joint tape: Manufacturer's approved types, self-adhering fiberglass mesh compatible with sheathing panels.

7. Joint Sealant:
a. Types approved by manufacturer of sheathing panels, for long term joint protection.
1) Basis of Design: "Elmer's Siliconized Acrylic Lates", Borden, Inc.; or approved equal.
2) Warranty: **Twenty (20) year** manufacturer's standard warranty.

8. Provide miscellaneous materials as produced or recommended by manufacturer of gypsum sheathing products.

9. Warranty: Manufacturer's standard warranty against material defects.
a. Warranty period: **Five (5) years**, start at approved date for substantial completion.

C. Silicone Emulsion Sealant: Product complying with ASTM C834, compatible with sealant tape and gypsum sheathing, recommended by manufacturers of both sheathing and tape for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Product: Subject to compliance with requirements, provide Elmer's Siliconized Acrylic Latex Caulk; Borden, Inc.; or approved equal.
a. Warranty: **Twenty (20) year** manufacturer's standard warranty.

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2.5 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.

2.6 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.

2.7 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.

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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; or approved equal.

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 runners tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other Work, except as otherwise indicated. Ramset; or approved equal, 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. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame; install runner track sections (for jack studs) at head and secure to jamb studs.

6. Space studs 16 inches o.c. except as otherwise indicated.

7. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

8. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.

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9. Provide runner tracks of same gauge as jamb studs. Space jack studs same as partition studs.

10. Cut studs ½" short of full height to provide perimeter relief.

11. Do not fasten studs to top track to allow independent movement of studs and track.

12. Door jambs:
    a. Install double 20 gauge studs at each jamb for all doors.
    b. Space wall furring members 16 inches o.c. except as otherwise indicated.

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. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.)

H. Form control joints and expansion joints at locations indicated (@ 30'-0" o.c. or 900 sf), with space between edges of boards, prepared to receive trim accessories.

I. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to ½ inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

J. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

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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.

B. Double-Layer Application: Install gypsum backing board for base layer and exposed gypsum board for face layer as follows:

1. On partitions/ walls apply base layer and face layers in accordance with referenced standards and manufacturers recommendations.

2. Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
   a. Fasten base layers with screws and face layer with adhesive and supplementary fasteners, except where both layers are fastened separately to supports with screws where required for fire rated assemblies.

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.

D. Install metal control joint (beaded type) where indicated or required.

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.

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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. **Glass-Mat, Water-Resistant Backing Panels**: Finish according to manufacturer's written instructions.

3.7 GYPSUM SHEATHING INSTALLATION

A. General: Install gypsum sheathing board according to manufacturer's instructions and GA-253 "Application of Gypsum Sheathing."

B. Install tongue-and-groove gypsum sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints. Fasten gypsum sheathing board to framing with self-drilling, bugle-head screws, as follows:

C. Install square end and edged sheathing vertically with long edges parallel to, and centered over, studs. Install solid blocking where end joints do not bear against framing sills or track. Fasten gypsum sheathing board to perimeter framing and to each stud with self-drilling, bugle-head screws, located a minimum of 3/8 inch (9.5 mm) from ends and edges of board units, as follows:

1. Space fasteners to comply with manufacturer's recommendations.

D. Sheathing Tape: Apply sheathing tape to joints in sheathing; overlap tape by not less than the tape width at joint intersections.

1. For glass-fiber tape, apply approximately a 3/8-inch (9.5-mm) bead of siliconized emulsion sealant to tapes along joints and embed sealant into tapes along their entire surface with a trowel. In addition, apply sealant with a trowel to each exposed fastener so that fasteners are completely covered.

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3.8 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.

3.9 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 09290 - ARCHITECTURAL COLUMN COVERS

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 05400 - Miscellaneous Structural Steel.
2. Section 05500 - Metal Fabrications.
3. Section 07900 - Joint Sealer Assemblies.
4. Section 09900 - Painting.

1.2 SUMMARY

A. Section Includes:

1. Prefabricated structural column enclosures and steel support subframing assembles include the following:
   a. Glass Fiber Reinforced Gypsum (GRG) - interior applications.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's Specifications, installation instructions, and general recommendations. Include data substantiating that products to be furnished comply with requirements of the Bid Documents.

B. Shop Drawings: Submit complete shop drawings for fabrication and erection, including plans, elevations, and large scale details of typical sections and connections.

1. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures.

2. Provide location and details of anchorage devices to be embedded in or fastened to other construction. Furnish templates if required for accurate placement.

3. Include schedule and erection procedure for proper installation.

4. Include Manufacturer's and Installer Warranty.

C. Verification Samples: To verify compliance with requirements of Bid Documents, submit complete sets of samples, illustrating full range of color and texture to be expected in the completed work. Provide samples of minimum size as follows:

1. 24 inches in length.

D. Certificates: Submit manufacturer's certification that products comply with requirements of the Bid Documents.

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E. Maintenance Data: Submit manufacturer's instructions for proper maintenance materials and procedures.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain required products from a single manufacturer.

B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than 5 years.

1. Accessories: Provide accessory items only as produced or recommended by manufacturer of primary products.

C. Fabricator Qualifications: Provide products fabricated by a company which has successfully specialized in production of this type of work for not less than a recommended 10 years.

D. Erector Qualifications: Install products of this section by a company with the following minimum requirements:

1. Erector to be preauthorized by the manufacturer of the column enclosures.

E. Mock-up: Prior to installation of work of this section, erect sample at location directed by or acceptable to the Architect, using specified materials and illustrating range of color, texture, and workmanship to be expected in the completed work. Once mock-up has been approved by the Architect, retain until the work has been completed and accepted.

1. Configuration: Approximately 4 feet long.

2. Mock-up may be incorporated into the final work; demolish and remove from site when directed by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Pack and otherwise protect each unit to avoid damage during shipping, handling and storage.

B. Delivery and Storage: Store materials on project site to maintain proper separation and grading integrity. Protect and cover materials to prevent excessive accumulation of moisture and exposure to heavy impact.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Do not proceed with installation until existing and forecasted weather conditions are favorable and will allow work to proceed in accordance with manufacturer's recommendations.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate work of this section with installation of steel framing assemblies.

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1.8 WARRANTY

A. Special Project Warranty: Submit a written warranty signed by the manufacturer, the Contractor and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the Bid Documents.

1. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
   a. Warranty period: **Two (2) years** after date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. Basis of Design: Prefabricated Glass Reinforced Gypsum (GRG) units as manufactured by Custom Casting Northeast, Inc.; 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 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, intended performances and all other design attributes listed in this Specification 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:

1. Concrete Designs Inc.
2. Formglas Inc.
3. Or approved equal.

2.2 MIXES

A. GRG) Glass Fiber Reinforced Gypsum Mix: Manufacturer's standard.

2.3 FABRICATION

A. (GRG): (Custom Mold Fabrication) Molds: Fabricate molds to achieve proper size, shape and texture for GRG members as shown on approved shop drawings and samples.

1. Material Characteristics:
   a. Shell Thickness: 3/16 inch minimum for field area and ½" at attachment points.
   b. Weight: 1.5 lb/sq.ft.; (based on 1/8" thickness).

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c. Flexural strength: 3600 psi, plus or minus 10%. (Based on 1/8" thickness), in accordance with ASTM C947.
d. Tensile Strength: 1450 psi., plus or minus 10%. (Based on 1/8" thickness).
e. Compressive strength: 10,000 psi, plus or minus 10%. (Based on 1/8" thickness), in accordance with ASTM C109-87).
f. Impact : 13 lb/sq.in., with no penetration, in accordance with ASTM D 256-87.
g. Density: 103-110 lbs./ cu.ft, plus or minus 10%. (Based on 1/8" thickness).
h. Barcol Hardness: 84, (ASTM D2583-87.
i. Rockwell Hardness: 95, (ASTM D785)
j. Flammability: Flame spread: - 0. Smoke developed: - 0. Class I ASTM E84.
k. Humidified deflection: 1/16" (ASTM C-473)
l. Thermal expansion: 1.17x 10/F (ASTM D696)
2.11x 10/G (ASTM D696)

2. Tolerances: Fabricate to within the following tolerances:
a. Dimensional : All directions, Plus or minus 1/8 inch.
b. Thickness: Plus or minus 1/16 inch.

3. Warpage or bowing: plus or minus 1/16 inch per foot across the diagonal.

2.4 RELATED MATERIALS

A. Steel Framing: Material and workmanship conform with the requirements of AISC, AISI, and Metal Lath Steel Framing Association for light gauge steel frame members.

1. Steel frame members shall be as specified by the manufacturer.

B. Joint Treatment materials:

1. All hidden exterior joints to be reinforced with fiberglass perforated joint tape.

2. Bedding material shall include bonding agent and grout mix as recommended by manufacturer. Grout materials shall be applied, as recommended by manufacturer and /or bonding agent manufacturer.

C. Miscellaneous Materials:

1. General: Provide auxiliary materials of types and grades recommended by manufacturer for work included in this section.

2. Adhesive: Manufacturer's recommended adhesive; Dow Corning 795; Liquid Nails, by PPG Architectural Coatings Co.; Loctite - PL400 or PL Premium; or approved equal.
a. Class A, conforming to Specification #TT-S-00230C.

3. Fasteners: All fasteners will be galvanized or plated finish. Stainless steel fasteners will be used at any exposed face penetrations.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect substrates and conditions under which the work of this section will be performed, and verify that installation properly may commence. Do not proceed with the work until unsatisfactory conditions have been resolved fully.

3.2 PREPARATION

A. Clean substrate, removing projections and substances detrimental to the work; comply with recommendations of manufacturer of products to be installed for proper preparation procedures.

3.3 ERECTION

A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

1. Erection of supplementary framing and bracing: Install supplementary framing and bracing members specified by manufacturer, follow manufacturer's standard printed instructions for this type of application.

2. All members to be installed level, plumb, square and with all proper spacing and allowable tolerances.

3. Tolerances: Install products of this section to within the following tolerances:
   a. Face width of joint: Plus or minus 1/4 inch.
   b. Out of plane: (unit to unit), Plus or minus 3/16 inch.
   c. Warpage or bowing: Plus or minus 1/8 inch.
   d. All joints will be properly aligned with uniform joint width, in accordance with provisions shown on shop drawings and with allowance made to prevent overall dimensional error.
   e. Adjustment or changes effecting allowance for panel expansion and contraction shall not be permitted without approval by the manufacturer.

B. Curing: GRG members and units will be stored under controlled conditions for sufficient period of time to insure product stability before shipment.

3.4 PROTECTION

A. General: Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration at substantial completion.

3.5 ADJUSTMENT, CLEANING AND FINISHING

A. Remove and replace any defective prefabricated units.

B. Clean exposed unit surfaces and adjacent surfaces soiled or damaged during installation.

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C. Clean up all debris caused by the work of this section and keep the project site and buildings clean and neat at all times.

D. Apply finish coating in accordance with requirements of section 09900. All finish coating shall be compatible with materials specified or furnished under the work of this section.

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SECTION 09510 - ACOUSTICAL CEILINGS

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 acoustical ceiling is shown and scheduled on the Drawings.

B. Type of acoustical ceilings specified in this section includes the following:

1. Lay in acoustical ceiling board, exposed suspension system.

1.3 QUALITY ASSURANCE

A. Installer: Firm with a recommended three years' of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.

B. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Surface Burning Characteristics: As follows, tested per ASTM E 84.

1. Flame Spread: 25 or less.
2. Smoke Developed: 50 or less.

D. All acoustical ceilings shall be installed to conform to the requirements of International Building Code/2021, NJ ed., for Category C and the recommendation of the Ceiling and Interior Systems Construction Association (CISCA) for Zone 2 seismic design and comply with installation requirements for areas subject to light to moderate seismic activity.

E. Contractor shall provide adequate ventilation and humidity control before, during and after ceiling installation to prevent damage (sagging, etc.) to ceilings prior to Owner's acceptance of building.

F. Warranty:

1. Provide manufacturer's special project warranty against sagging or warping of acoustic ceiling boards for a minimum period of **thirty (30) years** which starts on approved date of substantial completion.

G. Unless otherwise approved by the Architect, all Acoustical Ceiling Board types and Suspended Grid System types shall be by a single manufacturer.

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1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required including certified test reports to show compliance with requirements of these Specifications.

1. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.

B. Samples: Submit manufacturer's standard size samples of acoustical units, but not less than 6" square, and of exposed ceiling suspension members including wall and special moldings. Provide samples showing full range of colors, textures and patterns available for each type of component required.

C. Shop Drawings: Submit shop drawings for acoustical ceilings, including layout of system components and details of connections between elements of system and between system and other building components.

1. **Contractor must provide shop drawings certifying that attachment devices meet specified loads. Contractor must coordinate with all Subcontractors for fixture loads, etc.**

D. Testing Reports: Submit testing reports which indicate compliance with indicated requirements.

E. Deliver extra materials to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% (rounded up to the nearest full carton) of each type of acoustic unit installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0% (rounded up to the nearest full carton) of each type suspension component installed.

1.5 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, Work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Provide Acoustical Ceiling Board (ACB and AACB) and Metal Suspension System as manufactured by Armstrong World Industries; United States Gypsum Co.; CertainTeed Ceilings; or approved equal.

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B. Acoustical Ceiling Tile and Grid system products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

1. 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 as performance of the "Basis of Design" Systems.
   a. USG Corporation,
   b. CertainTeed Ceilings.
   c. Rockfon, LLC,
   d. Or approved equal.

2. 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.

C. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A232 and Section 00800.

2.2 ACOUSTICAL CEILING BOARDS

A. Refer to reflected ceiling plans for sizes and locations.

B. Where ACB-1 is indicated: 24" x 48" x 7/8" thick, square edge, NRC .80; CAC 35 light reflectance 87%, sag resistance; Humiguard Plus Performance. Armstrong Ultima High NRC (Item# 1943); equivalent from USG, CertainTeed; or approved equal. [Unperforated]

C. Where ACB-2 is indicated: 24" x 24" x 7/8" thick, square edge, NRC .80; CAC 35 light reflectance 87%, sag resistance; Humiguard Plus Performance. Armstrong Ultima High NRC (Item# 1940); equivalent from USG, CertainTeed; or approved equal. [Unperforated]

D. Where ACB-3 is indicated: 24" x 48" x 7/8" thick, square edge, NRC .80; CAC 35 light reflectance 87%, sag resistance; Humiguard Plus Performance. Armstrong Ultima High NRC (Item# 1943); equivalent from USG, CertainTeed; or approved equal. Color: Black [Unperforated]

E. Where AACB is indicated: 24" x 48" x 5/8" thick, square edge, CAC 40; Class A; light reflectance 88%, Sag Resistance; HumiGuard Max Performance, mineral fiber composition with ceramic binders. Armstrong Fine Fissured Ceramaguard (Item# 605), white finish; or approved equal. [Unperforated]

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color

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indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.

C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.

D. Concrete Inserts: Inserts formed from hot-dipped galvanized sheet steel and designed for attachment to concrete forms and for embedment in concrete, with holes or loops for attachment at hanger wires.

E. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1coating, sized so that stress at 3-times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12gage (0.106").

F. Type of System: Either direct-hung or indirect-hung suspension system, at Contractor's option.

1. Carrying Channels: 1-1/2 inch steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs. per lineal foot.

G. Edge Moldings and Trim: Metal types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated. Provide 7/8" edge at wall angle and reveal edges.

H. Hold-Down Clips: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., or where indicated, provide hold-down clips spaced 2'-0" o.c. on all cross tees.

2.4 EXPOSED METAL SUSPENSION SYSTEMS

A. Double Web Steel Suspension System: For use where ACB ceilings are indicated. Manufacturer's standard system roll-formed from prefinished hot dipped galvanized steel with 15/16" wide exposed faces on flanges of structural members; other characteristics as follows:

1. Structural Classification: Intermediate-Duty System.

2. Finish: Painted in color as selected by Architect.

3. Basis of Design: Armstrong World Industries “Prelude XL Exposed Tee System”; USG “Donn Brand DX”, CertainTeed 15/16" Classic Stab; or approved equal.

B. Double Web Suspension System: For use where AACB ceilings are indicated. Manufacturer's standard system fabricated from roll-formed prefinished hot dipped galvanized steel with 15/16" wide exposed faces of aluminum cap on flanges of structural members cap and other characteristics as follows:

1. Structural Classification: Intermediate-Duty System.

2. Finish: Painted, in colors as selected from manufacturer's full line of colors. Provide white color unless indicated otherwise.

3. Basis of Design: Armstrong World Industries “Prelude Plus XL Fire Guard”; USG “Donn Brand DXA/DXLA”, CertainTeed 15/16" FireSecure; or approved equal.

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2.5 MISCELLANEOUS MATERIALS

A Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which acoustical ceiling Work is to be performed and notify Architect in writing of unsatisfactory conditions. Do not proceed with Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by Subcontractors for support of acoustical ceilings.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

3.3 INSTALLATION

A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to Work.

B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.

1. Install tile with pattern running in one direction, unless otherwise indicated.

C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".

1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.

2. Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter

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corners accurately and connect securely.

3. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

4. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

E. Cooperate with Subcontractors for installation of their materials and equipment, particularly with those installing the ductwork, ceiling diffusers and lighting fixtures so that diffusers, lighting fixtures and other items are located on center lines of tile or on centers of joints as shown on approved shop drawings.

1. Provide additional hanger wires to support superimposed loads. Locate the supplemental hangers within 6 inches of each corner of the item being supported.

2. Where light fixtures, or other recessed items occur in ceilings, frame acoustical material properly to permit installation of such recessed items and do all necessary cutting and fitting of acoustical materials and suspension systems to accommodate same. Cut neatly around all pipes passing through ceilings. Build in fixture frames and yokes in cooperation with Electrical Subcontractor.

3.4 CLEANING

A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace Work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage. Contractor is responsible for cleaning or replacement of all damaged tile, regardless of how the damage was caused and regardless of by which Subcontractor.

END OF SECTION 09510

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SECTION 09522 – SOUND ABSORBING WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sound-absorbing wall panels, custom-fabricated and fabric-finished.

1.02 REFERENCES

A. ASTM International
   1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Surface Burning Characteristics (ASTM E84)
      a. Flamespread: 25 maximum.
      b. Smoke Developed: 450 maximum.
      c. Fire ratings for all fabric covered panels is based on testing of the panel wrapped with the standard in stock fabric, Guilford of Maine, FR 701 Style 2100; or approved equal fabric.
      d. This rating applies to all acoustical wall treatment unless specifically excluded in the product, paragraph 2.02.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract AIA A232 and Section 00800 - Submittal Procedures.

B. Product Data: Submit product data sheet, for specified products.

C. Shop Drawings: Submit shop drawings showing layout, edge profiles and panel components, including anchorage, accessories, finish colors and textures.

D. Samples: Submit selection and verification samples of finishes, colors and textures.

E. Test Reports: Certified test reports showing compliance with specified performance requirements.
   1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirements Section.

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B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.06 PROJECT CONDITIONS

A. Environmental Requirements: Do not install panels until wet work, such as concrete and plastering, is complete; the building is enclosed; and the temperature and relative humidity are stabilized at 60 - 80 degrees F (16 - 27 degrees C) and 35% Minimum RH and 55% Maximum RH, respectively. All products constructed with wood or wood fiber content must be stored for at least 72 hours in the controlled environment specified herein prior to installation to allow the materials to stabilize.

PART 2 PRODUCTS

2.01 SOUND-ABSORING WALL PANELS

A. Basis of Design Manufacturer: Kinetics Noise Control, Inc.; or approved equal.

2.02 MANUFACTURED UNITS

A. HardSide Panels; or approved equal:
   1. Thickness: 2 inches (51 mm).
   2. Sizes: Refer to Architectural Drawings for the required sizes.
   3. Core: 2 inches (51 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m^3) density.
   4. Edge Detail: Beveled hardened with a Class A hardening solution.
   5. Facing: 100% polyester fabric, FR 701 Style 2100 by Guilford of Maine; or approved equal.
      a. Color: As selected from fabric manufacturer's full range of colors.
   6. Sound Absorption (ASTM C423): Noise Reduction Coefficient as follows:
      a. 2 inches (51 mm) panel: 1.00, minimum.
   7. Mounting Accessories: Z-clips.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
   1. Verify that stud spacing is 16 inches (406 mm) o.c., maximum, for panels installed over open studs.
   2. Do not install panels until unsatisfactory conditions are corrected.

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3.03 CLEANING

A. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as new condition.

B. Keep site free from accumulation of waste and debris.

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SECTION 09650 - RESILIENT FLOORING

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 flooring and accessories is shown on Drawings and in schedules.

1. Luxury vinyl tile - (LVT).
2. Static dissipative vinyl composition tile (VCT-NC).
3. Rubber resilient wall base.
4. Rubber tile floor and stair treads.
5. Resilient edge strips.

1.3 RELATED SECTIONS

A. Section 01455 - Concrete In-situ Relative Humidity and pH Testing.

B. Section 03300 - Cast in Place Concrete Slabs on Grade.

C. Section 03452 - Cement Based Self-Leveling Underlayment.

D. Section 07900 - Joint Sealer Assemblies.

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 2170-11 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

2. ASTM F 1869-11 Standard Test Method Using Anhydrous Calcium Chloride.

3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

4. ASTM F 1861 Type TS, Group 1 Performance Requirements for Resilient Rubber Wall Base.

5. ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocol for Resilient Rubber Wall Base.

6. ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols for Resilient Rubber Wall Base.

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7. ASTM F 2169 Standard Specification for Resilient Stair Treads, Type TS, Class 1 and 2, Group 1 and 2.

8. ASTM D 2240 Not less than 85 Shore A.

9. ASTM D 3389 Abrasion Resistance: less than 1 gram weight loss.

10. ASTM D 2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring of 0.6 or greater.

11 ASTM E 648 Standard Test Method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I.

B. Moisture vapor emission testing in accordance with ASTM F 1869-11. Test results should not exceed 3 pounds per 1,000 square feet per 24 hours, unless otherwise specified by the flooring or adhesive manufacturer.

1. ASTM Standard also states that relative humidity inside of the concrete slab should not exceed 75%, per ASTM F2170-11, unless otherwise specified by the flooring or adhesive manufacturer.

C. Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

1. Wherever possible, provide each type of required resilient flooring and accessories produced by a single manufacturer.

D. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

1. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.

2. ASTM E648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class 1.

E. 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.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.

B. Samples for Verification Purposes: Submit the following samples in triplicate of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.

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1. Full size tile samples.

2. For initial selection of colors and patterns submit, prior to above, samples in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.

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. Testing of Substrate:

1. Submit test reports of testing the concrete or other floor substrate, indicating compliance with manufacturer's requirements for moisture and alkalinity percentage of contents. Tests shall be performed in accordance with requirements of Section 01455.

E. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

F. Replacement Material: After completion of Work, deliver to project site replacement materials from same manufactured lot as materials installed, and as follows:

1. Tile flooring, not less than one box for each 50 boxes or fraction thereof, for each type, size and color 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 flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation.

1. Store resilient flooring 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 flooring and 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).

E. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturers and their recommendation for bond and maximum levels of moisture and pH per testing as performed under requirements of Section 01455.

1.7 WARRANTY

A. Luxury Vinyl Tile Flooring (LVT)

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1. Warranty: Manufacturer's standard for material and labor:
    a. A **fifteen (15) year Limited Commercial Warranty** for labor and material. Warranty period shall start from approved date of substantial completion.

B. Static Dissipative Vinyl Composition Tile Flooring (VCT-NC)

1. Special Warranty: Manufacturer's standard for material and labor:
    a. A minimum of **Two (2) years** for labor and material. Warranty period shall start from approved date of substantial completion.

C. Rubber Tile: Manufacturer provides a **five (5) year** Limited Warranty on all rubber tile.

C. Wall Base: **Five (5) year** Limited Commercial warranty.

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. Manufacturers of Luxury Vinyl Tile (LVT1 through LVT3):
    a. Basis of Design: "CMYK", as manufactured by Patcraft; 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) Armstrong Commercial Flooring,
            b) Interface,
            c) Mannington,
            d) Milliken,
            e) Mohawk,
            f) Shaw,
            g) Tarkett,
            h) Or approved equal.

2. Manufacturers of Static Dissipative Vinyl Composition (VCT - NC):
    a. Static Dissipative Tile SDT, as manufactured by Armstrong World Industries";
    b. Granit SD, as manufactured by Johnsonite (a Tarkett Co., Azrock Collection);
    c. Static Dissipative ESD, as manufactured by Roppe;
    d. Or approved equal.

3. Rubber Tile:
    a. #995 Hammered design profile, as manufactured by Roppe Corporation.
    b. Equivalent by Endura Rubber Flooring.
    c. Equivalent by Mohawk.
    d. Or approved equal.

4. Rubber Stair Treads with Risers:
    a. #95 Hammered design profile tread with riser, as manufactured by Roppe Corporation.

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b. Equivalent by Endura Rubber Flooring,.
c. Equivalent by Johnsonite.
d. Equivalent by Mohawk.
e. Or approved equal.

5. 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 LUXURY VINYL TILE FLOORING (LVT1 through LVT3)

A. Provide products in compliance with ASTM F 1066, Class 1 as per ASTM E648, through pattern, 9.845" x 39.38" (25 cm x 1 m) plank, Class III Printed Vinyl Tile, with minimum slip resistance as per ASTM D 2047 / UL 410, and as follows:

1. Asbestos-free.
2. Wear Layer: 20 mil (.020 inches / .5 mm).
3. Overall Thickness: 0.098 inches (2.5 mm).
4. Finish: Exoguard+™
5. Color(s) / Pattern(s): As selected by the Architect from manufacturer's available full range of colors and patterns.
6. Provide manufacturer's approved adhesive.

2.3 STATIC DISSIPATIVE VINYL COMPOSITION TILE FLOORING (VCT-NC)

A. Provide products in compliance with ASTM F1066 - Class 2 through pattern, Class 1 Flame Spread as per ASTM E648, Static Generation per ANSI/ESD STM 97.2 at 12% R.H., Static Dissipation per ETS Dissipation Method at 12% R.H., 12" x 12" tile with minimum slip resistance as per ASTM D 2047 / UL 410, and as follows:

1. Asbestos-free.
2. Gauge: 1/8 inch.

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3. Colors: As selected by the Architect from manufacturer's available full range of colors.
4. Provide manufacturer's approved adhesive.

B. Static Dissipative Tile:

1. Static dissipative VCT provides a controlled pathway for static electricity to flow safely to the ground, protecting both personnel and delicate electronic equipment.
   a. VCT (NC)composed of four integrated parts:
      1) Specialized tile: VCT is made from polyvinyl chloride resin, fillers, and pigments, but dissipative VCT also incorporates a conductive additive, such as carbon fibers or metallic particles, throughout the entire tile.
      2) Conductive adhesive: A conductive adhesive is used to bond the tiles to the subfloor and creates a tile-to-tile connection for continuous conductivity.
      3) Copper grounding strips: Copper strips are laid under the tiles and adhesive to provide a path for the static charge to reach a building ground.
      4) Static dissipative polish: A special polish can be used to provide an extra layer of protection, particularly on hygroscopic tiles that rely on humidity for their dissipative properties.
      5) Refer to the Electrical Drawings and Specifications for related Work.

2.4 RUBBER TILE FLOORING

A. Hammered Profile Rubber Tile: Provide rubber tile units for high traffic areas, conforms to ASTM F1344, with hammered profile surface pattern complying with the following requirements:

1. Hammered Profile Surface Pattern: Manufacturer's chamfered edge raised profile of geometric form, height of raised profile above depressed surface and total tile thickness including profile height as indicated below:
   a. Nominal Dimensions: 19-11/16" x 19-11/16" (50 cm)
   b. Nominal Thickness: 1/8" (3.175 mm)
   c. Material Composition: Manufacture units from homogeneous rubber compound, pigments, stabilizing fillers, integral waxes and soil-releasing agents.
   d. PVC Free: Does Not Require a Finish
   e. Extremely Durable: Excellent Chemical Resistance
   f. FloorScore® Certified: Recyclable (IMPACT Program)
   g. Superior Slip Resistance
   h. Color(s): As selected by the Architect from manufacturer's available full range of colors
   i. Provide manufacturer's approved adhesive

2.5 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:

2. Height: 4-inches, unless otherwise indicated on the Drawings.

3. Thickness: 1/8 inch gauge.

4. Style: Standard top-set cove.

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5. 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. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from manufacturer's available full range of colors; not less than 1" wide.

C. Resilient Stair Treads: Provide treads where shown, consisting of single-piece units for width of stair treads.

1. Units shall comply with Americans with Disabilities Act regulations,

2. Meet building code standards from American National Standards Institute.

3. Meet standards of American Society for Testing and Materials.

4. Meet flammability requirements of the National Fire Protection Association Life-Safety Code 101.

5. Product is PVC free and recyclable.

6. Provide rubber stair tread units shall comply with FS RR-T-650, Type A, hammered profile.
   a. Thickness: Not less than 3/16" nominal and 1/4" at nosing.
   b. Nose Design: Class 1 - square

D. Adhesives (Cements): Water resistant, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.

1. Adhesives to be used for resilient floor applications shall not generate any odor or unpleasant smell.

E. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

F. Leveling and Patching Compounds: Latex types as recommended by flooring manufacturer.

2.6 COLORS, TEXTURES AND PATTERNS

A. Colors, textures and patterns 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 textures and colors).

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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.

B. Concrete Substrates: Perform concrete relative humidity and pH testing and to comply with manufacturer's recommended moisture tests before beginning installation, to verify that concrete surfaces have cured sufficiently to allow adhesive bond to resilient flooring.

1. 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.

3.2 PREPARATION

A. Perform moisture content testing as required by manufacturer’s instructions to ensure pH readings and moisture transmission are acceptable. Perform testing in accordance with requirements of Section 01455.

1. If values exceed this level, follow manufacturer’s recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.

B. Broom clean or vacuum surfaces to be covered, and inspect subfloor.

1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.

2. Apply concrete slab primer and/or sealer, as recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3. Remove paint, curing compounds, and other materials that could interfere with adhesion of resilient products.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.

B. Access Covers: Install resilient flooring tightly to removable access covers in field of flooring, taking care that pattern will match when covers are in closed position.

C. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without

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telegraphed markings from adhesive or substrate.

D. Extend resilient flooring into toe spaces, door reveals, and into closets and similar openings.

E. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.

F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

G. Install resilient flooring on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.

H. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

3.4 INSTALLATION OF TILE FLOORS

A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

1. Lay tile in pattern shown or as directed by Architect.

C. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.

D. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated or where joints occur in substrate. Do not saw cut joints.

3.5 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.

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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.

C. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

D. Apply resilient accessories to stairs as indicated and in strict accordance with manufacturer's installation instructions.

3.6 CLEANING AND PROTECTION

A. Perform following operations immediately upon completion of resilient flooring:

1. Sweep or vacuum floor thoroughly.

2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.

3. Damp-mop floor being careful to remove black marks and excessive soil.

4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.

B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.

1. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.

2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.

3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.

C. Clean resilient flooring not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer.

3.7 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. Tile Flooring: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size selected and installed.

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2. Accessories: Furnish not less than 2% of each type, size and color selected and installed.

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SECTION 09657 - COMMERCIAL SMOOTH SHEET VINYL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section includes labor, materials and other services necessary to complete resilient sheet flooring, slip resistant sheet vinyl flooring systems and accessories work. Conform with requirements of all Sections of Division 1, General Requirements, as it applies to the work of this Section, including but not limited to the following:
   1. Coordination of start date and timeframe.
   2. Coordination of substrate preparation.
   3. Coordination of moisture and pH testing.
   4. Coordination with moisture mitigation if required.
   5. Coordination of proper plumbing fixtures for connections with flooring.
   6. Floor installation and heat welding of all seams, horizontal and vertical.

B. Related Sections:
   1. Section 01455 – Concrete In-Situ Relative Humidity and pH Testing.
   2. Section 03300 – Concrete Work: Concrete finishing.
   3. Section 04200 – Unit Masonry.
   4. Division 15 – Plumbing Work.

1.2 REFERENCES

A. **ASTM D 2047**, Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

B. **ASTM E662**, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

C. **ASTM F710**, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

D. **ASTM F 970**, Standard Test Method for Static Load Limit.

E. **ASTM F1303**, Standard Specification for Sheet Vinyl Floor Covering with Backing.

F. **ASTM F2170**, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

G. **(RFCI)** Resilient Floor Covering Institute
   1. RFCI Standard Slab Moisture Test Method (Calcium Chloride Method) as a supplementary test method to ASTM F2170.

H. **ASTM F 3010** Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings

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I. **DIN 51130** Slip Resistance Test

J. **ACI 302.2R-06** Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

K. **RFCI** Recommended Work Practices for Removal of Resilient Floor Covering

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's current printed product literature, Specifications, installation instructions, and field reports in accordance with AIA A232 and Section 00800 - Submittal Procedures.

B. Shop Drawings: Submit shop drawings to indicate materials, details, and accessories in accordance with AIA A232 and Section 00800 - Submittal Procedures including but limited to the following:
   1. Submit a cut diagram indicating seam locations and roll direction. Use mitered seam layouts for corners when changing directions 180 degrees (e.g. when running material down corridors which bisect at a right angle), unless approved otherwise.

C. Samples: Submit duplicate 6" x 9" (152 mm x 228 mm) sample pieces of sheet material, 6" (152 mm) long cap strip and cove former in accordance with AIA A232 and Section 00800 - Submittal Procedures.

D. Closeout Submittals: Submit the following:
   1. Maintenance Data: Submit manufacturer's maintenance data for incorporation into manual specified in accordance with Section 01700 – Closeout Submittals. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced in performing Work of this section who has specialized in installation of Work similar to that required for this project.
   .1 Training: Installer who has attended an Altro flooring; or approved equal, installation training clinic or who has successfully installed the flooring product previously.
   .2 Awarded flooring Subcontractor must use in-house installers.
   .3 Awarded flooring Subcontractor must be able to provide recent Altro; or approved equal, references with contacts.

B. Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing.
   a. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
   b. Incorporation: Mock-up may be incorporated into final construction upon Architect's and Construction Manager's approval.

C. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, manufacturer's warranty

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requirements, and installer qualifications.

D. Bond Test: Install multiple bond tests using 3′ x 3′ pieces of material adhered with the appropriate adhesive to verify quality of adhesion. Remove half of each piece after 24 hours, then the other half after 48 hours. To help assess resistance to indentation, place end user equipment onto a sample for 72 hours. Document all results.

1.5 SITE CONDITIONS

A. Temperature Requirements: If storage temperature is below 65F (18C) or the floor temperature is below 50F (18C), the flooring product must be moved to a warmer place and allowed to reach this temperature before unrolling or installation. For further information, refer to current manufacturer's Installation Practices and Quick Facts.

B. Maintain air temperature and structural base temperature at flooring installation area between 68F (20C) and 80F (26C) for 48 hours before, during and 24 hours after installation.

1.6 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver, store and handle resilient flooring materials in accordance with Section 016-0 - Product Requirements.

C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.

E. Store rolls in dry locations. Stand rolls on end. Protect and secure rolls from falling.

1.7 WASTE MANAGEMENT AND DISPOSAL

A. Deposit all packaging materials in appropriate container on-site for recycling or reuse.

B. Avoid using landfill waste disposal procedures when recycling facilities are available.

C. Keep all discarded packaging away from children.

1.8 WARRANTY

A. Warranty period for Altro Operetta; or approved equal, shall be **ten (10) years** commencing on date of substantial completion. Refer to conditions of the Contract for project warranty provisions.

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PART 2 - PRODUCTS

2.1 SHEET VINYL FLOORING

A. Resilient Sheet Vinyl Manufacturer: Altro Operetta by Altro; or approved equal.

B. Basis of design Material: Altro Operetta; or approved equal, (measurements and product weights listed are approximate):
   a. Slip Resistance ASTM D2047 .7 Dry, .8 Wet.
   b. Thickness: 2.0 mm.
   c. Roll Width: 6' 7" (2 m).
   d. Roll Length: 66' (20 m);
   e. Weight: 4.9 lbs /yd2.
   f. Altro Operetta; or approved equal, uses a non-woven polyester/cellulose, glass fiber reinforcement.

C. SOUND INSULATION
   1. Altro Operetta; or approved equal, provides 4dB of sound insulation.

D. COLOR
   1. Color to be selected from manufacturer's current range of colors.

2.2 ACCESSORIES

A. Including but not limited to:
   1. Vinyl welding rod: Acceptable material:
      a. Altro Weld Rod; or approved equal.

B. Cove former: Acceptable material, sized to suit application:
   1. Altro Cove; or approved equal, former 20R - 24 mm (1") radius.

C. Cap strip: Acceptable material, sized to suit application, vinyl:
   a. Altro Cap Strip C4; or approved equal.

D. Subfloor Filler and Leveler: Use only grey Portland cement-based "moisture tolerant" underlayments, and patching compounds. Use for filling cracks, holes or leveling. White gypsum materials **are not** acceptable.

E. Metal edge strips:
   1. Aluminum extruded, smooth or mill finish stainless steel with lip to extend over flooring as selected by the Architect.

F. Adhesives
   1. Leveling and Patching Compounds: Latex-modified, moisture resistant, silicate free, Portland cement based or blended hydraulic-cement-based formulation.
   2. Adhesives:
      a. Altrofix 30- 2-part polyurethane for areas prone to moisture.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog, installation instructions.
B. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.2 PREPARATION

A. Remove substrate paint, coatings and other substances that are incompatible with adhesives or contain soap, wax, oil, solvents, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

B. Permanent and non-permanent markers, pens, crayons, and paint shall not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.

C. Smooth flooring shall be installed over subfloors conforming to ASTM F710 for concrete and other monolithic floors.

D. Always conduct moisture tests per ASTM F-2170 on all concrete slabs regardless of age or grade level. ASTM F-2170 Internal Relative Humidity (IRH) test results must not exceed 90%. Alkalinity Testing per ASTM F710 with an acceptable range of 7-9.9 pH.

E. Do not proceed with Work until results of moisture condition tests are acceptable.

F. When patching, a *moisture tolerant* patching compound must always be used.

G. Contingency for High Moisture Readings in Concrete:
   1. If at the time of installation the moisture readings are in excess of manufacturer's recommendations, the Contractor shall employ a means of Moisture Mitigation. This includes, but is not limited to, the following methods:
      a. Application of a Moisture Reduction Barrier (MRB)
      b. Temporary use of dehumidification equipment.
      c. Postponing of the flooring installation start time.
      d. A budget should be provided to the Contractor for use of an MRB

3.3 INSTALLATION

A. Installation: Install Altro Operetta; or approved equal, flooring in accordance with the current posted manufacturer's Installation Practices, Downloads, Technical Documents and Installation Guides. All Seams shall be heat welded with Altro Weldrod™; or approved equal, only. Failure to install indicated flooring in accordance with recommended procedures will void the manufacturer's Limited Product Warranty.

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B. Drains: Fit Altro; or approved equal, flooring and mechanically fasten to drain outlets to ensure a permanent, watertight installation. The installation of the flooring in a wet environment is a system installation. All circular drain covers must be modified in the field or specified by the Architect to be Surface-Membrane Clamping Style Drains and installed per the instructions in the Flooring installation guide. The AltroMastic, Cove Former, and Cap Strip; or approved equal, accessories are necessary accessories for a water-tight and manufacturer-compliant installation.

C. Coved Installation: Where flooring is coved up wall surfaces and other abutments, installation shall be in accordance with manufacturer's Installation Practices using the following accessories:
   1. At standard wall finishes: Use Altro C5 vinyl cap strip; or approved equal, to accommodate sheet vinyl to a height as indicated; adhere with contact tape.
   2. At FRP paneling: Use Altro C4 cap; or approved equal.
   3. Top set cove base: Install in accordance with manufacturer's instructions.

3.4 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas.
   1. Repair or replace damaged installed products.
   2. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
   3. Current recommended maintenance procedures Downloads, Technical Documents, Maintenance Guides.

B. Protection:
   1. Sweep or vacuum all construction debris and dust first, then clean the flooring with AltroClean 44 /AltroClean 44 Plus; or approved equal, using an auto scrubber.
   2. Cover and protect finished installation from damage from Subcontractors using a non-staining, temporary floor protection system, such as reusable textured plastic sheeting.
   3. Never use tapes on the surface on the finish flooring, Sharpies, pens, crayons or construction markers on either the finish flooring or the substrate.
   4. No traffic for 24 hours after installation, unless approved by the manufacturer.
   5. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
   6. Wait 72 hours after installation before performing initial cleaning. Start a regular maintenance program after the initial cleaning as recommended by manufacturer.

3.5 PROTECTION

A. Cover and protect finished installation from damage from Subcontractors using a non-staining, temporary floor protection system, such as a reusable textured plastic sheeting.

B. Altro Operetta; or approved equal, should be covered and protected from all Subcontractors during construction with a suitable non-staining protective covering without taping to the surface of the flooring.

END OF SECTION 09657

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SECTION 09661 - RESILIENT QUARTZ TILE FLOORING (ALTERNATE BID)

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work of this section consists of Resilient Quartz Tile, (RQT) and recommendations including, but not limited to adhesives, trowels, and cleaning products.

1.2 REFERENCES: Current versions of all listed documents:

A. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

B. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using insitu probes.

C. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

D. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

E. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

F. ASTM F 970 - Standard Test Method for Static Load Limit.

G. ASTM F 1066 – Standard Specification for Vinyl Composition Floor Tile.

H. ASTM F 1700 - Standard Specification for Solid Vinyl Floor Tile.

I. Resilient Floor Covering Institute (RFCI) - Recommended Work Practices for Removal of Resilient Floor Coverings.

J. Resilient Floor Covering Institute (RFCI) – Moisture and Resilient Floor Coverings.

1.3 SUBMITTALS

A. Submit product data in accordance with Division-1, including manufacturer's installation and maintenance instructions.

B. Submit shop drawings per Division-1, including keyed location plans, plans indicating tile type, layout, pattern direction, edge transitions, columns, doorways, enclosing partitions, built-in furniture, cabinets, cutouts, expansion and control joints and attachment requirements.

C. Submit representative samples per Division-1, including representative color samples for color(s) – 2 full size products for final selection.

D. Installer Certification – Submit a list of at least three vinyl tile flooring installations completed successfully within the past year requiring the same general degree of installation expertise.

E. Shop Drawings: Show floor pattern layout.

F. Submit per Division-1: Compatibility Certificates, test and evaluation reports and qualification statements.

G. Healthy Design Submittal: Consumer Products Safety Commission Test for Phthalates

1. Submit documentations showing the submitted material was tested via CPSC-C1001-09.3 in order to determine the level of phthalate compounds present in the material is less than 0.1%.

H. FloorScore® Certification, MAS Certified Green® Certification, or equivalent.

I. Provide access to product transparency data such as provided by mindful Materials, Declare, or equivalent.

1.4 QUALITY ASSURANCE

A. Qualifications: Installer shall be experienced in the vinyl tile flooring industry and shall have a minimum of **five (5) years** experiencing in the installation of similar products.

1.5 STORAGE, DELIVERY & HANDLING

A. Storage, Delivery & handling per manufacturer's guidelines, industry guidelines and Division-1 requirements.

1.6 WARRANTY

A. Special Warranty:

1. Manufacturer offers a **Two (2) year** warranty on product defects, from the date of purchase.
2. Manufacturer offers a **twenty (20) year** limited warranty stating properly installed and maintained quartz flooring tiles are guaranteed to be free from wear through due to normal use in commercial applications. Please contact manufacturer for a complete copy of the warranty.

1.7 ENVIRONMENTAL REQUIREMENT

A. Provide permanent HVAC operation (1-week minimum) and permanent lighting prior to installation.

B. Maintain room temperature of 65°-80°F or the conditions expected during normal occupancy. Please note: The minimum temperature needs to be 55°F.

C. Do not install flooring until all other significant construction work is complete.

D. Moisture producing activities, such as drywall, concrete, masonry, painting, and grouting must be complete and cured before installing RQT.

PART 2 - PRODUCTS

2.1 DESIGN SPECIFICATION

A. Basis of Design: "Rikett Quartz Tile", as distributed by Rikett America; or approved equal.

1. Items specified are to establish a measure of quality for design, function, materials & appearance. Products recommended/specified by Rikett America; or approved equal, include flooring, adhesives, and maintenance products.
2. Substitute manufacturers of equivalent products can be considered by the Architect, who will be the sole judge of the basis of what is considered equivalent in accordance with AIA A232 and Section 00800.

2.2 CONSTRUCTION

A. Composition: Minimum 70 percent mined quartz suspended in a vinyl matrix
B. Surface: Type A, smooth.
C. Thickness: 0.080 inch (2.0 mm).
D. Edge: Square.
E. Color: As selected by Architect from standard color line.

2.3 PRODUCT OPTIONS:

A. Colors:
   1. Rikett **Medley** (directional color chip pattern) Standard Color SKU's:
      a. Quartz Tile 1: As selected by Architect / Owner from manufacturer's standard colors,
      b. Quartz Tile 2: As selected by Architect / Owner from manufacturer's standard colors,
      c. Quartz Tile 3: As selected by Architect / Owner from manufacturer's standard colors.
B. Size:
   1. Standard Size and Thickness – US market:
      a. 2.0mm x 24 in. x 24 in.

2.4 STANDARD CONSTRUCTION

A. Composition: Minimum 70 percent mined quartz suspended in a vinyl matrix
B. Surface: Type A, smooth
C. Thickness: 0.80 inch (2.0 mm)
D. Edge: Square
E. Color: As indicated above.

2.5 FLOOR CLEANING SYSTEMS

A. Standard Rikett Quartz Tile with Rikettseal™ PUR; or approved equal, does not require floor

finish. Follow manufacturer's written recommendations for post installation maintenance, regular ongoing maintenance, and best practices for maintaining and protecting the floor.

2.6 ACCESSORIES

A. Concrete slab leveling and patching compound: Latex modified Portland cement-based patching compound; Ardex CP; or approved equal.

B. Expansion Joints: Refer to Division 07.

C. Adhesive – Pressure Sensitive: Solvent free, low odor, acrylic based water-resistant type by recommendation in the most current version of the manufacturer's installation guidelines to suit floor tile product and substrate conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Jobsite Conditions & Measurements: Visit jobsite to verify installation conditions and floor measurements.

B. Concrete Substrate: Verify the substrate is free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, curing, sealing, hardening, or parting compounds or any other substance that will interfere with the adhesion of the new resilient quartz tile product. Verify the substrate is flat within 3/16 inch in 10 feet and within the equivalent of 1/32 inch in 12 feet.

C. Concrete surfaces: Verify the concrete is visually sound and dry. To determine if a concrete slab is dry, use a Relative Humidity test. Unless specified otherwise by the approved adhesive manufacturer, moisture limits are:

1. RH Tests should be less than 75% RH (relative humidity) as tested by ASTM F 2170.

D. Expansion joints, construction seams, and other irregularities are to be filled flat and smooth only with underlayments approved by the manufacturer. Do not skim coat concrete subfloors.

E. Verify the substrate is flat within 3/16 inch in 10 feet and within the equivalent of 1/32 inch in 12 feet. (or 3mm per 3m).

F. Rikett quartz tile; or approved equal, can be installed on, above, or below grade.

G. Commencement of installation means substrate has been accepted as suitable by the installer.

3.2 PREPARATION

A. If necessary, mechanically abrade all substrates.

B. Sweep and vacuum substrate, and ensure that surface is free of oil, grease, wax, dust, or any other foreign substances.

C. Use latex Portland cement filler to patch cracks, small holes, and for leveling of small areas.

DO NOT skim coat large areas with latex patching compound. Sand patched areas smooth after material is cured. Use only quality materials and products, which do not contain gypsum.

D. If approved self-leveling underlayments are used, they must dry sufficiently (run moisture test) and be sanded smooth before installing floor. Manufacturer is not responsible for strength, adhesion, or general performance of underlayments as proper compounding and preparation of subsurface is the responsibility of the installer. Suggested products include: Ardex K-15; Mapei PRP110; or approved equal.

E. Structural Lightweight Concrete must have a compressive strength greater than 2000 P.S.I.

3.3 INSTALLATION

A. Follow the latest version of the Rikett Quartz Tile Installation Guide; or approved equal.

B. To reduce telegraphing of minor subfloor irregularities fill, patch and sand as necessary.

C. Apply adhesive per manufacturer's instructions supplied.

D. Following installation of tile (typically within an hour after installing) roll entire floor area twice in two perpendicular directions with minimum 100-pound roller to ensure proper bonding.

3.4 PROTECTION

A. The flooring installer should protect the finished floor from abuse by other Trades and traffic by covering it completely with heavy commercial grade Kraft paper. Light foot traffic can be permitted 12 hours after installation. Keep all heavy traffic, equipment and rolling loads off the floor for 48 hours. At all times, luan boards, plywood or equivalent should be used as required to protect the new floor from all heavy traffic, equipment and rolling loads.

3.5 CLEANING

A. Following installation flooring should be cleaned with a neutral cleaner. (See manufacturer's maintenance instructions for complete details and recommended products.)

3.6 WARRANTY

A. Special Warranty: The manufacturer will warrant the product for product defects for a period of **two (2) years** from the date of purchase from the manufacturer.

B. The manufacturer will warrant the wear surface of the quartz tile for a specified period of **twenty (20) years**, provided the product is installed and maintained in accordance with recommended procedures.

C. See the manufacturer's warranty for complete details.

END OF SECTION 09661

SECTION 09682 - CARPET ENTRY MATS (CEM)

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 01455 - Concrete In-situ Relative Humidity and pH Testing.
2. Section 03300 - Concrete Work.
3. Section 09650 - Resilient Flooring, for rubber base.

1.2 SUMMARY

A. Extent, location and details of carpet entry mat is indicated on the Drawings.

B. Work of this section includes furnishing and installation of carpet entry mat, adhesives and accessories.

1.3 DEFINITIONS

A. Commercial Carpet Entry Mat: Carpet intended for use in commercial and public spaces, with construction, fire ratings, static control and appearance appropriate for this use.

1.4 REFERENCES

A. American Association of Textile Chemists and Colorists (AATCC):

1. AATCC 134 Test Method for Electrostatic Propensity of Carpets.
2. AATCC 174 Test Method for Antimicrobial Assessment.

B. American Society for Testing and Materials (ASTM):

1. ASTM E648 Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source (also referenced as NFPA 253 and FTM Standard 372).

2. ASTM E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials (also referenced as NFPA 258).

1.5 PERFORMANCE REQUIREMENTS

A. Warranty Performance Requirements:

1. **Ten (10) year** Commercial Limited Warranty:
   a. Fiber - Abrasive Wear – Manufacturer warrants that, under normal use, carpet using Solution Q SD Nylon will lose no more than 10% of the pile face fiber, by weight, during the warranty period. This warranty does not cover

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appearance retention, matting and crushing and normal appearance changes in high traffic areas.

b. Fiber - Static Protection - Manufacturer warrants that, under normal use, carpet using Solution Q SD Nylon will not generate static build-up in excess of 3.5 kv, during the warranty period as tested by AATCC Test Method 134.

c. Fiber - Colorfastness to Light and Atmospheric Contaminants Warranty - Manufacturer warrants that, under normal use, carpet utilizing Solution Q® SD Nylon, when installed and maintained as recommended by Manufacturer for indoor use only, will not display a significant change in color due to exposure to light or exposure to atmospheric contaminants (Ozone or Oxides of Nitrogen) during the warranty period.

1.6 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's product literature and installation instructions for type of carpeting material and installation accessory required. Include methods of installation for each type of substrate.

1. Submit written data on physical characteristics, durability, resistance to flame resistance characteristics and showing compliance with the Contract requirements, including independent laboratory test reports.

2. Include manufacturer's recommended Specifications for primer, adhesive and installation instructions.

B. Fiber Requirements: Submit certification from the fiber producer verifying the following:

1. Use of the specified fiber in the submitted carpet product.
2. Must have federally registered Branded trademark.

C. Certificate of Compliance:

1. Submit certified test reports that carpet meets all the performance requirements stated above in paragraph 1.5 - Performance Requirements. Submit certified test reports that carpet meets all performance criteria.

D. Samples:

1. Submit two carpet samples 6" x 8" of each type, color, and pattern of carpet materials required.

2. Substitutions to specified product must be submitted for approval by the Architect.

3. Final Sample Submittal:
   a. Submit two (2) sets of samples for each carpet type.
   b. No carpet shipments are permitted until acceptance of final samples is given by the Architect / Owner.
   c. Samples submitted are assumed to be the manufacturer's best obtainable match to the carpet described under Materials Section.

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E. Shop Drawings:

1. For carpeted areas, submit shop drawings showing installation of carpeting, pattern direction, necessary installation accessories, and provisions for Work of other trades. Show location of different patterns or styles of carpet. Also show locations of any threshold conditions.

2. The Contractor will supply reproducible prints on request, to facilitate shop drawing preparation.

F. Maintenance Manual:

1. Within thirty (30) days of awarding the Contract, submit two (2) copies of carpet manufacturer's maintenance manual, including their recommendations for the care, cleaning and maintenance programs of each type of carpeting.

G. Recycling, Energy Conservation, and Reclamation Programs:

1. Submit manufacturer's written certifications that all indicated programs are established and in full effect at the time of bidding.

H. Testing of Substrate:

1. Submit test reports of testing the concrete or other floor substrate, indicating compliance with manufacturer's requirements for moisture and alkalinity percentage of contents.

I. Warranty: Submit Manufacturer's Warranty as described in paragraph 1.5 (above).

J. Closeout Submittals:

1. Maintenance Data: Include maintenance procedures, recommended cleaning and stain removal materials, and recommended cleaning schedule. Include product Safety Data Sheets (SDS) for cleaning and stain-removal materials.

2. Installation Instructions: Include detailed installation procedures. Include modular installation procedures, adhesive types, trowel size(s), spread rates, open times, and Safety Data Sheets (SDS) for all modular adhesives.

3. Warranties and Performance Certifications:
   a. Submit written warranties for all products as well as Performance testing results on all items included in Warranty section.

1.7 QUALITY ASSURANCE

A. Moisture vapor emission testing in accordance with ASTM F 1869-11. Test results should not exceed 3 lbs. per 1,000 sq. ft. per 24 hrs., unless otherwise specified by the flooring or adhesive manufacturer.

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1. ASTM Standard also states that relative humidity inside of the concrete slab should not exceed 75%, per ASTM F2170-11, unless otherwise specified by the flooring or adhesive manufacturer.

B. Single Source Responsibility: Provide products from a single manufacturer.

C. Warranty must be manufacturer's standard and not job specific.

D. All styles must come from the same manufacturer.

E. Do not install carpet until areas have been fully enclosed and environmental conditions have reached the levels indicated during occupancy.

F. Maintain ambient temperature and humidity conditions during and after installation of carpet at levels indicated during occupancy.

G. Allow carpet to reach room temperature or minimum temperature recommended by manufacturer before beginning installation.

H. Protect adhesives from freezing. Follow manufacturer's recommendations for minimum temperatures to which adhesives are exposed.

I. IAQ Requirements, Green Label: All products must be CRI Green Label Plus Certified.

1.8 QUALIFICATIONS

A. Manufacturer:

1. Company specializing in manufacturing Commercial Carpet with a recommended minimum five (5) years of documented experience and has been in continuous operation and using technology that has been in use with a recommended (10) years.

2. The manufacturer must agree to provide on-site supervision during the start up phase of installation without any additional cost to the Owner.
   a. The manufacturer shall provide the Architect with written documentation of locations within the project that were supervised by the manufacturer.
   b. Manufacturer shall notify the Architect and the Contractor if installation instructions are not completely followed.

3. The manufacturer must agree to provide a Reclamation Program. Written documentation, indicating that this program is in effect with proof that the mechanics of the program is available at the time of the bid.

B. Installer:

1. Company specializing in installing carpet with a recommended minimum five (5) years of documented experience approved by the manufacturer, and participation in manufacturer's installation programs including responsible carpet removal.
   a. The installation of the carpet must be guaranteed by the manufacturer of the carpet.

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b. Installation must be performed by an installer that is pre-approved in writing by the manufacturer of the carpet.
c. The agreement between the manufacturer and the installer must specifically address all installation procedures and materials to be used with the specified warranties.

2. Installer shall follow all installation procedures recommended by the manufacturer and use only materials supplied by the manufacturer to assure obtaining required warranties offered by the manufacturer.

C. Indoor Air Quality Testing:

1. Submit testing reports furnished by an independent testing laboratory with manufacturers' certification attesting that all carpet supplied for this project has been tested and passed the Indoor Air Quality Testing requirements established by the Carpet and Rug Institute (CRI), Green Label Plus Program for VOC's, which do not exceed the established emission levels. Likewise, the adhesives to be used for installation of the carpet have been tested and determined to be in compliance with the CRI Indoor Air Quality Testing Program requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory original wrappings, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number.

B. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

C. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Basis of Design: "Walk Forward", as manufactured by Patcraft (Shaw - a Berkshire Hathaway Company); or approved equal.

1. Construction - Multi-Level Pattern Loop

2. Gauge- 1/12

3. Stitches Per Inch - 10.3 per inch

4. Tufted Pile Height - 6/32"

5. Tufted Yarn Weight - 26.0

6. Finished Pile Thickness - 0.084"

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7. Total Thickness - 0.261"

8. Dye Method - 100% Solution Dyed

9. Backing Material - EcoWorx Tile

10. Fiber - 100% Eco Solution Q Nylon

11. Average Density- 11143

12. Size/Width - 24" x 24"

13. Protective Treatments - SSP® Shaw Soil Protection

14. Installation Method - To be reviewed and approved by the Architect.

15. Performance:
    a. Static - Less than 3.5 kV (AATCC-134)
    b. Flammability - Passes DOCFF-1-70 Methenamine Pill Test
    c. Flooring Radiant Panel Test - Meets NFPA Class 1 tested under ASTM E-648
    d. Smoke Chamber NFPA-258 - Less than 450 Flaming Mode (ASTM-E-662)
    e. CRI Green Label Plus - GLP 9968

16. Patterns and Colors: As selected by Architect from manufacturer's full range of available patterns and colors. Allow for more than 2 patterns and 3 colors.

B. Subject to compliance with requirements of the Bid Documents, manufacturers offering products which may be incorporated in Work include the following:

1. Equivalent by Interface;
2. Equivalent by Tandus Flooring;
3. Equivalent by Mannington Commercial;
4. Equivalent by LEES Carpets;
5. Or approved equal.

2.2 ACCESSORIES

A. Floor Primer: Manufacturer's approved floor primer applied to all areas that will receive carpeting.

B. Installation: "Lok Dots", pressure-sensitive adhesive system. Non-toxic and odorless system virtually eliminates VOC emissions; or approved equal.

C. Miscellaneous Materials: As recommended by the manufacturer of the carpet and other carpeting products; selected by Installer to meet project circumstances and requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

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A. Examine and test substrates for moisture content, high alkalinity, levelness and other conditions under which carpeting is to be installed. Notify Contractor in writing of major conditions detrimental to proper completion of the Work.

1. **Do not proceed until unsatisfactory conditions have been corrected.**
   a. **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.**

2. Coordinate with installation of floor leveling underlayment where indicated or required.

3.2 PREPARATION

A. Perform moisture content testing as required by manufacturer's instructions to ensure pH readings of no more than nine (9). Moisture transmission of 5.0-lbs/sq. ft per 24 hours is acceptable. If values exceed this level, follow manufacturer's recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes and other defects with sub-floor filler.

C. Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install carpet. Prohibit traffic until filler is cured.

D. Vacuum floor again immediately before installation of carpeting.

E. Preheat area(s) to receive carpet to a minimum temperature of 68°F for 72 hours prior to installation, with a relative humidity of not more than 65%. Maintain minimum temperature of 50°F thereafter. Carpet must be stored at a minimum temperature of 68°F, for 72 hours prior to installation.

3.3 INSTALLATION

A. Install carpet in accordance with the Technical Bulletins provided by the manufacturer for tufted products which include but not limited to the following:

1. Conducting Site Testing and conditioning,
2. Floor Preparation,
3. Installation of the carpet, including layout (carpet layout and cutting, etc.)

B. Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets in each space.

C. Provide cut outs where required. Conceal cut edges with protective edge guards or flanges.

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D. Install carpet under open-bottom items and install tight against walls, columns, and cabinets so that the entire floor area is covered with carpet. Cover over floor-type door closers.

E. Install edging guards at openings and doors wherever carpet terminates, unless indicated otherwise.

F. Perform cutting in accordance with manufacturer's recommendation using tools designed for carpet being installed. Verify carpet match before cutting to insure minimal variation between dye lots.

G. Install carpet from same dye lot and run within each continuous carpet area.

H. Use leveling compound where necessary. Feather floor leveling compounds minimum of 4 ft.

I. Do not bridge building expansion joints with continuous carpeting. Provide for movement.

J. Trim carpet neatly at walls, and around interruptions

K. Complete installation of edge strips, concealing exposed edges.

L. Cut carpet at fixtures, architectural elements, and perimeters.

M. Use a fixed metal strip at area transitions adjacent to different flooring material(s).

3.4 CLEANING

A. Remove and discard debris and recycle unusable scraps. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors.

3.5 CALL BACK

A. Prior to expiration of the **ten (10) year warranty**, perform all necessary corrections and adjustments.

3.6 ADDITIONAL MATERIAL

A. Deliver to Owner as directed not less than five percent (5%) additional carpet of each type, pattern and color used.

END OF SECTION 09682

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SECTION 09685 - CARPET TILE

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 01455 - Concrete In-situ Relative Humidity and pH Testing.

2. Section 03300 - Concrete Work.

3. Section 03452 - Cement Based Self-Level Underlayment.

4. Section 09650 - Resilient Flooring, for rubber base.

1.2 SUMMARY

A. Extent, location and details of Collection and type of carpet tile is indicated on the drawings.

B. Work of this section includes furnishing and installation of carpet tile, adhesives and accessories.

1.3 DEFINITIONS

A. Commercial Carpet: Carpet intended for use in commercial and public spaces, with construction, fire ratings, static control and appearance appropriate for this use.

1.4 REFERENCES

A. American Association of Textile Chemists and Colorists (AATCC):

1. AATCC 16: Test Method of Colorfastness to Light.

2. ATTCC 134: Test Method for Electrostatic Propensity of Carpets.

3. AATCC 174: Antimicrobial Activity Assessment of Carpets.

B. American Society for Testing and Materials (ASTM):

1. ASTM E 648: Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

2. ASTM E 662: Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

3. ASTM E 2471: Standard Test Method for Using Seeded-Agar for the Screening Assessment of Antimicrobial Activity In Carpets

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1.5 PERFORMANCE REQUIREMENTS

A. Comply with the following general performance requirements:

1. Radiant Panel: ASTM E-648: Class 1
2. Smoke Density: ASTM E-662 c450
3. Static: AATCC - 134, <:3.0 KV
4. Lightfastness: AATCC 16 - E, s 4.0 @ 60 @ AFU's
5. Indoor Air Quality: Green Label Plus #GLP0820

B. Comply with the following special performance requirements:

1. Carpet must be square, 4 hole cross-section.
2. Carpet must be 100% Recycled Content Nylon.
3. Carpet must have permanent anti-static fiber.
4. Carpet must have Soil Protection.
5. Carpet must be 100% Solution Dye.

C. Warranty Performance Requirements:

1. **Twenty (20) year** excessive surface wear (loss of more than 10% by weight of face fiber), edge ravel, backing separation, shrinking, stretching and static electricity Warranty from the date of invoice.

2. **Twenty (20) year** - Antimicrobial Preservative Protection Warranty.

3. **Special Project Warranty:**
   a. In addition, a written special project warranty, executed by the Contractor and the Installer, agreeing to repair or replace carpet which fails in material or workmanship within a period of **two (2) years**, which starts at the date of substantial completion, without any cost to the Owner, and agreeing to repair or replace other defects beyond Contractor's / Installer's / Manufacturer's controls, as judged by the Architect, at Owner's expense at prevailing rates.
   b. TacTiles® carpet tile will not be adversely affected by defects in their materials or workmanship for a period of **two (2) year** from the date of invoice when used to install the appropriate Interface® carpet products.

4. Refer to Section 01900 - Warrantees and Guarantees, which include but not limited to the following requirements:
   a. Excessive wear,
   b. Edge ravel,
   c. Backing separation,
   d. Shrinking,
   e. Stretching,
   f. Cupping,
   g. Doming,
   h. Static electricity,
   i. Antimicrobial effectiveness,
   j. Excessive color loss.

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1.6 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's product literature and installation instructions for each type of carpeting material and installation accessory required. Include methods of installation for each type of substrate.

1. Submit written data on physical characteristics, durability, resistance to fading and flame resistance characteristics and showing compliance with the contract requirements, including independent laboratory test reports.

2. Include manufacturer's recommended specifications for primer, adhesive and installation instructions.

B. Fiber Requirements: Submit certification from the fiber producer verifying the following:

1. Use of the specified fiber in the submitted carpet product.

2. Must have federally registered Branded trademark.

C. Certificate of Compliance:

1. Submit certified test reports that carpet meets all the performance requirements stated above in paragraph 1.4 (above) Performance requirements. Submit certified test reports that carpet meets all performance criteria.

D. Samples:

1. Submit two carpet samples 6" x 8" of each type, color, and pattern of carpet materials required. Submit two samples, 6" in lengths of edge guard stripping.

2. Any alternates to specified products must be submitted for approval by the Architect after project award.

3. Final Sample Submittal:
   a. Submit two (2) sets of samples for each carpet type.
   b. No carpet shipments are permitted until acceptance of final samples is given by the Architect / Owner.
   c. Samples submitted are assumed to be the manufacturer's best obtainable match to the carpet described under Materials Section.

E. Shop Drawings:

1. For carpeted areas submit shop drawings showing installation of carpeting, seam diagram, pattern direction, necessary installation accessories, and provisions for work of other trades. Show location of different patterns or styles of carpet. Also show locations of any threshold conditions.

2. The Contractor will supply reproducible prints on request, to facilitate shop drawing preparation.

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F. Maintenance Manual:

1. Within sixty (60) days of awarding the Contract, submit two (2) copies of carpet manufacturer's maintenance manual, including his recommendations for the care, cleaning and maintenance programs of each type of carpeting.

G. Recycling, Energy Conservation, and Reclamation Programs:

1. Submit manufacturer's written certifications that all indicated programs are established and in full effect at the time of bidding.

H. Testing of Substrate:

1. Submit test reports of testing the concrete or other floor substrate, indicating compliance with manufacturer's requirements for moisture and alkalinity percentage of contents. Tests shall be performed in accordance with requirements of Section 01455.

I. Warranties:

1. Submit Warranties as described in paragraph 1.5 (above).

J. Closeout Submittals:

1. Maintenance Data: Include maintenance procedures, recommended cleaning and stain removal materials, and recommended cleaning schedule. Include product data and Safety Data Sheets (SDS) for cleaning and stain-removal materials.

2. Installation Instructions: Include detailed installation procedures. Include modular installation procedures, adhesive types, trowel sizes, spread rates, open times, and Safety Data Sheets (SDS) for all modular adhesives.

3. Warranties and Performance Certifications:
   a. Submit written warranties for all products as well as Performance testing results on all items included in Warranty section and Performance section of this specification.

1.7 QUALITY ASSURANCE

A. Single Source Responsibility: Provide products from a single manufacturer.

B. Warranties must be manufacturer's standard and not job specific.

C. All styles must come from the same manufacturer.

D. Carpet must be 100% Recycled Content Nylon

E. Do not install carpet until areas have been fully enclosed and environmental conditions have reached the levels indicated during occupancy.

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F. Maintain ambient temperature and humidity conditions during and after installation of carpet at levels indicated during occupancy.

G. Allow carpet to reach room temperature or minimum temperature recommended by manufacturer before beginning installation.

H. Protect adhesives from freezing. Follow manufacturer's recommendations for minimum temperatures to which adhesives are exposed.

I. IAQ Requirements, Green Label: All products must be CRI Green Label Plus Certified.

J. Carpet must be 100% recyclable.

1.8 QUALIFICATIONS

A. Manufacturer:

1. Company specializing in manufacturing Commercial Carpet with a recommended minimum five (5) years of documented experience and has been in continuous operation and using technology that has been in use for a recommended ten (10) years.

2. The manufacturer must agree to provide on-site supervision during the start up phase of installation without any additional cost to the Owner.
   a. The manufacturer shall provide the Architect / Construction Manager with written documentation of locations within the project that were supervised by the manufacturer.
   b. Manufacturer shall notify the Architect / Construction Manager and the General Construction Work Contractor if installation instructions are not completely followed.

3. The manufacturer must agree to provide a Reclamation Program. Written documentation, indicating that this program is in effect with proof that the mechanics of the program is available at the time of the bid.

B. Installer:

1. Company specializing in installing carpet with a recommended minimum five (5) years of documented experience approved by the manufacturer, and participation in manufacturer's installation programs including responsible carpet removal.
   a. The installation of the carpet must be guaranteed by the manufacturer of the carpet.
   b. Installation must be performed by an installer that is pre-approved in writing by the manufacturer of the carpet.
   c. The agreement between the manufacturer and the installer must specifically address all installation procedures and materials to be used with the specified warranties.

2. Installer shall follow all installation procedures recommended by the manufacturer and use only materials supplied by the manufacturer to assure obtaining required warranties offered by the manufacturer.

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C. Indoor Air Quality Testing:

1. Submit testing reports furnished by an independent testing laboratory with manufacturers' certification attesting that all carpet supplied for this project have been tested and passed the Indoor Air Quality Testing requirements established by the Carpet and Rug Institute (CRI), Green Label Program for VOC's, which do not exceed the established emission levels. Likewise, the adhesives to be used for installation of the carpet have been tested and determined to be in compliance with the CRI Indoor Air Quality Testing Program requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory original wrappings, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number.

B. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

C. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide "On Line Collection" for Color Types 2 and 3 carpet tile, as manufactured by InterfaceFLOR; or approved equal.

1. Type: Tufted Textured Loop.
2. Face Yarn: 100% Recycled Content Nylon
3. Color System: 100% Solution Dyed.
4. Yarn Weight: 22.0 ounces per square yard.
5. Pile Density: 6,146 ounces per cubic yard
6. Backing Material: GlasBac™
7. Pile Thickness: 0.12".
8. Stitches: 9/in.
9. Size: 9.845 in. x 39.38 in.
10. Soil/Stain Protection: Protekt²®.
11. Preservative Protection: Intersept® antimicrobial
12. Preservative Efficacy: (AATCC 174 Parts 2&3) 99% Reduction/No Mold 7 Days. (ASTM E-2471) Complete Inhibition.
13. Smoke Density: ASTM E-662 c450
14. Static Test: (AATCC - 134) <3.0 KV
15. Flooring Radiant Panel: ASTM E-648 Passes.
16. Indoor Air Quality: Green Label Plus #GLP0820.
17. Environmental Specifications:
    a. Total Recycled Content 69.26%
    b. Recycled Content (Pre Consumer) 58.14%
    c. Recycled Content (Post Consumer) 11.12%

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d. Other Environmental Claims: Certified Carbon Neutral Floors™
Free of Added Heavy Metals, Formaldehyde, Flurinated Chemicals (PFAS), and Halogenated Flame Retardants.

e. End of Life: Carpet to Carpet Recycling through ReEntry®

18. Lightfastness: (AATCC 16-E) ≤4.0 @ 60 AFU's
19. Static: (AATCC-134) <3.0 KV
21. Traffic Classification: Heavy.
20. Warranty: Manufacturer's standard - **Twenty (20) year** (Educational) from the date of invoice. .

Special Project Warranties: In addition, a written special project warranty, executed by the Contractor and the Installer, agreeing to repair or replace carpet which fails in material or workmanship within a period of **two (2) years**, which starts at the date of substantial completion, without any cost to the Owner, and agreeing to repair or replace other defects beyond Contractor's/ Installer's / Manufacturer's controls, as judged by the Architect, at Owner's expense at prevailing rates.

TacTiles® carpet tile will not be adversely affected by defects in their materials or workmanship for a period of **two (2) years** from the date of invoice when used to install the appropriate Interface® carpet products.

B. Provide "Night Lights Collection" for Color Type 1 carpet tile, as manufactured by InterfaceFLOR; or approved equal.

1. Type: Tufted Textured Loop.
2. Face Yarn: 100% Recycled Content Nylon
8. Color System: 100% Solution Dyed.
9. Yarn Weight: 19.0 ounces per square yard.
10. Pile Density: 7,355 ounces per cubic yard
11. Backing Material: GlasBac™
12. Pile Thickness: 0.09".
8. Stitches: 8.5/in.
9. Size: 9.845 in. x 39.38 in.
10. Soil/Stain Protection: Protekt²®.
11. Preservative Protection: Intersept® antimicrobial
12. Preservative Efficacy: (AATCC 174 Parts 2&3) 99% Reduction/No Mold 7 Days. (ASTM E-2471) Complete Inhibition.
13. Smoke Density: ASTM E-662 ≤450
14. Static Test: (AATCC - 134) <3.0 KV
15. Flooring Radiant Panel: ASTM E-648 Passes.
16. Indoor Air Quality: Green Label Plus #GLP0820.
17. Environmental Specifications:
    a. Total Recycled Content 69.26%
    b. Recycled Content (Pre Consumer) 58.36%

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c. Recycled Content (Post Consumer) 10.31%
d. Other Environmental Claims: Certified Carbon Neutral Floors™
Free of Added Heavy Metals, Formaldehyde, Flurinated Chemicals (PFAS), and Halogenated Flame Retardants.
e. End of Life: Carpet to Carpet Recycling through ReEntry®

18. Lightfastness: (AATCC 16-E) ≤4.0 @ 60 AFU's
19. Static: (AATCC-134) <3.0 KV
21. Traffic Classification: Severe.
20. Warranty: Manufacturer's standard - **Twenty (20) year** (Educational) from the date of invoice.

Special Project Warranties: In addition, a written special project warranty, executed by the Contractor and the Installer, agreeing to repair or replace carpet which fails in material or workmanship within a period of **two (2) years**, which starts at the date of substantial completion, without any cost to the Owner, and agreeing to repair or replace other defects beyond Contractor's/ Installer's / Manufacturer's controls, as judged by the Architect, at Owner's expense at prevailing rates.

TacTiles® carpet tile will not be adversely affected by defects in their materials or workmanship for a period of **two (2) years** from the date of invoice when used to install the appropriate Interface® carpet products.

C. Patterns and Colors: As determined by Architect.

D. Comparable products of 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.

1. Approved equal by The Mohawk Industries Group.
2. Approved equal by Bentley.
3. Approved equal by Bigelow.
4. Approved equal by Patcraft.
5. Approved equal by Prince Street.
6. Approved equal by Mannington.
7. Or approved equal.

2.2 ACCESSORIES

A. Floor Primer: Manufacturer's approved floor primer applied to all areas that will receive carpeting.

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B. Carpet Edge Guard, Non-metallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum 2" wide anchorage flange; colors selected by Architect from standard colors.

C. Installation Adhesive: Water-resistant, non-staining as recommended by carpet manufacturer, which complies with flammability requirements for installed carpet.

D. Miscellaneous Materials: As recommended by manufacturers of carpet, cushions, and other carpeting products; selected by Installer to meet project circumstances and requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and test substrates for moisture content, high alkalinity, levelness and other conditions under which carpeting is to be installed. Notify contractor in writing of major conditions detrimental to proper completion of the work.

1. Do not proceed until unsatisfactory conditions have been corrected.

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. Coordinate with installation of floor leveling underlayment where indicated or required.

3.2 PREPARATION

A. Repair minor holes, cracks, depressions, and rough areas using material recommended by carpet or adhesive manufacturer.

B. Clear away debris and scrape up cementitious deposits from surfaces to receive carpeting; vacuum clean immediately before installation. Check concrete surfaces to ensure no dusting through installed carpet; apply sealer where required to prevent dusting.

3.3 GENERAL

A. Install work in strict conformance with manufacturer's printed recommendations and as shown on approved seaming layouts.

B. Substrates shall be free from dust, oils, grease or other foreign matter. Cracks, holes and unevenness shall be filled with latex base floor filler.

C. During winter conditions, building shall be preheated to 72°F for at least 24 hours prior to installation. During summer conditions, air conditioning shall be in operation or other provisions shall be made to obtain temperatures and humidity within limits recommended by the manufacturer.

1. Temperatures shall be kept constant night and day during installation.

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2. Concrete shall have cured for at least sixty (60) days prior to installation.

3.4 CARPET TILE

A. Butt Fitting and Joints: Brush pile back and tip individual tiles into place to avoid catching pile in the joint.

1. Frequently check joints for proper alignment and firm abutment.

2. Avoid excessively tight joints which will cause tile to peak or buckle.

3. Check tightness and establishing gain factor.

4. Cut tile from the back and secure cuts or partial tiles with manufacturer's standard or approved releasable compatible adhesive or double sided tape.

5. Install all carpet tile with pile orientation in the proper direction, as recommended by the manufacturer for each carpet type, follow manufacturer's embossed arrows on the back of tiles as guide for the proper direction.
   a. If carpet product will be installed in parquet pattern only, arrows should point in the same direction every other tile and diagonally.

6. Center floor trench headers directly under a full tile row.

7. Install tile rows adjacent to walls as per manufacturer's recommended instructions.

8. In open perimeter designs, use a fixed reducer an carpet keeper strips to secure the tile area. Use types and sizes recommended by the tile carpet manufacturer.

9. Remove and replace damaged tiles, protect carpet tile until inspection for substantial completion of carpet tile work.

10. Install every tile with releasable adhesive in accordance with manufacturer's instructions and information for using of appropriate tools and methods of applications.

OR/

Install carpet tile using "GlasBac®/GlasBacRE TacTiles® Connectors", as manufactured by InterfaceFLOR; or approved equal. The clear 3" x 3" polyester squares replace adhesives when used to install modular carpet with GlasBac® and GlasBac RE backings; or approved equal, only.

3.5 CLEANING

A. Remove and dispose of debris and unusable scraps. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors.

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3.6 CALL BACK

A. Prior to expiration of **two (2) year warranty**, perform all necessary corrections and adjustments.

3.7 ADDITIONAL MATERIAL

A. Deliver to Owner as directed not less than five percent (5%) additional carpet tile of each type, pattern and color used.

END OF SECTION 09685

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SECTION 09720 – HYGENIC WALL COVERINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes labor, materials and other services necessary to complete vinyl wall coverings.

B. Conform with requirements of all Sections of Division 1, General Requirements, as it applies to the Work of this Section.

1.2 RELATED SECTIONS

A. Section 04200 – Unit Masonry

B. Section 09657 – Commercial Smooth Sheet Vinyl

C. Division 15 – Plumbing Work

1.3 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this Specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. American Society for Testing & Materials (ASTM) and ISO:
1. ASTM E 84-05 Standard Test Method for Surface Burning Characteristics of Building Materials. CLASS A
2. ASTM D5420 Gardner Impact Exceeds 198-inch pounds
3. ISO 14644 9:12 Standard Laboratory Practice for Quantifying Air Cleanliness by Particle Concentrations – Meets ISO 2
4. CA 03150 Measures VOC Emissions
5. DIN IEC 60 167 Surface Resistance
6. ASTM G21 Fungi Resistance
7. ASTM D3273 Mold Resistance
8. ISO 62 Water Absorption
9. ASTM G154 UV Exposure
10. FDA Compliant
11. USDA Compliant
12. EN 684 Seam Strength Test (result 897 N/50 mm)

C. Plumbing Code Compliance
1. 2021, National Standard Plumbing Code

1.4 SYSTEM DESCRIPTION

A. Performance Requirements: Provide Altro Whiterock; or approved equal, wall covering

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which has been manufactured by Altro; or approved equal and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's current printed product literature, specifications, installation instructions, and field reports in accordance with AIA A201 and Section 00800 - Submittal Procedures.

B. Shop Drawings: Submit shop drawings to indicate materials, details, and accessories in accordance with AIA A201 and Section 00800 - Submittal Procedures including but limited to the following:

1. Submit a layout diagram indicating the location of each panel and joining method.

C. Samples: Submit duplicate sample pieces of Altro Whiterock material, as well as accessory pieces in accordance with AIA A201 and Section 00800 - Submittal Procedures.

D. Quality Assurance Submittals: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Manufacturer's Instructions: Current published manufacturer's installation and maintenance instructions.
3. Manufacturer's Field Reports: Specified herein.

E. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: **Twenty (20) years** from date of substantial completion.

1.6 QUALITY ASSURANCE

A. **Installer Qualifications: Current Installers who have passed the Altro Whiterock; or approved equal, installation instruction and have successfully installed the indicated product.**

B. Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's, Construction Manager and Architect's acceptance of finish color, texture and pattern, and workmanship standards.

1. Mock-Up Size: 4' x 4'
2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
3. Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.

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C. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE & HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver, store and handle Altro Whiterock; or approved equal, wall panels in accordance with Section 01600 - Product Requirements.

C. Deliver materials in manufacturers' original, unopened, undamaged containers with identification labels intact.

D. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer. Panels should be stored flat and be pre-conditioned a minimum of 72 hours in ambient temperatures similar to the prevailing operational conditions.

E. Store panels in temperature-controlled environments. Leave protective blue film on panel until ready to use.

F. Altro Whiterock, adhesives and accessories must be stored in enclosed, dry conditions not subjected to freezing or excessive heat. Heat above 140F (60C) will distort and damage the material. Cold temperatures will make the material brittle and temperatures below 23F (-5C) should be avoided during storage.

G. When stacking pallets, they should not be stacked more than 8 pallets high and stacked flat without bumps or rolls and in a square and well aligned configuration. Safety precautions should be taken to secure pallets to prevent shifting or falling.

H. Panels and all Altro; or approved equal, materials are to be acclimated on site 72 hours prior to installation. HVAC is to be up and running with ambient temperatures between 68F (20C) and 80F (27C) through to 24 hours after installation.

I. Maintain air temperature and structural base temperature at between 68F (20C) and 80F (27C) for 72 hours before, during and 24 hours after installation.

J. Verify permanent HVAC is operational. If temporary heat is required, use electric or indirect heat sources. Do not use kerosene or propane in direct contact with the ambient air.

K. Verify other finishing operations, including painting, have been completed.

1.8 WASTE MANAGEMENT AND DISPOSAL

A. Deposit all packaging materials in appropriate container on site for recycling or reuse.

B. Avoid using landfill waste disposal procedures when recycling facilities are available.

C. Keep all discarded packaging away from students / children.

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1.9 PROJECT CONDITIONS

A. Temperature Requirements: If storage temperature is below 68F (20C), the Altro Whiterock; or approved equal, wall panel must be moved to a warmer place and allowed to reach this temperature before installation. For further information, refer to current Installation Guide.

B. Maintain air temperature and structural base temperature at installation area between 68F (20C) and 80F (27C) for 72 hours before, during and 24 hours after installation.

C. Allow sufficient time for proper preparation, installation and curing.

D. Close spaces to traffic during installation until the installer is satisfied that the adhesive has set.

E. Verify permanent HVAC is operational. If temporary heat is required, use electric or indirect heat sources. Do not use kerosene or propane in direct contact with the ambient air.

F. Verify other finishing operations, including painting, have been completed.

G. If more than one pallet of material is used, use material in sequence.

H. Panels and all other materials must be checked for defects before installation. Do not install materials with visible defects.

I. **Do not install near open heat sources.**

1.10 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Bid Documents.

C. Warranty Period shall **be twenty (20) years** commencing on Date of Substantial Completion.

1.11 EXTRA MATERIALS

A. Provide extra materials of product and adhesives in accordance with Section 01700 - Closeout Submittals.

B. Provide 4 sq.ft of each color, pattern and type material required for project for maintenance use.

C. Provide 4 sq.ft of extra materials in one piece and from same production run as installed materials.

D. Clearly identify each wall panel and each container of adhesive.

E. Deliver to Consultant, upon completion of the work of this section and store where directed.

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PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: Altro USA; or approved equal.

2.2 HYGIENIC WALL COVERINGS

A. Altro Whiterock™; or approved equal, is 100% pure vinyl, extruded, semi-rigid PVCu sheet. Contains no plasticizers or fillers and is homogenous.

B. Basis of Design material: Measurements and product weights given below are approximate):
Thickness: 0.10" (2.5 mm); Panel Width: 4′ (1.22m) Panel Height: Either 8′2″ or 9′10″ (2.5m or 3m); Weight 4′x 8′2″ Panel: 24 lbs (10.4 kg) Weight 4′ x 9′10″ Panel: 29 lbs (12.7 kg).

1. COLORS:
   a. As selected by the Owner / Architect from the manufacturer's full color line: Standard White, Satins and Matte.

2.3 ACCESSORIES - Including but not limited to:

A. Vinyl welding rod: Acceptable material:
1. Altro weld rod – WSR01 White, WSR/** color

B. Joint Strips: 2-Part Joint Strip (8′ or 10′) – to match panel color.

C. Start and Edge Trim (selected from the following)
1. 1-Part Start and Edge Trim – [G833/25 White] Length 98.5″
2. 1-Part Start and Edge Trim – [G833/30 White] Length 118″
3. 2-Part Start and Edge Trim – [A833/25 White] [A833/25/** color] Length 98.5″
4. 2-Part Start and Edge Trim – [A833/30 White] [A833/30/** color] Length 118″

D. Stainless Steel Accessories:
1. Stainless Steel Corner Protector – [A861/12] Dimensions: 4′ x 3″ x 3″
2. Stainless Steel Corner Protector – [A861/12] Dimensions: 8′ x 3″ x 3″

E. Acrylic Adhesive: For porous, even substrates (and climate-controlled areas) use Altro W157; or approved equal, one-part, water-based, acrylic adhesive as recommended by the manufacturer.

F. Polyurethane Adhesive: For wet, non-porous substrate (and areas subject to temperature fluctuations) use Altro W39; or approved equal, 2-Part Adhesive.

G. Sanitary Sealant Compounds and Tape Adhesion Promoter:
1. Altro Sanitary Sealant; or approved equal, A802 White, A803 Clear, A806/** color, 10.5 oz Tube.

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2. Ecofix 75 Spray Adhesive.

H. Double-Sided Tape:
1. 2″ Double-Sided Tape A815/216 – 33 LM roll; or approved equal.

I. Wall-To-Floor Heat-Weld:
1. WSBU200; or approved equal, Vinyl Backer – 15lm coil – used behind coved flooring when welding panels to floor

2.4 SOURCE QUALITY

A. Source Quality: Obtain Wall products from a single manufacturer.

PART 3- EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions and product label instructions for installation.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with the manufacturer's instructions.

3.3 SUBSTRATE PREPARATION

A. Walls should be smooth and level. High points must be removed and low points filled with filler intended for the substrate and environmental conditions.

B. Wall tiles must be fixed firmly to the wall. As long as the tile edges do not protrude, you do not have to skim grout joints.

C. Surfaces must be permanently dry and free from all substances that may contribute to adhesive bond failure.

D. Remove loose paint and conduct an adhesive bond test with paint.

E. Exterior walls must be adequately damp-proofed and insulated.

F. Dry wall substrates should be paint ready.

3.4 PREPARATION

A. All surfaces must be free from dust and cleaned prior to product installation. The working environment must also be dust free. Failure to comply with these conditions will reduce the bond strength between the adhesive and substrate and may cause the wall panels to de-bond.

B. Very absorbent / porous substrates (particularly plaster finishes and unprimed sheetrock) must have a proprietary sealer e.g. PVA primer or similar, applied to the surface a minimum of 12 hours prior to the installation.

C. All electrical switches, power points etc., should be in a first fix / installation state. All

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electrical equipment should only be moved or altered by a qualified electrician.

D. All plumbing should have pipework removed to a first fix or installation state and "tails" left protruding from the substrate. Panels can then be drilled and slid over the pipe tails. All holes should be drilled 1/8" (3mm) oversize to allow for expansion, then sealed with the manufacturer's sanitary sealant. Plumbing should always be done by a qualified plumber.

E. Hot pipes and steam pipes should be insulated and a 1/8" to 1/4" (3-6mm) expansion gap should be created when installing panels around these pipes, then sealed with manufacturer's sanitary sealant.

F. All pipes, fixing bolts, etc. extending through the panels should have a minimum 1/8" (3mm) expansion gap and be sealed using manufacturer's sanitary sealant.

G. If fitting to doorframes, these must be in place prior to installation of Altro Whiterock; or approved equal.

H. Prior to installation, it is advisable to complete any painting which comes in contact with the panels, as sealant used at junctions is non-paintable.

I. Panels should be stored flat and be pre-conditioned a minimum of 72 hours in ambient temperatures similar to prevailing operational conditions.

J. The panels must be stored on a level, flat surface off the ground (risk of condensation on the panels if stored on damp surfaces). Storage on uneven surfaces could cause the panels to distort prior to installation.

K. First, check the room using a 6' (2 m) level to ensure all walls are flat, paying particular attention to the corners, window reveals, and door entrances. These need to be inspected to ensure they are free of any debris or irregularities, which could prevent the panels laying flat to the substrate after the adhesive has been applied and the panel installed.

3.5 INSTALLATION

A. Hygienic Wall Installation: Install panels in accordance with the current manufacturers' installation guide. All joints should be joined by approved methods as detailed in the installation guide. Failure to install panels in accordance with recommended procedures will void the product warranty.

3.6 CLEANING

A. Once all panels and joints are installed, remove protective film and clean all surfaces down with antistatic solution or antistatic wipes. This is required as the panel may have static build up and any dust in the atmosphere will adhere to the surface of the panel.

1. Panels can be cleaned with a diluted soap/detergent solution, see current maintenance.

2. When cleaning the panel surface, the manufacturer recommends the temperature of water does not exceed 140° F (60° C).

3. Pressure cleaning with hot water may be used with the pressure nozzle a minimum of 2 feet (600 mm) away from the surface.

4. To reduce the buildup of static, cleaning the panels with an anti-static solution is recommended.

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5. For stubborn stains use AltroClean 44; or approved equal, cleaner in correct dilution, or equivalent alkaline cleaner, please refer to current maintenance guidelines.

6. Remove construction debris from project site and legally dispose of debris.
   a. If a construction waste separation / disposal workplan is incorporated in the project, ensure this section references how the excess material can be recycled or disposed. Avoid sending construction waste to landfill sites if alternative methods are available.

END OF SECTION 09720

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SECTION 09843 - SOUND-ABSORBING CEILING UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Sound-absorbing ceiling baffles.

B. Related Section:

1. Section 09510 – Suspended Acoustical Tile Ceilings.
2. Division 16 – Electrical Work.

1.2 REFERENCES

A. ASTM International

1. ASTM C423 (2009) – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM E84 (2016) – Standard Test Method for Surface Burning.

B. ISO – International Organization for Standardization

1. ISO 105 – Textiles – Tests for color fastness.
2. ISO 354 – Measurement of sound absorption in a reverberation room.
3. ISO 9705 – Room corner test for wall and ceiling linking products – Part 1: Test method for a small room configuration.

1.3 DEFINITIONS

A. NRC: Noise Reduction Coefficient

B. SAA: Sound Absorption Average

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of product.

C. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale on which the following items are shown and coordinated with each other.

D. Electrical outlets
1. Suspended ceiling components.
2. Structural members to which suspension devices will be attached.
3. Items penetrating or covered by sound-absorbing ceiling baffles.

E. Lighting fixtures

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1. Air outlets and inlets
2. Speakers
3. Alarms
4. Sprinklers
5. Access panel

F. Sample warranty: Manufacturer's special warranty.

G. Maintenance data: Include manufacturer's written cleaning and stain removal recommendations.

H. Extra Materials: Provide 10 percent of the amount installed for each indicated.

1.5 QUALITY ASSURANCE

A. Preinstallation Meeting: Conduct meeting at site prior to starting Work of this section. Include installer, manufacturer representative as required, and all Subcontractor(s) affected by installation of ceiling units. Coordinate all items associated with installation.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in the manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store materials protected from exposure to harmful environmental conditions and at temperature conditions recommended by the manufacturer.

C. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain temperature, humidity, and ventilation within limits recommended by the manufacturer.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace the defective parts of the panel(s).

B. Warranty does not include:
1. Deterioration or failure of panel due to moisture, dust stains, or other contaminants from daily use.
2. Any condition resulting from a use for which the product was not designed.
3. Differential shading from direct sunlight exposure.
4. Tears, burns, pulls, cuts, or damage resulting from improper maintenance and installation.

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C. Warranty Period: **Twenty (20) years** from date of product manufacture.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: Acoufelt; or approved equal.

2.2 SOUND-ABSORBING CEILING BAFFLES

A. Ceiling Baffles

1. Types: Linear, Wing and Truss LED.
   a. Composition: 100 percent polyester
   b. Material: FilaSorb™, or approved equal.
   c. Recycled Content: 60 percent minimum recycled PET (Polyethylene Terephthalate).
   d. Mounting Hardware: Manufacturer's standard
2. Noise Reduction Coefficients:
   a. 0.75 for Truss, Linear Baffles.
   b. 0.45 for Wing Baffle
3. Surface Burning Characteristics: Class A according to ASTM E84
4. Thickness: 1/2-inch (12 mm) or 0.94-inch (24 mm) manufacturer standard for unit required
5. Dimensions (Refer to Drawings for lengths):
   a. Linear: 6 inches (152 mm), 8 inches, (20\3 mm) 10 inches, (254 mm) or 12 inches (305 mm) deep by 110 inches long (2794 mm)
   b. Wing: angle runs 4 inches to 8 inches (102 mm to 203 mm) or 5 inches to 10 inches (127 mm to 254 mm) or 6 inches to 12 inches (152 mm to 305 mm) deep] by 110 inches long (2794 mm)
   c. Truss LED: min of 2 inches thick by 3 inches high (50.8 mm by 76mm), up to 12 inches thick by 20 inches high by min of 12" long by 108 inches long (304.8mm by 2438mm), 110 inches long (2794mm).
6. Colors: As selected by the Owner / Architect from manufacturer's standard and additional colors.

2.3 SOUND-ABSORBING CEILING CLOUDS

A. Cloud:

1. Type: Hexagon
2. Composition: 100 percent polyester
3. Material: FilaSorb™, or approved equal.
4. Recycled Content: 60 percent minimum recycled PET (Polyethylene Terephthalate)
5. Mounting Hardware: Manufacturer's standard.

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6. Weight: 4800 gm/ sq. m. (0.98 lb. per cu. ft.)
7. Acoustical Performance: Hexagon: NRC of .45 - .60, According to ASTM C 423.
8. Thickness: Pendant: ½" (12mm), All others: 1 inch (24mm)
9. Surface Burning Characteristics: Class A according to ASTM E84
10. Dimensions (Refer to Drawings for size(s)):
    a. Hexagon: 24 inches by 20.78 inches (610 mm by 528 mm) 36 inches by 31.18 inches (914mm by 792mm), 41.57 inches by 48 inches (105 mm by 1219 mm)
11. Colors: As selected by the Owner / Architect from manufacturer's standard and additional colors.

2.4 ACCESSORIES

A. Construction Adhesive. High initial tack adhesive. Products:
    1. Bostik; Xtreme High Tack
    2. H.B.Fuller; Toolbox™ Original
    3. Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate conditions are acceptable for product installation in accordance with manufacturer's written instructions.

B. Do not proceed with installation until acceptable conditions are corrected.

3.2 PREPARATION

A. Surface Preparation: Ensure that surface is clean; free of any dust, flaking paint, loose debris, or grime; structurally sound; dry; and free of imperfections.

B. Use matching caulk to fill in any unwanted cracks in joints.

3.3 INSTALLATION

A. Install in accordance with the manufacturer's written instructions.

3.4 CLEANING AND PROTECTION

A. After installation, clean baffles, panels, tiles and shapes, and clouds in accordance with manufacturer's written instructions.

B. Maintain baffles, panels, tiles and shapes and clouds in accordance with manufacturer's written instructions.

END OF SECTION 09843

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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 05120 - Structural Steel.
4. Section 05210 - Steel Joists.
5. Section 05300 - Metal Decking.
6. Section 05400 - Miscellaneous Structural Steel.
7. Section 05500 - Metal Fabrications.
8. Section 06400 - Architectural Woodwork.
9. Section 08110 - Hollow Metalwork.
10 Section 08211 - Wood Doors, for light frames.
11 Section 09250 - Gypsum Drywall.
12. Division 15 - Mechanical Work.
13. Division 16 - 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, 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

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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) 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 and duct 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 Subcontractors, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

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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) Varnishes and Sanding Sealers: VOC content of not more than 350 g/L.
      (8) Stains: VOC content of not more than 250 g/L.
      (9) 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 Subcontractors, 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.

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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.

2. On actual wood surfaces, provide two 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.

C. Acknowledgment of Bid Documents: Contractor / Installer shall submit to the Architect certifications signed by each of the Contractor and Installer attesting acknowledgment of requirements of the Bid Documents for specific project requirements indicated in this Specifications.

1. Installer shall submit proof of evidence, (this project Specification section) with their 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 approved 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.

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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. The Pittsburgh Paints Company
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 a total of 20 different colors of each type of paint, (excluding graphics and /or art Work as indicated) with change of color within a room or space occurring either on a horizontal or vertical line, allow for multiple (6) colors at each room unless otherwise shown. Where roof structure is exposed, steel beams, steel joists and metal decking will be painted with different colors, as selected by the Architect.

2. Contractor shall allow for split frames at all new and existing hollow metal door and borrowed lite frames to be painted.

3. 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.

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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; or approved equal.

2. 2nd Coat: Sherwin-Williams, Pro Industrial Waterbased Alkyd Urethane; or approved equal.

3. 3rd Coat: Sherwin-Williams, Pro Industrial Waterbased Alkyd Urethane; or approved equal.

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; or approved equal.

2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic; or approved equal.

3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic; or approved equal.

4. Apply to following interior surfaces: Hollow metal Work, metal lites for wood doors, miscellaneous steel and ferrous metal fabrications.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

B. Semi-Gloss (Satin) Enamel:

1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer; or approved equal.

2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial DTM Acrylic; or approved equal.

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3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial DTM Acrylic; or approved equal.

4. Apply to following interior surfaces: Exposed metal ductwork.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

C. 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; or approved equal.

* 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; or approved equal.

3. 3rd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel; or approved equal.

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.

D. Flat - Acrylic Latex:

1. 1st Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Primer; or approved equal.

2. 2nd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat; or approved equal.

3. 3rd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat; or approved equal.

4. Apply to following interior surfaces: Interior surfaces of ducts, where visible through registers or grilles, etc.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

E. Egg-Shell - Dryfall Acrylic Latex:

1. 1st Coat: Galvanized steel or ferrous metal primer to suit substrate.

2. 2nd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat; or approved equal.

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3. 3rd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat; or approved equal.

4. Apply to following interior surfaces: Overhead exposed structural steel, steel joists, underside of steel deck, etc.

5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

F. Water-Based Acrylic Epoxy:

1. Base Coats: Block fillers (Sherwin-Williams Loxon Block Surfacer and/or Primers recommended by manufacturer; or approved equal.

* 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; or approved equal.

3. 3rd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy; or approved equal.

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.

G. Transparent Waterborne Varnish Finish:

1. Stain Coat (if required): 755000000 - Minwax Performance Series Tintable Wood Stain 250; or approved equal, Color as selected by Architect.

2. 1st Coat: 630250444 - Minwax® Water Based Polyurethane 275 VOC Clear; or approved equal.

3. 2nd Coat: 630250444 - Minwax® Water Based Polyurethane 275 VOC Clear; or approved equal.

4. 3rd Coat: 630250444 - Minwax® Water Based Polyurethane 275 VOC Clear; or approved equal.

5. Apply to Architectural woodwork.

H. Concrete Floor Sealer: Clear Acrylic Waterborne Concrete Sealer; (Non-slip coating for concrete floor sealer finish):

1. 1st Coat: Floor-Tex; Seal Krete Inc., as distributed by Sherwin-Williams; or approved equal.

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2. 2nd Coat: Floor-Tex; Seal Krete Inc., as distributed by Sherwin-Williams; or approved equal.

3. Apply to concrete floors where concrete sealer is indicated on finish schedule.

4. 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.

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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.
    c. Wood (interior) - 8% maximum.

B. Cementitious Materials:

1. Prepare cementitious surfaces of concrete, concrete block, 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.

3. Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

C. Wood:

1. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

2. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

3. When transparent finish is required, use spar varnish for backpriming.

D. 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.

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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, floors or ceilings to be painted, paint all new and existing surfaces in same area. Paint from corner to corner on walls, floors, 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. **Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.**

E. Sand lightly between each succeeding enamel or varnish coat.

F. 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.

G. 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.

H. **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.**

I. Primer Coat: Apply primer coat of material which is required to be painted or finished, and which has not been prime coated by others.

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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.

J. **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.**

K. 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.

L. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats, unless otherwise indicated.

M. 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 Subcontractors, 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 Subcontractors, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION 09900

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SECTION 09950 - WALLCOVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Type of wallcovering required includes vinyl-coated fabric digital wallcoverings.

1.2 SUBMITTALS

A. Product data for type of wallcovering material specified.

1. For each type of digital wallcoverings material specified, the Contractor shall submit: for Architect's approval, a sample, labeled with the appropriate material name and SKU information.

2. For Owner's approval, a copy of the maintenance instructions, as provided by wallcovering manufacturer. Include technical information, installation instructions for each type of substrate and maintenance instructions.

3. Include data on physical characteristics, durability, fade resistance and flame resistance characteristics.

4. Include manufacturer's recommendations for maximum permissible moisture content of substrates.

B. Samples for verification purposes of type of wallcovering indicated and for each color, texture and pattern selected for installation. Prepare samples from the same materials to be used on the project. Include the following:

1. Full width sample of each wallcovering required, not less than 36 inches long, showing complete pattern.

2. 12 inch long sample of each molding accessory.

C. Product certificates signed by manufacturer of wallcoverings certifying that materials furnished comply with specified requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has specialized in the installation of wallcoverings similar to that required for this project.

B. Manufacturer Qualifications: Provide the/each type of wallcovering produced by a single manufacturer with a recommended 3 years' production experience, whose published product literature clearly indicates compliance of wallcoverings with requirements indicated.

C. Fire Performance Characteristics: Provide wallcovering materials that have been tested and bear the UL label and marking, indicating the following fire performance characteristics:

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1. Surface Burning Characteristics: As follows, tested in accordance with ASTM E 84, Class A.
    a. Flame spread: Not more than 25.
    b. Smoke developed: Not more than 50.

D. Physical Properties:

1. Vinyl Wallcoverings: Provide vinyl wallcoverings with the following physical properties:
    a. ASTM-G21 Mold & Mildew Resistance
    b. ASTM-D5420 Impact resistance
    c. Air Quality Meets California Section IAQ 1350
    d. No Plasticizers, No Phthalates, No Formaldehyde, No Chlorine, No Halogen
    e. No Heavy Metals, including: Cadmium, Mercury, Lead, or Zinc, and No Ozone Depleting Chemicals
    f. Prop 65 Compliant
    g. No Harmful Off-Gassing
    h. Low VOC Emitting
    i. Type III Properties Passes all criteria for WA101

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in original factory packages or containers, clearly labeled to identify manufacturer, brand name, lot number, quality or grade, and fire hazard classification.

B. Store materials inside in original undamaged packaging, in a well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity. Do not store rolled goods upright; lay flat, blocked off the ground to prevent sagging and warping. Maintain temperature in storage area above 40 deg F (4 deg C).

C. Comply with recommendations of the manufacturer for special delivery, storage and handling requirements.

1.5 PROJECT CONDITIONS

A. Maintain a constant minimum temperature of 60 deg F (16 deg C) in installation areas for at least 10 days before and 10 days after application of materials.

B. Illuminate installation areas using the building's permanent lighting system; temporary lighting alone will not be acceptable.

1.6 SEQUENCING AND SCHEDULING

A. Schedule installation with other construction activities to minimize the possibility of damage and soiling during the remainder of the construction period.

1.7 WARRANTY

A. **Special Project Warranty**: Submit a written warranty, executed by the Installer and Manufacturer, agreeing to repair or replace wallcovering materials which fail in materials or workmanship within the specified warranty period. This warranty shall be in addition to and

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not a limitation of other rights the Owner may have against the Contractor under the Bid Documents.

1. Warranty period is **two (2) years** after the date of substantial completion.

B. Digital Wallcovering Manufacturer is not responsible for labor charges, improper installation, installation of incorrect goods (those not approved or confirmed by the customer), removal of goods, or problems arising from defects in the construction, surface, or preparation of the wall.

1.8 MAINTENANCE

A. Replacement Materials: After completion of Work, deliver to the project site not less than 5 percent (5%) of each wallcovering type, and of each color and pattern installed, exclusive of material required to properly complete the installation. Furnish replacement materials from same production run as materials installed.

1. Package replacement materials with protective covering or wrapping, clearly identified with appropriate labels as replacement material.

2. Furnish accessory components as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Custom Digital Design (for the project) as manufactured by Level Digital Wallcoverings; or approved equal.

B. Substitutions to be reviewed after project award in accordance with AIA A232 and Section 00800.

2.2 VINYL WALLCOVERING

A. Description: Type III 35 oz. PVC-Vinyl Wallcovering

B. Construction: Woven-Backed Textured Vinyl Printed with UV-LED Inks

C. Substrate:
1. Roll Width: 54" (1.37 m)
2. Weight: 35 oz. per lineal yard
3. Face: Textured PVC-Vinyl
4. Backing: Woven Poly-Cotton

D. Inks: UV-LED inks with nearly zero VOC's containing up to 50% naturally-derived monomers and oligomers. UL GREENGUARD Gold Certified meeting California CDPH Standard Method v1.2, Classroom and Office Environment.

E. Other Properties:
1. Stain-Resistant.
2. Break Strength

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3. Tear Strength
4. Cold Crack
5. Heat Aging
6. Shrinkage
7. Coating Adhesion
8. Colorfastness
9. Washability
10. Scrubability
11. Blocking
12. Crocking

F. Color, Pattern and Texture: Custom Design as approved by the Owner and as submitted by the Match Architect's sample for control of color, pattern and texture.

1. Provide vinyl wallcovering materials in colors and patterns as selected by the Architect.

G. WallMax Liquid Laminate; or approved equal:

1. Product is coated with WallMax; or approved equal, protective liquid laminate
   a. This UV curable coating provides important stain resistance to common concerns in high-traffic commercial environments.

2. WallMax; or approved equal, contains fire suppressing chemistry and has been tested and proven to contribute towards achieving Class A fire ratings through ASTM-E84 test methods.

3. The coating formulation is heavy metal free with attributes that have been tested and proven to kill bacteria and prevent mold spores from forming, even in the most humid environments.

2.3 ACCESSORY ITEMS

A. Adhesives: Use a wallcovering adhesive that is strippable and cleans up with water before drying (Roman PRO-774 Clay Strippable is recommended.) An adhesive that is mold and mildew resistant is recommended in areas that are susceptible to mold or mildew.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Wall surfaces should be clean, smooth, and free from any marks, mildew, and imperfections. Any loose paint, or other surface materials should be removed.

B. Any mold or mildew must be removed from the hanging surfaces prior to installation. Walls should not contain in excess of 4% residual moisture content. A moisture meter should be used to determine moisture content. Moisture infiltration and accumulation can lead to mold or mildew growth and must be corrected prior to the installation of the wallcovering. If you are unsure if moisture problems are present, consult a qualified professional before proceeding.

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C. A wallcovering primer (Roman-PRO 977 Ultra Prime; or approved equal, is recommended) is required and it is never recommended to apply wallcovering directly to paint. Gypsum board finish should comply with AWCI Specification, Level 4 or higher although a Level 5 finish is ideal.

D. Use only a lead pencil for marking walls and back of wallcovering. Do not use ballpoint or marking pen, they will bleed through the surface.

E. Do not install wallcovering unless a temperature above 65º F with a relative humidity level of 50% or less is maintained in both areas of installation and storage for at least 48 hours prior to and after installation.

F. Make sure that all surfaces to receive wallcovering are protected from damage during installation.

3.2 INSTALLATION

A. Layout & Alignment

1. Follow the Installation Diagram to determine the direction and sequence of each panel, and to determine the best starting point for installation. Though they may appear similar, each panel is unique and may not be interchanged with another panel.

2. Wallcovering panels are shipped with unprinted selvage around the edges to protect the panel during shipping. This selvage area also includes panel information and indicator marks for proper alignment. Take note of this information before trimming off the selvage.

3. All panels have 2" of bleed on the top and bottom* to allow for variations in the wall height. Be sure to account for this when planning the location of your panels.

4. The first and last panels also include 2" of bleed on their outward facing sides* to allow for variations in the wall length. This is indicated with a registration mark at the top of the panel (see the Installation Diagram for reference). Be sure to account for this when planning the location of your panels.

5. All panels have 1 h of bleed on each side where they meet an adjacent panel* to facilitate pattern alignment. See Trimming Options below for more information.

6. Proper alignment of the pattern is critical to a successful installation. Use a laser level to mark plumb lines one the wall for each panel. Align the registration marks on each panel with the plumb lines to make sure it is perfectly plumb. (If a panel is rotated even slightly it may appear to align in one area, but will not align in another.) Then beginning at eye level, use the pattern itself to fine-tune the alignment of the pattern across the panels. Once the pattern is perfectly aligned, proceed to trimming the seams (see Trimming Options below).

B. Pasting Options

1. Recommended: Paste the Wallcovering. Apply the recommended adhesive to the back of each panel using either a pasting machine or a paint roller.

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2. Option: Paste the Wall. Apply the recommended adhesive to the wall using a paint roller and mist the back of the wallcovering with warm water.

3. With either option, book the wallcovering for 10-15 minutes, then apply the panels directly to wall in the correct order.

C. Trimming Options

1. Recommended: Double Cut. Remove the unprinted selvage from the sides of each panel, but do not trim the 1" bleed. When installing each panel, overlap the bleed areas to align the pattern from one panel to the next. Double cut each seam as you go.

2. Option: Table Cut. Lay the panel on a table and align a straight edge with the registration marks at the top and bottom of the panel. Trim along the straight edge to remove the 1" bleed. Use the freshly trimmed edge of your panel to help align the straight edge on the adjacent panel. Butt-fit the panels on the wall.

3. Trim the wallcovering with a very sharp razor knife.

D. Smoothing & Cleaning

1. Avoid excessive side-to-side pressure when applying the material. Use a smoothing brush or a plastic smoother to remove air pockets or paste lumps. Work air pockets or paste outward toward the edges. Avoid tools with metal blades as they may tear the material or damage the printed surface.

2. Excess adhesive may be removed from the face of the wallcovering using a clean, damp natural sponge and a lint-free microfiber cloth. Make sure to continuously wipe away excess adhesive as you install the panels, as dry adhesive may leave a hazy residue on the panels.

3.3 CLEANING

A. Remove surplus materials, rubbish, and debris resulting from wall covering installation upon completion of Work, and leave areas of installation in neat, clean condition.

3.4 PROTECTION

A. Provide protective methods and materials needed to ensure that wallcoverings will be without deterioration or damage at time of substantial completion.

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SECTION 10100 - DRY MARKERBOARDS AND EXHIBITION BOARDS

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 dry markerboards and exhibition boards is indicated on the Drawings.

B. Type of dry markerboards and exhibition boards specified in this section includes the following:

1. Porcelain enamel steel dry marker boards.
2. Fabricork fabric faced cork exhibition boards.
3. Factory applied trim.
4. Field applied trim.
5. Magnetic markerboard tray(s).

1.3 REFERENCES

A. ASTM E84 Standard Test Method for Surface Burning Characteristics for Building Materials.

B. ASTM C540 Gloss for ceramic materials.

C. ASTM C614 for alkali resistance.

D. ASTM D2244 evaluation of color differences.

E. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.

F. ASTM C208-72 for cellulosic fiberboard.

G. ANSI A208.1-79 for particleboard.

H. ANSI H35.1-82 for aluminum temper and alloy.

I. HNSI A424-80 for steel for porcelain enameling.

J. FS LLL-B-810 for tempered hardboard.

K. PEI-1002 Manual and Performance Specification for Porcelain Enamel Writing Surfaces.

L. BYK-Gardner Surface Distortion.

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M. GREENGUARD Indoor Air Quality Certified.

N. GREENGUARD Children and Schools Indoor Air Quality Certified.

1.4 QUALITY ASSURANCE

A Manufacturer: Furnish all dry markerboards and exhibition boards by a single manufacturer for the entire project.

B. Surface Burning Characteristics: Provide exhibition board surfaces which are identical in composition to those with surface burning characteristics indicated below, as determined by testing in compliance with ASTM E84. Use only exhibition boards which are certified to meet the following standards:

1. Flame Spread: Not more than 25.
2. Smoke Developed: Not more than 40.

C. Uniformity of color, corrosion, temperature, alkali, water, range of gloss test, uniform texture, light reflectance and cleanability are requirements for all groups and have specific ranges for each.

D. Product Certifications: Provide GREENGUARD Indoor Air Quality Certified and GREENGUARD Children and Schools Indoor Air Quality Certificates for markerboards.

E. Reflectivity of LCSII ceramicsteel Markerboard writing surfaces shall not exceed the following:

1. Gloss Range / 60° Gloss meter GU (Gloss Units)
   a. LCSII ceramicsteel for Markerboard 68 -76% (low gloss surface).
   b. LCSII ceramicsteel for writing surfaces - Surface Distortion reduction and the optimum improvement to performance characteristics.

2. Contrast/waviness for Markerboards (light and dark effects) shall be no greater than 15 [Scale 0 – 30] when tested with BYK – Gardner Wave Scan 5+ Measuring device showing visual acuity (contrast sensitivity) to the human eye at distances greater than 3 meters (10'- 0").

3. Resolution (visual acuity) shall be based on 3 lines per degree and be visibly maintained beyond the current standard of 3 meters. [Byk-Gardner Wave Scan 5+ Measuring device].

4. Surface distortion ("orange peel"/surface peaks and valleys) as tested by the BYK-Gardner Wave Scan 5+ Measuring device [Scale 0 – 60]. Values are established by the difference in the highpoint/low point of the Markerboard test surfaces. P 3 ceramicsteel shall establish the lowest range of distortion from 11.7 – 16.02.

1.5 SUBMITTALS

A. Samples and colors for each:

1. Face sheet materials
2. Cork materials

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3. Vinyl materials
4. Aluminum trim types and profiles.

B. Shop Drawings: Submit shop drawings for each type of drymarker and exhibition board. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout and installation details.

1. Drawings shall indicate location and actual material lengths of each unit. Room elevations shall indicate joint locations and include dimension from floor and adjacent side walls, cross-sections for trim, backing, face and core materials, fastener spacing and types of units provided.

C. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.

D. Certification: Submit the manufacturer's certification that materials furnished for the project comply with the specified requirements.

E. Manufacturer's Product Warranty: Submit manufacturer's product and accessories warranty and certificate of authenticity from manufacturer.

F. Product use, regular cleaning, stain removal and precautions information in the operation and maintenance instructions.

1.6 SPECIAL PRODUCT WARRANTY

A. Submit a "**Life of Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.

B. Submit a Special Warranty, stating that when installed in accordance with manufacturer's instructions and recommendations, exhibition boards are guaranteed for **two (2) years** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.

C. Writing Surface Warranty Period: **Lifetime of the building** commencing on the Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: "Series 1", as manufactured by Claridge Products and Equipment, Inc.; or approved equal.

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1. Finishes and Colors: Shall be selected by the Architect from manufacturer's available full range of finishes and colors including painted aluminum colors.

B. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Manufacturers of Porcelain Enamel Dry Markerboards and Exhibition Boards:
   a. Aarco Products Inc.
   b. Educational Equipment.
   c. Platinum Visual Systems
   d. Or approved equal

2.2 MARKERBOARD MATERIALS

A. Porcelain Enamel: Provide balanced, high pressure laminated porcelain enamel markerboards of 3-ply construction consisting of facing sheet, core material and backing.

1. Face Sheet: LCS-II Porcelain Enamel grade cold rolled steel for markerboard, as indicated on Drawings.
   a. Coat the exposed face with a 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat.
      1) Bottom Ground Coat – 1.5 to 2.2 mils
      2) Top Ground Coat – 2.0 to 2.8 mils
      3) Top Cover (Color) Coat – 3.0 to 4.0 mils
   b. Fuse cover and ground coats to the steel at the manufacturer's firing temperatures, but not less that 1,200 deg.F (649°C).
   c. LCS-II Porcelain Enamel for markerboard with improved writing and erasing surface (3 colors low gloss and 3 colors high gloss)
   d. Facing sheet construction:
      1) 1.7-2.5 mils enameled ground coat on face minimum thickness.
      2) 3.0 – 4.0 mils enameled cover (color) coat for markerboard.
      3) 1.7-2.5 mils enameled minimum ground coat on back of facing.
      4) Firing temperatures shall be a minimum of 1200°F for LCSII markerboard.

2. Writing Surface Core: 7/16" Medium Density Fiberboard (MDF) composed of approximately 90% post-industrial waste.
   a. Units over 12'-0" in length and longer will require H-bar at center.

3. Moisture backer shall be factory laminated to core material. A 0.005" thick aluminum backer shall be provided standard on all markerboards.

4. Perimeter trim shall be as indicated on the Architectural Drawings.

5. Markerboard tray(s): Provide item #264M satin anodized finish magnetic markerboard tray(s). Size: 2-3/4" deep x 12" long with ¾" radius corners.

6. Field-Applied Trim:
   a. Screw-On Aluminum Trim
   b. Slip-On Aluminum Trim
   c. Snap-On Aluminum Trim

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7. Maprail: shall be provided on all markerboards and will be either 1" or 2", as indicated on the Architectural Drawings/details.
    a. Cork insert to be Claridge Cork; or approved equal. Color as selected by Architect.

8. Accessories (1″ or 2″):
    a. Maphooks (minimum two per 4' maprail).
    b. Flag holder (one per room).
        1) Provide separate wall mount flagholder, as required. Coordinate locations with locations of Owner provided Smartboards.
    c. Map roller brackets (one pair per markerboard).
    d. Maprail end stops (one pair per display rail).

9. Special-Purpose Graphics: Fuse or paint music staff graphic onto surface of visual display unit, in locations as indicated on the Drawings.

10. Lamination:
    a. Factory machine type only.
    b. Specially formulated adhesives.

2.3 EXHIBITION BOARD MATERIALS

A. Fabricork: #1380 Vinyl fabric on natural cork underlay with Duracore backing.

B. Thickness: Total laminated thickness of core and covering is ½". All thicknesses are nominal.

C. Vinyl Fabric: 15 oz/In yd.

D. Lamination: Factory machine type with specially formulated adhesive.

E. Metal Trim and Accessories: Factory fabricated frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure. Plastic accessories will not be accepted.

2.4 FABRICATION

A. Assembly: Provide factory assembled dry markerboard and exhibition board units, except where field assembled units are required.

B. Make joints only where the total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.

1. Provide the manufacturer's standard vertical joint system between abutting sections of dry markerboard.

PART 3 - EXECUTION

3.1 PREPARATION

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A. Field Measurements: Take field measurements prior to the preparation of shop drawings and fabrication where possible, to ensure proper fitting of the Work. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay Work.

B. Prior to all work of this section, carefully inspect the installed Work of all other Trades and verify that all such work is complete to the point where this installation may properly commence.

3.2 INSTALLATION

A. Deliver factory-built dry markerboard and exhibition board units completely assembled in one piece without joints, wherever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

B. Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for a complete installation.

1. Anchor all components securely using tamperproof fasteners, where accessible.

2. Install all dry markerboards and exhibition boards with completely concealed continuous hangers.

3. Where wall mount flagholders is required install units where directed by the Architect / Owner.

C. Provide factory-trained installers.

D. Apply manufacturers' adhesive behind each board using roughly ¼ cup @ 16" on center.

E. Mounting heights from the floor for each room shall be as follows:

Consult with the Architect / Owner before start of installation:

1. Kindergarten 24"
2. First & Second grades 26"
3. Third & Fourth grades 28"
4. Fifth and Sixth grades 30"
5. Seventh – ninth grades 33"
6. Tenth and up grades 36"

F. Provide covering for H-moldings to match vinyl-covered boards.

G. Clean boards using manufacturers' recommended procedures and install cleaning labels for each room.

H. Locate accessories on each board as specified.

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I. Provide mitered and wrapped hairline joints for all trims.

J. Provide fasteners at perimeter trims 16″ – 24″ and 12″ – 16″ on trays.

3.3 ADJUST AND CLEAN

A. Verify that accessories required for each unit have been properly installed and that operating units function properly.

B. Clean units in accordance with the manufacturer's instructions. Break-in markerboards only as recommended by the manufacturer.

C. Repair or replace all damaged units and surfaces to the approval of the Architect at no additional cost to Owner.

END OF SECTION 10100

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SECTION 10100.1 – VISUAL DISPLAY SURFACES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Section Includes:
   1. Porcelain Enamel Steel Markerboards for projection.

1.02 REFERENCED STANDARDS

A. American Society for Testing Materials
   1. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes
B. Porcelain Enamel Institute
   1. PEI-1002 Manual and Performance Specifications for Porcelain Enamel Writing Surfaces
C. GREENGUARD Environmental Institute
   1. GREENGUARD Indoor Air Quality Certified
   2. GREENGUARD Gold Indoor Air Quality Certified

1.03 SUBMITTALS

A. Shop Drawings: Provide shop drawings for type of visual display board required.
B. Product Data: Provide technical data for materials specified. Include Material Safety Data Sheets, when applicable.
C. Samples and color charts: Provide Manufacturer's color charts and composition samples of face, core, backing and trim to illustrate finish, color and texture, where required.
D. Manufacturer's Instructions: Provide Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturer shall be a firm engaged in the manufacture of visual display boards in the United States.
   2. Manufacturer shall have a minimum of 5 years' experience in the manufacture of visual display boards.
B. Product Certifications: Provide GREENGUARD Indoor Air Quality Certified® and GREENGUARD Gold certificates for markerboard surfaces, as applicable.
C. Operation and Maintenance: Include data on regular cleaning, stain removal, and precautions.

1.05 PROJECT CONDITIONS

A. Field measure prior to preparation of shop drawings and fabrication to ensure proper fit.
B. Comply with manufacturer's recommendations for acclimating area for interior moisture and temperature to approximate normal occupied conditions.

1.06 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of visual display boards with spaces sufficiently complete so that visual display boards can be installed upon delivery.
B. Store products in manufacturer's unopened packaging until ready for installation.
C. Store materials protected from exposure to harmful weather conditions and at temperatures and humidity conditions recommended by manufacturer.

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1.07 WARRANTY

A. Submit a "**Life of the Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, the porcelain enamel steel visual display boards are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards but does not include cost of removal or reinstallation.

B. Writing Surface Warranty Period: Ten (10) years commencing on Date of Substantial Completion.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Visual Display Board Manufacturer: Claridge Products and Equipment, Inc.; or approved equal.

2.02 MATERIALS FOR VISUAL DISPLAY SURFACE PANELS

A. Visual Display Surface Face Sheet – Manufactured in accordance with Porcelain Enamel Institute's Specification.
   1. Shall be enameling grade cold rolled steel.
   2. Enameling grade steel shall be coated with LCS^3 Porcelain Enamel by Claridge Products and Equipment; or approved equal.
      a. 3-Coat process shall include:
         i. Bottom Ground Coat – 1.5 to 2.2 mils
         ii. Top Ground Coat – 2.0 to 2.8 mils
         iii. Top Cover (Color) Coat – 3.0 to 4.0 mils
   3. Firing Temperature: Enamel shall be fired at lowest possible temperatures to reduce steel and porcelain stresses and achieve superior enamel and hardness.
   4. Color: White.
      a. NOTE: LCS^3 No. 100 can be used as a projection surface.

B. Surface Core
   1. 7/16" Medium Density Fiberboard (MDF) composed of approximately 90% post-industrial waste.

C. Surface Backing
   1. Steel Back

2.03 ALUMINUM TRIM

A. Trim shall be 6063 alloy grade aluminum with T5 tempering in accordance with ASTM B221, and shall have 201-R1 satin anodize finish.
   1. Factory Built Trim
      a. Series: Aspire; or approved equal, Series Trim – 5/8" wide face trim

PART 3 – EXECUTION

3.01 PROJECT CONDITIONS

A. Verify before installation that interior moisture and temperature approximate normal occupied conditions.

B. Verify that wall surfaces are true and plumb and are prepared and ready to receive boards.

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3.02 INSTALLATION

A. Deliver factory built units completely assembled and of dimensions shown in details and in accordance with manufacturer's shop drawings as approved by the Architect.
B. Follow manufacturer's instructions for storage and handling of units before installation.
C. Do not install boards on damp walls or in damp and humid weather without heat in the building.
D. Install level and plumb, keeping perimeter trim straight in accordance with manufacturer's recommendations.

3.03 ADJUST AND CLEAN

A. Verify that all accessories are installed as required for each unit.
B. At completion of work, clean surfaces and trim in accordance with manufacturer's recommendations, leaving all materials ready for use.

END OF SECTION 10100.1

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SECTION 10161 - SOLID PLASTIC TOILET COMPARTMENTS

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 minimum Class “C”, fire-rated solid toilet compartments and privacy & health barriers is indicated on the Drawings.

B. Style of toilet compartments includes: Floor-anchored, overhead braced.

C. Style of screens include: Wall-hung / floor anchored privacy & health barriers.

D. Related Work:

1. Section 10800 - Toilet Accessories.
2. Division 15 - Plumbing Fixtures.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.

B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition and privacy & health barrier assemblies not fully described by product Drawings, templates, and instructions for installation of anchorage devices built into other Work.

C. Samples: Submit full range of color samples for each type of unit required. Submit 4" square samples of each color and finish on same substrate to be used in Work, for color verification after selections have been made.

D. Test Reports: Submit manufacturer’s reports of testing of rigid plastic products indicating compliance with indicated performance requirements.

1.4 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances where ever taking of field measurements before fabrication might delay Work.

B. Coordination: Furnish inserts and anchorages which must be built into other Work for installation of toilet partitions and related Work; coordinate delivery with other Work to avoid delay.

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C. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for a recommended 5 years.

D. Installer's Qualifications: A company regularly engaged in installation of products specified in this section, with a recommended minimum of 5 years of experience.

E. **Code Compliance: Privacy partitions (including toilet partitions) shall be tested in accord and comply with NFPA 286 Room-Corner Test.**

F. Interior Wall and Ceiling Finish Materials in accordance with IBC/2021, NJ ed., Section 8031.1. shall be classified in accordance with ASTM E84 or UL 723. Interior finishes shall be grouped in the following classes:

1. Class A = Flame spread index 0-25
   Smoke developed 0-450

   Class B = Flame spread index 26-75
   Smoke developed 0-450

   Class C = Flame spread index 76-200
   Smoke developed 0-450

   Exception: "Room corner test for interior wall or ceiling finish materials"

   a. Interior wall or ceiling finish materials shall be permitted to be tested in accordance with NFPA 286 and shall comply with IBC/2021, NJ ed., Section 803.1.2.1.

2. In accordance with IBC/2021, NJ ed., 803.9 - High-density polyethylene (HDPE) and polyproplyene (PP), when the material is used as an interior finish, it shall comply with IBC/2021, NJ ed., Section 803.1.2.

G. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC/2021, NJ ed., / ANSI A117.1-2017.

1.5 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for **twenty-five (25) years** from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor is not included in the warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Provide products as manufactured by Scranton Products; or approved equal, from their full line of standard textures and colors.

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1. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
   a. Metpar Corp.,
   b. ASI Global Partitions,
   c. Bradley,
   d. Hadrian Manufacturing Inc.,
   e. Or approved equal.

2.2 MATERIALS

A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

B. Solid Plastic: One piece seamless, one inch thick solid HDPE plastic with a homogenous color throughout fabricated from polymer resins.

C. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

D. Stainless Steel Castings: ASTM A167, Type 304.

E. Aluminum: ASTM 6463-T5 alloy.

F. **Interior Wall and Ceiling Requirements by Occupancy** for flame spread index per (IBC/2021, NJ ed., Table 803.11):

GROUP	SPRINKLERED			NONSPRINKLERED		
	Interior exit stairways, ramps & passageways [a, b]	Corridors & enclosure for exit access stairways and ramps	Rooms & enclosed spaces [c]	Interior exit stairways, ramps & passageways [a, b]	Corridors & enclosure for exit access stairways and ramps	Rooms & enclosed spaces [c]
A-1, A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M	B	C	C	A	B	C

Notes:
a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 sf of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked, as required by Section 803.13.1.
b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.
c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing

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partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the Group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 shall not be less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons of less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

2.3 FABRICATION

A. General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories and grab bars, as indicated.

B. Overhead-Braced Partitions: Furnish galvanized steel supports and leveling bolts at pilasters, as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous extruded aluminum anti-grip overhead-bracing at top of each pilaster. Furnish shoe at each pilaster to conceal supports and leveling mechanism.

C. Wall-Hung / Floor Braced Privacy & Health Barrier Screens: Furnish panel units in sizes indicated, of same construction and finish as partition system panels.

D. Minimum requirements for partitions are as follows:

1. Doors: 1- inch thick equipped with gravity type hinges and push-pull hardware. Provide out-swinging, over-sized doors at water closet compartments for handicapped users.
   a. Panel Edge: **Ship lap, no sight strike**.

2. Pilasters: Adjustable, 1 inch thick; provide overhead headrail bracket.

3. Fasteners: Stainless steel 1/4 inch tamper proof shoulder screws and barrel nuts.

4. #14 Screw: Stainless steel #14 x 1-1/2 inch screw used along with plastic anchors for attachments to floor and building walls.

5. End Cap: Aluminum cap fastened to the ends of headrail bracing.

6. Headrail Bracket: 16 gauge stainless steel used to connect headrail bracing.

7. Door Pull: Heavy duty Zamac chrome-plated used on out-swinging doors only. Provide on inside and outside of door.

8. Latch: Anodized aluminum with bright-dip finish. Specially black hard coat slide bolt for extra long wear.

9. Strike: Heavy-duty aluminum extrusion with bright-dip anodized finish: rubber door stop.

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10. Bumper/Coat Hook: Heavy Zamac chrome-plated with rubber bumper. All doors are furnished with hook. Bumper functions as a stop on in-swinging doors. Mounting height to be 48" above finish floor.

11. Door Stop: Zamac chrome-plated used on out-swinging doors only as a stop.

12. Hinges and Shoes as follows:
    a. Wall Brackets shall be 1½" stirrup type made of heavy-duty aluminum (6463-T5 alloy) with a bright dip anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel tamper resistant torx head sex bolts.
    b. Continuous Stainless Steel Helix Hinge:
        1) Length: 54 inches (1372 mm).
        2) Available in two versions: a held-open and a held-closed, so non-handicapped doors can be held open when not in use. This hinge does allow for a slight lift so the standard aluminum slide latch can be opened in an emergency by lifting the door.
    c. Shoes: 20 gauge stainless steel construction to secure the pilaster to the floor.

13. Provide manufacturer's special hardware and accessories to accommodate all loads and conditions of partitions and screens.
    a. Sex bolt (thru bolt) connection at the top and bottom of each hinge (pilaster and door side) for extra strength in addition to the ¾" #14 screws at the remaining connections.

2.4 COLORS AND FINISHES

A. Selection from manufacturer's full line of standard fire-rated colors and finishes. Allow for two colors per room, with a total of four colors.

1. Stainless steel items shall have a polished finish.

2. Aluminum items shall have a natural color anodized finish.

3. Chrome plated items shall have a polished finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

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C. Examine areas to receive toilet partitions and screens for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the Architect and Construction Manager.

3.3 INSTALLATION

A. General: Comply with manufacturer's recommended procedures and installation sequence. Install partitions rigid, straight, plumb, and level. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.

B. Overhead-Braced Partitions: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead-brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead-brace when doors are in closed position.

C. Privacy & Health Barrier Screens: Attach with concealed anchoring devices, as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.

D. Install in accordance with manufacturer's instructions.

E. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.

F. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

G. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

H. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 ADJUST AND CLEAN

A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors (and entrance swing doors) to return to fully closed position.

B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION 10161

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SECTION 10430 - DIMENSIONAL LETTERS - LTV SERIES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements and the Drawings are collectively applicable to this Section.

B. Section Includes:
   1. Interior/exterior dimensional letters of pressure sensitive, adhesive applied, digitally cut, vinyl composition.

C. Related Sections:
   1. Section 08520 – Aluminum Windows
   2. Section 08800 – Glass & Glazing

1.2 QUALITY ASSURANCE

A. Supplier: Obtain all products in this section from a single supplier.

B. Regulatory Requirements: Products shall meet requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.

C. Installer: Installation shall be performed by installer specialized and experienced in Work similar to that required for this project.

1.3 SUBMITTALS

A. Submit in accordance with requirements of AIA A232 and Section 00800.

B. Product Data: Submit product data for specified products. Include material details for each sign specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.

D. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.

E. Installation: Submit supplier's installation instructions.

F. Closeout Submittals:
   1. Submit maintenance data for installed products, including precautions against harmful cleaning materials and methods.
   2. Submit warranty documents specified herein.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 1.
   1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
   2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
   4. Handle products in accordance with manufacturer's instructions.

1.5 WARRANTY

A. Project Warranty: Comply with requirements of Section 01900.

B. Manufacturer's Warranty: Submit manufacturer's special warranty executed by authorized company official.

1. Special Warranty Period: **Two (2) years** from product ship date. Warranty specifically excludes letter mounting substrate.

PART 2 - PRODUCTS

2.1 SIGNAGE SYSTEMS

A. Basis of Design: "Dimensional Lettering – LTV Series as manufactured by ASI Signage Innovations; or approved equal.
   1. Substitutions: Submit in accordance with AIA A232 and Section 00800 after project award.

B. Graphics Material: 2 mil cast vinyl film of integral color as selected by Architect from manufacturer's standard options.

C. Fabricated Letter / Number:
   1. Letterstyle: As indicated on the Drawings.
   2. Height: 5".
   3. Color: Black with reflective border.
   4. Mounting Method: Pressure sensitive adhesive.

2.2 FABRICATION - GENERAL

A. General: Comply with requirements indicated for material, thickness, finish, color(s), design, shapes, size, and details.

B. Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners.

C. Create signage to required size and layout. Comply with requirements indicated for design, dimensions, finish, color and details of construction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.

B. Scheduling of installation by Contractor implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

A. Install product in accordance with supplier's instructions.

B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated.

3.3 CLEANING, PROTECTION, AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

3.4 SIGN SCHEDULE

A. Schedule: Refer to signage schedule and Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION 10430

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. Cast metal plaques.
3. Exterior signs.
4. 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/2021, NJ ed., 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.

1. Furnish full-size rubbings for metal plaques.

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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/2021, NJ ed., 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 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.

B. Aluminum Castings: Provide aluminum castings of alloy and temper recommended by the aluminum producer and finisher for the casting process used and for the use and finish indicated.

C. Fasteners: Unless otherwise indicated, used concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.

D. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into masonry Work.

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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/2021, NJ ed., and ICC/ANSI 117.1 - 2017. 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) Types "7 & 9" Signs - Classrooms and Offices:
         a) Provide 1/4" thick non-combustible, self extinguishing solid composite plastic sign signs with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face. Provide window insert with non-glare clear plastic cover
         b) Basis of Design: Provide "Series 200A Sand Carved process with window insert Series 400 Vinyl Copy" as manufactured by Mohawk Sign Systems Inc.; or equivalent by Brandon Signage Co.; or approved equal.
      2) Type "8" Signs - Multi-Purpose Room, Stage, Cafeteria, Auditorium, Faculty Dining, Main Offices, Media Center, Kitchen, 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.
      3) 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.
      4) Sizes: As indicated or as directed by the Architect / Owner.
      5) All room signs shall have radius corners.

2. Room Numbers Signage:
   a. Provide Room Numbers plastic signs for all rooms with room number, as shown on Drawings and schedules.
      1) Type "10" Signs - Boiler Room, Elevator Machine Room, Storage, Custodial, Electrical, Mechanical, 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.

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3. Room Occupant Capacity Signs:
    a. Provide room occupant capacity signs for room capacity more than 50 persons and as indicated.
        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.

4. Barrier Free Accessibility Signs and Directional Signage:
    a. Basis of Design; "Vandal-resistant signs" as manufactured by Americraft Inc.; or approved equal.
        1) Provide injection molded process, 1/8" thick acrylic with non-glare clear front surface, graphics and colors on second surface (Back surface), with radius corners and stepped edging. Provide mounting holes with stainless steel screws. Colors to be selected by the Architect from manufacturer's available full range of colors.
        2) Provide tactile plastic signs displaying international symbol of accessibility in tactile form and accompanied by Grade II Braille.
        3) For Directional Signage, indicate the route to the nearest accessible element.
        4) Provide signage at the following locations and as indicated on the Contract Drawings:
            a) Accessible toilet including stalls.
            b) Accessible building entrances.
            c) Accessible areas of refuge.
            d) Accessible means of egress.

5. Special Signage:
    a. AED Cabinet Signage:
        1) Provide signage where indicated or required by Code, of silk screened copy, on baked enamel aluminum sheet material 0.063 thick, in two colors; with black AED letters, red heart image with white lightning bolt on white background, as otherwise required by Authorities Having Jurisdiction.

6. 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.

7. 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.

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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.

8. 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 ½" minimum from the corresponding raised characters or symbols.

9. Mounting: As directed by the Architect using required fasteners.

C. EXTERIOR SIGNS:

1. Accessible parking signs, directional signs to accessible entrances, barrier free loading zone signs and traffic control signs to be located as shown on Drawings or as indicated herein.
   a. Provide silk screened copy, on baked enamel aluminum, colors as indicated or as otherwise required by Authorities Having Jurisdiction, (Manual on Uniform Traffic Control Devices latest edition) with aluminum post embedded in concrete.
   b. Accessible Entrance Sign: Provide aluminum entrance signs at each indicated entrance, displaying international symbol of accessibility. Provide silk screened copy, blue on white baked enamel.

2. Fasteners and Anchors: Use manufacturer's recommended type, size and quantity of fasteners for indicated signs. Provide concealed mounting and predrilled holes for setting wall anchors.

3. Mounting Posts: 2-7/8" diameter, aluminum pipe, finish and color to be selected by the Architect from manufacturer's standard.
   a. Provide aluminum interlocking brackets and bolt/nut sets.

4. Signage for identifying emblem for Structure with Truss Construction:
   a. Provide emblem signage of bright and reflective backed enamel aluminum color, isoscales triangle shape, 12" horizontally by 6" vertically with the following letters, of size and color to make them conspicuous, printed on the emblem:
      1) "R" to signify a roof with truss construction.
   b. The emblem shall be permanently affixed to the left of the main entrance door at a height between four and six feet above the ground, and as directed by the Architect.

2.5 CAST METAL PLAQUE

A. Provide a rectangular 2'-8" x 1'-10" plaque with raised letter copy. Raised letter copy shall be as directed by the Architect / Owner.

B. Fabricate cast metal plaque to comply with requirements specified for metal, border style, background texture and finish and to comply with requirements shown for thickness, size, shape and copy.

C. Produce castings free from pits, scale, sand holes or other defects.

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D. Hand tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish.

1. Metal: Aluminum or bronze casting as selected by the Architect.

2. Border Style: None (straight), polished edge.

3. Background Texture: Manufacturer's standard pebble texture.

4. Background Finish: Provide dark statuary finish to comply with the requirement specified for aluminum finishes, or as selected by the Architect from manufacturer's available finishes.

2.6 FINISHES

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's available full range of colors.

B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

1. Aluminum Finishes:
   a. Class II Clear Anodized Medium Satin Finish: Provide AA-M31C22A31 finish (medium satin mechanical finish, with chemical etch, medium matte finish, 0.4 mil thick minimum anodic coating).
   b. Baked Enamel Finish: Provide finish AA-M4xC12C42R1x (manufacturer's standard non-directional mechanical finish including sanding and filing, cleaning with inhibited chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment and painted with organic coating specified below).
      1) Organic Coating: Provide manufacturer's standard thermosetting enamel system consisting of a prime coat and a finish coat.

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.

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.

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b. Fasteners and Anchors: Manufacturer recommended concealed types for indicated signage and substrate materials.

2. Cast Metal Plaque: Mount cast plaque using the standard method recommended by the plaque manufacturer for the type of wall surface indicated.
   a. Concealed Mounting: Mount the plaque by inserting threaded studs into tapped lugs on the back of the plaque. Set in predrilled holes filled with quick-setting cement.

C. Sign Mounted Panel Sign: Attach panel signs to signage panel surfaces:

1. 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

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SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND 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 fire extinguishers, cabinets and accessories is indicated on the Drawings.

B. Definition: "Fire Extinguishers" as used in this section refers to units which can be hand-carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems.

C. Type of products required include:

1. Fire extinguishers.
2. Fire extinguisher cabinets.
3. Mounting brackets.
4. Signs.

D. Related Sections:

1. Section 04200 - Unit Masonry
2. Section 07900 - Joint Sealer Assemblies.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain products in this section from one manufacturer.

B. Coordination: Verify that fire extinguisher cabinets are sized to accommodate fire extinguishers of type and capacity indicated.

C. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

1.4 SUBMITTALS

A. Product Data: Submit product data for each type of product included in this section. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

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1. Failures include, but are not limited to, the following:
   a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
   b. Faulty operation of valves or release levers.

2. Warranty Period: **Six (6) years** from date of Substantial Completion.

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. J.L. Industries.
2. Larsen's Mfg. Co.
3. Potter Roemer
4. Or approved equal.

2.2 FIRE EXTINGUISHERS

A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.

B. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.

C. Multi-Purpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5 lbs. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS

A. Provide manufacturer's standard brackets designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

B. Provide brackets for extinguishers not located in cabinets.

2.4 FIRE EXTINGUISHER CABINETS

A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.

B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.

C. Cabinet Type: Suitable for mounting conditions indicated, of the following types:

1. Semi-Recessed: Cabinet box (tub) partially recessed in walls of shallow depth.

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2. Provide fire rated UL listed type cabinets.

D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.

E. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: Square edges with backbend depths as follows:
   a. 1/4" to 5/16".

2. Trim Metal: Of same metal as door.

F. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

1. Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.

G. Door Glazing: Tempered float glass complying with FS DD-G-1403, grade B, style I, type I, quality q3, class as indicated below:

1. Clear glass, class 1 (transparent).

H. Door Style: Manufacturer's standard design as indicated below and on Drawing.

1. Vertical Duo-Panel: Tempered glass, 1/8" thick.

I. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

2.5 SIGNAGE

A. Identification: Signage complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Basis of Design: “PTD-182", V-Shaped Sign - ‘FIRE EXTINGUISHER’ with picture of extinguisher on red background; or approved equal.

2.6 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS

A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.

B. Painted Finishes: Provide painted finish to comply with requirements indicated below for extent, preparation and type:

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C. Extent of Painted Finish: Apply painted finish to both concealed and exposed surfaces of cabinet components except where other than a painted finish is indicated.

D. Color: Provide color or color matches indicated, or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

E. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.

F. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply cabinet manufacturer's standard baked enamel finish system to the following surfaces:

1. Interior of cabinet.
2. Exterior of cabinet except for those surfaces indicated to receive another finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

D. Where exact location of surface-mounted cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.

3.2 IDENTIFICATION

A. Identify existence of fire extinguisher in cabinet with die cut vertical lettering spelling "FIRE EXTINGUISHER" applied to door. Provide lettering to comply with requirements indicated for letter style, color, size, spacing and location or, if not otherwise indicated, as selected by Architect from manufacturer's standard vertical arrangements.

B. Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by Architect.

END OF SECTION 10522

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SECTION 10650 - OPERABLE PARTITION

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. Electrically operated, continuously hinged partition.

B. Related Sections:
   1. Section 03300 - Concrete Work.
   2. Section 04200 – Unit Masonry.
   3. Section 05120 – Structural Steel: For primary structural support, including pre-punching of support members by structural steel supplier per operable partition supplier's template.
   4. Section 05400 – Miscellaneous Structural Steel.
   5. Section 09250 – Gypsum Drywall.
   6. Division 16 – Electrical Work.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified in writing by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for Work similar in material, design, and extent to that indicated for this Project.

B. Acoustical Performance: Test operable partition(s) in an independent acoustical laboratory in accordance with ASTM E90 test procedure and classified in accordance with ASTM E413 to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.

C. Preparation of the opening shall conform to the criteria set forth per ASTM E557 *Standard Practice for Architectural Application and Installation of Operable Partitions.*

D. The operable wall must be manufactured by a certified ISO-9001-2015 company or an equivalent quality control system.

1.4 REFERENCE STANDARDS

A. ASTM International
   1. ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
   2. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   3. ASTM E84 - Surface Burning Characteristics of Building Materials.
   4. ASTM E413 - Classification for Rating Sound Insulation

B. Health Product Declaration Collaborative
   1. Health Product Declaration Open Standard v2.1

C. International Standards Organization
   1. ISO 14021 - Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labeling).
   2. ISO 14025:2011-10, Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures.
   3. ISO 14040:2009-11, Environmental Management - Life Cycle Assessment - Principles and Framework.
   4. ISO 14044:2006-10, Environmental Management - Life Cycle Assessment - Requirements and Guidelines.
   5. ISO 21930 – Sustainability in Buildings and Civil Engineering Works — Core Rules for Environmental Product Declarations of Construction Products and Services.

D. Other Standards
   1. ADA – Americans with Disabilities Act.
   2. UL 508A – Standard for Industrial Control Panels
   3. NFPA 70 – National Electrical Code
   4. ANSI Z97.1 - Safety Glazing Materials Used in Buildings.
   5. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
   6. NEMA LD3 - High Pressure Decorative Laminates.

1.5 SUBMITTALS

A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for type of operable partition, component and accessory specified.

B. Shop Drawings: Show location and extent of operable partition. Include plans, elevations, sections, details, attachments to other construction, and accessories. Indicate dimensions, weights, conditions at opening, and at storage areas, and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel. Indicate blocking to be provided by others.

C. Setting Drawings: Show imbedded items and cutouts required in other Work, including support beam punching template.

D. Samples: Color samples demonstrating full range of finishes available by Architect. Verification samples will be available in same thickness and material indicated for the Work.

E. Reports: Provide a complete and unedited written sound test report indicating test specimen matches product, as submitted.

F. Create spaces that are healthy for occupants.
   1. Furnish products and materials with Health Product Declaration (HPD), Manufacturer Inventory, or other material health disclosure documentation. Products without an HPD or other disclosure documentation are not acceptable.

G. Furnish materials that generate the least amount of pollution.
   1. Furnish products and materials that have third party verified environmental product declarations (EPD's). Consider products and materials that have optimized environmental performance (reduced life cycle impacts). Products without an EPD or other disclosure documentation are not acceptable.

H. Buy American: Folding door to be manufactured in the United States in compliance with applicable U.S. Federal Trade Commission (FTC) and U.S. Customs Service and Border Protections regulations and be labeled "Made in America".

1.6 DELIVERY, STORAGE, AND HANDLING

A. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.

B. Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.7 WARRANTY

A. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.

B. Warranty period: **Two (2) years**.

C. Suspension System Warranty**: Two (2) years**.

D. Lifetime warranty on hinges.

PART 2 – PRODUCTS

2.1 MANUFACTURERS, PRODUCTS, AND OPERATION

A. Manufacturers: Subject to compliance with requirements, provide product by the following:
   1. Modernfold, Inc.
   2. Or approved equal.

B. Door(s) to be manufactured in the U.S.A.

C. Products: Subject to compliance with the requirements, provide the following product:
   1. Acousti-Seal Premier; or approved equal, Electric Panel: Electrically operated continuously hinged operable partition.

2.2 OPERATION

A. Acousti-Seal Premier - Electric Panel; or approved equal: Series of continuously hinged flat panels, electrically operated, top supported with operable floor seals.

B. Final Closure: Side Jamb with overlapping trail panel.

C. Partition shall be operated by:
   1. Motor unit shall be reversible, continuous duty, and Class A insulated. Motor unit shall have NEMA MG 1 service factor, high starting torque, thermal overload protection, and open/drip proof enclosure. Motor assembly shall have wiring compliant with NFPA 70, 24-volt controls, compliant with UL 508A, and speed of 28 feet/minute. The drive unit motor shall be equipped with outboard limit switches to prevent over-extension. A positive chain drive attached to the lead

panel shall pull the partition across the opening. Cable, belt, or other friction type drives will not be accepted.

D. Electric motor shall consist of: 208-volt, 3-phase.

2.3 PANEL CONSTRUCTION

A. Nominal 3-inch (76mm) thick panels in manufacturer's standard 48-inch (1220mm) widths. All panel horizontal and vertical framing members fabricated from minimum 18-gage formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.

B. Panel skin shall be: 0.50-inch (13mm) NAUF medium density fiberboard, single material or composite layers continuously bonded to panel frame. Acoustical ratings of panels with this construction minimum: 50 STC.

C. Hinges for Panels, Closure Panels, Pass Doors and Pocket Doors shall be:
   1. Full leaf butt hinges, attached directly to the panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.

D. Panel Trim: No vertical trim required or allowed on edges of panels; minimal groove appearance at panel joints.

E. Panel Weight: 50 STC = 8 lbs./square foot

2.4 PANEL FINISH

A. Panel finish shall be: Wall covering and upholstery fabric with surface treatment to resist stains.

B. Panel Trim: Exposed panel trim of one consistent color: As selected by the Architect from manufacturer’s standard colors.

2.5 SOUND SEALS

A. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic or aluminum astragals or astragals in only one panel edge are not acceptable.

B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.

C. Horizontal bottom floor seals shall be:
   1. Modernfold; or approved equal, Floating Bottom Seal. Floating operable seals provide nominal 3.50 (89mm) operating clearance with an operating range of +.50" (15mm) to -3" (76mm) and shall provide continuous floor contact as panels are positioned without the need for tools or cranks.

2.6 SUSPENSION SYSTEM

A. #30 Suspension System
   1. Suspension Track: Track shall be structural aluminum. Static loading of track with brackets at 48-inch (1220 mm) centers shall show no failure of track or brackets at 5,000 pounds (2250 kg) point loading at mid-span. Track shall be supported by adjustable steel hanger brackets connected to structural support by pairs of 3/8-inch (9.5 mm) diameter threaded rods.
      a. Exposed track soffit: Track soffit to be integral to track shape and shall be powder-coated off white paint finish. Track must accommodate termination of plenum sound barriers on both sides of track for maximum sound control.
   2. Carriers: One trolley in alternating panels with 3-inch (76.2 mm) diameter glass reinforced nylon, all steel precision-ground ball-bearing wheels. Steel wheeled or reinforced polymer trolleys on aluminum track not permitted. Trolleys shall attach to panels with 1/2-inch (17 mm) diameter pendent bolt mounted to welded steel mounting plate.

2.7 SELECTED OPTIONS

A. Work Surfaces shall be as indicated on Drawings:
   1. Markerboard: White enamel on steel, bonded to the face of the panel with horizontal trim without exposed fasteners. Trim is not acceptable on vertical edges to provide uninterrupted work surface.
   2. Tackboard shall be minimum 5mm corkboard covered with vinyl or fabric. Trim shall not require exposed fasteners. No trim shall be permitted on vertical edges so as to provide uninterrupted work surface.

B. Selected accessories / options:
   1. Pocket Door(s): Acousti-Seal Pocket Door(s) by Modernfold, Inc.; or approved equal. Equipped with electric interlock system. (see manufacturer's Supplement Specification)
      a. Premier pocket door.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.

B. Install operable partition and accessories after other finishing operations, including painting have been completed.

C. Match operable partition by installing panels from marked packages in numbered sequence indicated on Shop Drawings.

D. Broken, cracked, chipped, deformed or unmatched panels <u>are not</u> acceptable.

3.2 CLEANING AND PROTECTION

A. Clean partition surfaces upon completing installation of operable partition to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and Installer that ensure operable partition is without damage or deterioration at time of Substantial Completion.

3.3 ADJUSTING

A. Adjust operable partition to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.4 EXAMINATION

A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partition. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 DEMONSTRATION

A. Demonstrate proper operation and maintenance procedures to Owner's Representative.

B. Provide Operation and Maintenance Manual to Owner's Representative.

END OF SECTION 10650

SECTION 10730 - CANOPY 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. Section Includes building supported, pre-engineered metal canopies including fascia channels, decking, tension rods, and attachment hardware.

B. Related Section(s):

1. Section 04200 - Unit Masonry.

1.3 REFERENCES

A. Aluminum Association (AA)DAF 45 - Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA)

1. 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Architectural Extrusions and Panels.

C. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.

D. ASTM International (ASTM)

1. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

2. B429 - Standard Specification for Aluminum-Alloy Extruded Pipe and Tube.

1.4 SYSTEM DESCRIPTION

A. Design Requirements: Design canopy system to withstand:

1. Standards for wind pressure, snow load, and drifting snow load in accordance with current adopted form of the Uniform Construction code or accepted requirements of local municipality.

1.5 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Indicate system components, dimensions, attachments and accessories.

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2. Samples:
    a. 3 x 3 inch coating samples in specified color.
    b. 6 inch long fascia extrusion sample showing profile and standard finish.
    c. 6 inch decking samples showing profile and standard finish.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years' experience in installation of canopy products.

1. Mockup: Provide mockup of canopy system including all framing members, supports, decking, hanger rods and attachments at location selected by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Extrudeck Series as manufactured by MASA Architectural Canopies; or approved equal.

B. Subject to compliance with the Specification section contained herein, other acceptable canopy manufacturers are one of the following:

1. Mapes Architectural Canopies,
2. Architectural Fabrications,
3. Or approved equal.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B221& ASTM B429 6063-T5 alloy and temper.

B. Hardware: All fasteners shall be (stainless steel) or (zinc coated) for corrosion resistance.

2.3 COMPONENTS

A. Framing:

1. Type: Extruded aluminum "J" channel fascia.
2. Size: 8" x .125".

B. Canopy Supports: Extruded Aluminum Canopy Support "I" Beam.

C. Decking: 3" x 6" x .090" Interlocking Extruded aluminum flat soffit decking, as selected from MASA; or approved equal, decking options.

D. Attachment: 1.050" diameter steel hanger rod, finished to match canopy.

E. Custom Fascia Profiles: 4" Crown.

F. Other Components: other components as indicated or as required for system attachment and performance.

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2.4 ACCESSORIES

A. Downspouts 2″ x 3″ (.125 Heavy Extruded) Finished to match canopy color.

2.5 FABRICATION

A. Fabricate canopy system in accordance with approved Shop Drawings.

B. Kit canopies to be mechanically assembled with shear stress strength as per engineering. Pre-assembled canopies are shop welded by MASA; or approved equal, approved personnel.

C. Drainage system to be concealed type. Covered surfaces direct water to field drilled drain, to be coordinated at site.

2.6 FINISHES

A. Kynar 500; or approved equal: Color to be selected by Architect / Owner from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 FIELD DIMENSIONS

A. Field verify dimensions of supporting structure at site of installation prior to fabrication.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Install components plumb and level, in proper plane, free from warp and twist.

C. Anchor system to building components; provide adequate clearance for movement caused by thermal expansion and contraction and wind loads.

3.3 ADJUSTING

A. Touch up minor scratches and abrasions on finished surfaces to match original finish.

B. Clean with mild, non-abrasive solution and a cotton cloth under low pressure.

END OF SECTION 10730

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SECTION 10800 - TOILET AND BATH 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 each type of toilet accessory is indicated on the Drawings and schedules.

B. Type of toilet accessories required includes but are not limited to the following:

1. Mirrors
2. Grab bars
3. Napkin disposals
4. Mop and Broom Holder/Utility Shelf

C. Refer to the Toilet Room Accessories Schedule which identifies items supplied by the Owner and installed by the Contractor.

1.3 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other Work to avoid delay.

B. Accessory Locations: Coordinate accessory locations with other Work to avoid interference and to assure proper operation and servicing of accessory units.

C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.

B. Setting Drawings: Provide setting Drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other Work.

1.5 WARRANTY

A. Washroom Accessories: Special Warranty is limited to replacing or repairing, at the manufacturer’s option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:

1. Complete unit (except mirrors) - **Two (2) years**.

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2. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.

3. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.

4. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **Two (2) years** against corrosion.

5. Bright Annealed Finish on 430 Series Stainless Steel - **Two (2) years** against corrosion.

Note: Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Catalog numbers used herein are Bradley Washroom Accessories, or approved equal. Refer to Drawings for schedule and additional information. Similar products for other indicated manufacturers will be acceptable.

B. Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the Work include one of the following:

1. American Specialties, Inc.

2. Bobrick Washroom Equipment, Inc.

3. Or approved equal

2.2 MATERIALS, GENERAL

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge (.034") minimum, unless otherwise indicated.

B. Brass: Leaded and unleaded, flat products, FS QQ-B-613; Rods, shapes, forgings, and flat products with finished edges, FS QQ-B-626.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gauge (.040") minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 527, G60.

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

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G. Mirror Glass: ASTM C-1048, Type I, Class 1, Quality q2, 1/4" thick, with silver coating, copper protective coating, and non-metallic paint coating complying with FS DD-M-411. Provide tempered safety glass for all mirrors.

H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

I. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.3 PRODUCT DESCRIPTIONS

A. Mirror Units: #780 Series, Mirror plates shall be of No. 1 quality 1/4" polished safety glass, silvered and electrolytically copper backed.

1. Frames shall be 3/4" x 3/4", type 304, 18 gauge satin finish stainless steel angle with mitered corners, welded and polished smooth, with 20 gauge angle stiffeners welded to frame, 20 gauge galvanized steel back with formed edges secured to frame with concealed screws and equipped with integral 18 gauge cold rolled steel all welded construction wall hangers.

2. Mirror units shall guaranteed by the manufacturer for a period of **fifteen (15) years** which starts on approved date of installation.

3. Sizes as indicated on drawings and schedules.

B. Grab Bars: (Provide quantity and types indicated)

1. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 (.050") gauge and as follows:
   a. Mounting: Concealed, manufacturer's standard flanges and anchorages.
   b. Clearance: 1-1/2" clearance between wall surface and inside face of bar.
   c. Gripping Surfaces: Manufacturer's non-slip texture.
   d. Heavy-Duty Size: Outside diameter of 1-1/2".

C. Napkin Disposals: Surface mounted, Model 4722-15, one toilet compartment, fabricated of type 304, 22 gauge stainless steel with exposed surfaces in satin finish. Self-closing push flap door and stainless steel removable receptacle with tumbler lock. Overall dimensions - 10–3/4" w x 15–1/8" h x 4" d.

2.4 MISCELLANEOUS ACCESSORIES

A. Mop and Broom Holder/Utility Shelf: No. 9954, combination unit with 18-gauge (.050") Type 304 stainless steel shelf with ½" returns, 16-gauge (.062") support brackets for wall mounting, provide 16-gauge stainless steel hooks for wiping rags on front of shelf, together with spring-loaded rubber cam type mop/broom holders; 1/4" diameter stainless steel drying rod suspended beneath shelf. Provide 36" long unit with 4 mop/broom holders and 3 hooks.

2.5 FABRICATION

A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either the interior surface of the accessory or on the back surface, the

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manufacturer shall indicate the manufacturer's information, model number on a printed waterproof label or a stamped nameplate attached to the accessory.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which Work is to be installed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 INSTALLATION

A. Install toilet accessory units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

B. Use all metal type fasteners such as anchors, plates, screws, bolts and expansion shields, type as required by the construction to which accessories are to be secured. Exposed hardware shall match finish of the accessory.

3.3 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings.

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SECTION 10900 - MISCELLANEOUS EQUIPMENT AND FURNISHINGS

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 DESCRIPTION OF WORK

A. Extent of each type of equipment is shown on Drawings.

1. High-Security Key Box

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's Specifications, installation instructions, and general recommendations, including data which substantiates that materials comply with requirements.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

PART 2 - PRODUCTS

2.1 HIGH-SECURITY KEY BOX

A. Basis of Design: Provide “Knox-Box® - Series 3200", recessed, high-security key box as manufactured by Knox Co.; or approved equal.

1. Color: As selected by Architect from manufacturer’s standard colors / finishes.

B. Subject to compliance with requirements, manufacturers offering products and accessories which may be incorporated in the work include the following:

1. TRAC-Vault” as manufactured by Supra a United Technologies Co.

2. Or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate installation with installation of adjacent materials, use of anchors and fasteners to suit existing wall construction and finishes.

B. Demonstrate proper operation of the equipment to Architect's satisfaction. Adjust as required for smooth, efficient operation.

C. Provide instructions for Owner's personnel, with manufacturer's use and maintenance

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manuals.

D. Protect equipment from damage until acceptance of the entire project by the Owner.

E. Install equipment and materials in accordance with manufacturer's recommendations and instructions for installation.

END OF SECTION 10900

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SECTION 11000 - GENERAL REQUIREMENTS - CASEWORK AND EQUIPMENT WORK

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 DESCRIPTION OF WORK

A. Casework and Equipment Work includes all items listed on the schedule. All general requirements of this section apply to the Contract.

1.3 QUALITY ASSURANCE

A. Products of individual manufacturers are scheduled to establish type and standard of quality. Products of other manufacturers proposed to be used shall meet the published Specifications of the specified product as to materials, finishes, design and fabrication, to the satisfaction of the Architect.

B. Compatibility: Provide each type of equipment by a single manufacturer, including accessories. It is of the utmost importance that a stability of design and interchangeability of parts and pieces be provided, and it shall be specifically understood that a miscellaneous assortment of equipment assembled by dealers or agents will not be considered as meeting requirements of the Specification.

C. Casework and/or Equipment Work specified herein and other Division 11 Specification sections have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

1. Comparable products of other manufacturers will be considered only if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed by manufacturers for indicated model numbers.

2. The Contractor will not award a Subcontract for Casework and Equipment to a supplier unless the Architect has approved that supplier's samples, certificates, individual product Drawings and proof of ability to perform.

1.4 SUBMITTALS

A. Submit manufacturer's technical data, catalog cuts and installation instructions for each type of casework and equipment.

B. Samples: Submit, for verification purposes, samples of each exposed material from which equipment units and accessories are composed, in each color, finish, pattern and texture indicated. If these qualities are not indicated, submit, for initial selection, manufacturer's color charts or samples of actual materials showing full range of standard colors, finishes and textures available. Include samples of the following:

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1. Plastic laminate
2. Baked enamel finishes for metal components
3. Wood and plywood materials and finishes
4. Molded plastic and fiberglass
5. Exposed fasteners

C. Submit full-size samples of finished units when complete with hardware, doors, adjustable shelves, etc., when requested by Architect. Acceptable sample units will be used for comparison inspection at project. Unless otherwise directed, acceptable sample units may be incorporated in the Work. Notify Architect of their exact locations. If not incorporated in the Work, retain acceptable sample units in the building until completion and acceptance of the Work. Remove sample units from the premises when directed by Architect.

D. Shop Drawings

1. Submit shop drawings showing plans, elevations, ends cross-sections. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.

2. Coordinate shop drawings with other Work involved.

1.5 PRODUCT HANDLING

A. Deliver casework only after wet operations in building are complete.

B. Store completed equipment in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.

C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

1.6 JOB CONDITIONS

A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.

B. Examination of Substrate and Conditions

1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.

2. Examine the substrate and the conditions under which the Work under this section is to be performed, including condition of substrate to which equipment is to be attached, and notify the Architect, in writing, of unsatisfactory conditions Do not proceed with Work under this section until satisfactory conditions have been corrected in an acceptable manner.

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1.7 QUALIFICATION OF SUPPLIERS OF CASEWORK AND EQUIPMENT

A. That it owns and operates a factory or factories adequate for and devoted to the manufacture of casework, equipment or material which is proposed to furnish and maintains strict inspection and quality control over the various manufacturing operations performed to produce a satisfactory end product of the standard and quality set forth in the detailed Specification.

1. That is at the time of submitting products and equipment and had been engaged in the manufacturing of casework or equipment for a recommended 10 consecutive years and has maintained during this time a published catalog of such specialized equipment, including a line similar to the specified.

2. That the manufacturer or their franchised representative shall have a major installation of equipment delivered and installed over a recommended 10 years conforming to the design and quality specified herein.

1.8 VARIATION FROM MATERIALS, PRODUCTS AND EQUIPMENT SPECIFIED

A. The designs, materials, finishes and functions have been selected by the Owner on the advise of the Architect with intention of creating an integrated building design. For this reason, no variations from the plans, Specifications and design guide will be permitted except as noted below.

1. Whenever and wherever in any of the Bid Documents an article, material or equipment is defined by describing a proprietary product or by using the statement, "as manufactured by", it is the intent that this shall describe by reference the materials desired; craftsmanship and method of manufacture, as well as the size and dimensions rather than detailing all of these requirements herein. It is not the intention to limit the bidding on such items, but merely to indicate that the item must conform to these standards.

2. **Any Laboratory Casework manufacturer requesting equivalence must submit test report from a Scientific Equipment and Furniture Association (SEFA) approved independent testing facility showing compliance with SEFA-8 standards. Failure to provide the required information maybe cause for rejection.**

PART 2 - PRODUCTS

2.1 See Schedules on Drawings.

2.2 GENERAL REQUIREMENTS

A. BASIS OF DESIGN: CATALOG NUMBERS REFER TO CAMPBELL-RHEA CASEWORK CATALOG, ETC.; OR APPROVED EQUAL, UNLESS OTHERWISE SHOWN, SEE PARAGRAPH 1.2 ABOVE.

B. ALL CASEWORK DOORS AND DRAWERS TO HAVE LOCKS KEYED ALIKE PER ROOM AND MASTER KEYED.

1. The Contractor shall package keys for each room separately and identify the room number on the package and deliver to the Owner's Representative.

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C. ALL TOPS SHALL BE 3/4" PLYWOOD WITH SOLID SURFACE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).

D. ALL BACKSPLASHES SHALL BE SOLID SURFACE SECURED TO THE WALL SURFACE (UNLESS NOTED OTHERWISE).

E. ALL FURNITURE, CASEWORK AND EQUIPMENT SHOWN DOTTED AND/OR IS INDICATED AS (N.I.C.) IS NOT IN CONTRACT.

F. UNLESS OTHERWISE SHOWN, THE CASEWORK AND EQUIPMENT WORK SUBCONTRACTOR SHALL SUPPLY AND DELIVER ALL SINKS, TAILPIECES, FAUCETS, STRAINERS, IN CASEWORK TO THE PLUMBING AND DRAINAGE SUBCONTRACTOR.

1. PLUMBING SUBCONTRACTOR SHALL SUPPLY AND INSTALL ALL TRAPS, VALVES ETC AND SHALL MAKE FINAL CONNECTIONS TO ALL WASTE/VENTS AND WATER AND, ETC., AS REQUIRED, TO MAKE SYSTEMS FULLY FUNCTIONAL.

2. UNLESS OTHERWISE SHOWN, CASEWORK AND EQUIPMENT SUBCONTRACTOR SHALL MAKE SINK CUT-OUTS.

3. SINK CABINETS TO BE INSTALLED BEFORE THE INSTALLATION OF ADJACENT CABINETS.

G. ALL (SUB)CONTRACTORS TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND NOTIFY ARCHITECT IN WRITTEN FORM OF ANY DISCREPANCIES.

H. PROVIDE ALL FILLERS, AS REQUIRED. FINISH TO MATCH CASEWORK.

I. UNLESS OTHERWISE SHOWN, RUBBER BASE ON ALL CASEWORK BY THE CONTRACTOR.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION

A. Deliver, uncrate, set in place and install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished Work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes in corners.

B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.

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C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

D. Adjust shelving, tables and chair heights (if applicable), as required and as directed by the Architect/Owner.

E. Inspect for dents, scratches, tears, stains, holes, etc. Replace any items showing damage, loose joints or other defects.

3.3 CLEANING AND PROTECTION

A. Clean and polish all items, remove packing cases and debris from the site.

B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the Work of other Trades until acceptance of the Work by the Owner.

C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 11000

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SECTION 11011 - CASEWORK AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Section Includes: Wood casework and related equipment.

1. Pre-manufactured wood casework and equipment, covered by this Specification and accompanying Drawings, are manufactured or supplied by one manufacturer to avoid divided responsibility.

B. Work included in this section:

1. Furnish all items of equipment as listed in the Specifications, equipment schedule and/or as shown on the Drawings, including delivery to the building, unpacking, setting in place, leveling, and scribing to walls and floors, as required.

2. **Furnishing:** Equipment Subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Plumbing Work Subcontractor.
   a. The Casework and Equipment Subcontractor(s) shall turn over to the Plumbing Subcontractor in a package, all sinks, fixtures, faucets, tailpieces, strainers, etc., and nipples and locknuts, etc., for installation and final connection by the Plumbing Subcontractor.

3. **Furnishing:** Equipment Subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Electrical Subcontractor.
   a. The Casework and Equipment Subcontractor(s) shall turn over to the Electrical Subcontractor in a package, all electrical devices, for installation and final connection by the Electrical Subcontractor.

4. The Casework and Equipment Subcontractor shall provide an itemized lists and a designated site location for the transfer of the above referenced materials to the Plumbing and Electrical Subcontractors. The list shall have a description of the items and quantity along with a sign-off line for the Plumbing and Electrical Subcontractor(s).
   a. A copy of the signed list is to be submitted to the Architect/Owner prior to billing for this equipment.

5. All debris, dirt and rubbish accumulated as a result of this installation shall be removed and the premises left clean and orderly.

6. All (Sub)Contractors shall familiarize themselves with the job conditions and building measurements in order to coordinate the planning, design, connections, delivery and erection of the fixed casework and related equipment furnished under these Specifications with other related and associated Work during the term of this Contract.

C. Work included under the work of other Contracts:

1. The **connection** of sinks, tailpieces, traps, service lines, drainlines, and piping within the equipment and through, under or along the backs of working surfaces as required by the

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Specifications and/or as shown on the Drawing shall be by the Plumbing and Drainage Subcontractor in accordance with Part-4 Specifications Sections.

2. The **connection** of electrical receptacles, shall be by the Electrical Subcontractor in accordance with Part-6 Specifications Sections.

3. The furnishing of any framing or reinforcements for walls, floors, or ceilings to support any equipment, Contractor in accordance with Part-2 Specifications Sections.

1.2 QUALITY ASSURANCE

A. Provide all casework (for integration with tops, sinks and service fixtures, as required) manufactured or furnished by the same company for single responsibility.

B. Basis of Design: **"Campbell Rhea - Classic Oak Series", as manufactured by Institutional Casework, Inc.**; or approved equal.

C. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

1. 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.
   a. Diversified Casework.
   b. Leonard Peterson - Vanguard Line, Lipped.
   c. TMI Systems Design Corp.
   d. Or approved equal.

2. 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.

3. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A232 and Section 00800.

4. Substituted product(s) shall be meet the following minimum requirements:
   a. All four corners of drawer boxes must be dove-tailed together, and the bottom of all drawer boxes must be let in to the sides, front and back, to be “fully captured.” Applied drawer bottoms will not be permitted.
   b. All drawer front shall be fabricated from solid red oak lumber.
   c. All cabinet doors shall be framed with solid oak rails on four sides. Tall case doors shall include a lightweight core to reduce stress on hinges. Doors constructed of plywood or particleboard, edge-banded with oak will not be permitted. Tall case doors shall be mounted with (4) hinges.
   d. All tall case doors shall be complete with three-point latching mechanism. Single-point latching will not be permitted.

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5. The Contractor will not award Subcontract to a wood laboratory casework supplier who is not on the approved list, unless the Architect has approved that supplier's samples, certificates, individual product Drawings, and proof of ability to perform.

1.3 SUBMITTALS

A. Submit two copies of manufacturer's data and installation instructions for each type of equipment.

B. Samples:

1. Submit one full size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.

2. Submit one full size sample of finished wall mounted cabinet unit complete with hardware, doors and adjustable shelves.

3. Acceptable sample units will be used for comparison inspections at project. Unless otherwise directed, acceptable sample units may be incorporated in the Work. Notify Architect of their exact locations. If not incorporated in the Work, retain acceptable sample units in the building until completion and acceptance of the Work.

4. Remove sample units from the premises when directed by the Architect.

C. Shop Drawings

1. Submit shop drawings showing plans, elevations, ends, cross-sections, service run spaces, locations and type of service fixtures with lines thereto. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.

2. Coordinate shop drawings with other Work involved.

D. **Test Reports - Certifications:**

1. Submit the following:
   a. Test reports certifying that the casework finish complies with chemical and other resistance requirements of the Specifications.
   b. Performance test reports from an independent testing lab on each specified top material.

1.4 PRODUCT HANDLING

A. Deliver casework only after wet operations in building are complete.

B. Store completed wood furniture in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.

C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

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1.5 JOB CONDITIONS

A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.

B. Examination of Substrate and Conditions

1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.

2. Examine the substrate and the conditions under which the Work under this section is to be performed, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with Work under this section until satisfactory conditions have been corrected in an acceptable manner.

1.6 WARRANTY

A. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.

1. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

PART 2 - PRODUCTS

2.1 GENERAL

A. The best cabinet making practices for casework construction shall be followed. All cabinets shall be integral units, each completely enclosed without the use of common partitions unless otherwise specified.

2.2 MATERIALS

A. Lumber:

1. Oak lumber is red oak, grade FAS or better, air dried and kiln dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Red oak lumber exposed to view, is free of stains, splits, shakes, season checks and other similar defects.

2. Other hardwoods are grade FAS or better, air dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Other hardwoods are used in semi-exposed, or unexposed, areas and comply with NHLA grading for FAS or better lumber.

B. Plywood:

1. Oak plywood is red oak, grade A-2, plain sliced, book-matched, crossbanded and has a solid core.

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a. 3/4 inch is a minimum of 7-ply.
b. ½ inch is a minimum of 5-ply.
c. 1/4 inch is a minimum of 3-ply.
d. 3/32 inch is a minimum of 3-ply.

2. Other hardwood plywoods are sound grade, have a solid core and are suitable for semi-exposed or unexposed areas.
   a. 3/4 inch is a minimum of 7-ply.
   b. ½ inch is a minimum of 5-ply.
   c. 1/4 inch is a minimum of 3-ply.
   d. 3/32 inch is a minimum of 3-ply.

C. Hardboard:

1. Hardboard is service tempered and consists of steam-exploded wood fibers, highly compressed into a hard, dense, 1/4 inch thick, homogeneous sheet, using natural resins and other added binders.

2. Physical properties:
   a. Average modulus of rupture is 5,300 lbs./sq. inch
   b. Density is 50 to 60 lbs./cu. foot
   c. Tensile strength of 3,500 lbs./sq. inch.

D. Particleboard:

1. Particleboard is industrial grade.

2. Physical properties:
   a. Density, 46 to 50 lbs./cu. ft.
   b. Modulus of rupture, minimum, 2,200 psi
   c. Modulus of elasticity, minimum, 450,000 psi.

E. Service Fixtures:

1. Water, or other services: Triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.
   a. **Water Faucets - Hot and Cold:** Faucets are cast from red brass, and have four-arm type handles with color coded indexes. Faucets have serrated hose nozzles. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are rigid. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, and or other accessories. Provide vacuum breakers.
      (1) Provide lever handle type faucet control for barrier free applications in accordance with sink notes indicated on Drawings.
   b. **Vacuum Breakers:** Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Breaker is tapped 3/8 inch N.P.T.

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2. Electrical Fixtures: Receptacles are 3-wire grounded, 20 A, 125V AC, with stainless steel cover plates and cadmium-plated steel boxes. Pedestal boxes are brushed, cast aluminum with conduit nipples and lock nuts.
   a. G.F.I. fixtures: 20 A, 125V AC, with a brown nylon face and a LED indicator light. Conform to UL Standard 943 Class A, have hospital grade high abuse receptacle construction, and certified corrosion resistance with cupro-nickel exposed metal parts. Provide terminal screw wiring connections and a trip time of 0.025 seconds.

3. Sinks and Sink Outlets:
   a. **Stainless steel** sinks have a satin finish. They are 18 gauge, type 304, 18-8 stainless steel, with heavily undercoated bottoms and positive pitch drains. Outlets are chrome plated brass. Drain holes are 3-1/2 inch diameter for 4-1/2 inch stainless steel cup strainers. The cup strainer has a neoprene stopper. Provide necessary tail pieces to tie into plumbing roughing, typical.

   NOTE: Coordinate with Plumbing Drawings and Specifications.

F. Tops (See Equipment Schedule):

1. Solid Polymer Fabrications (Solid Surface)
   a Refer to Section 06650.

G. Hardware and Accessories:

1. Pulls: Shall be selected by the Architect from manufacturer's available standard and custom units at no additional cost to the Owner.

2. Handles:
   a. Latching handle LH-1 is die cast zinc alloy, 4-1/4 inches long, has a dull chrome plated finish. Handle operates with 1/4 turn. Double door cases have latching handles on the right door and dummy handles on the left door. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors.
   b. Locking handle LK-1 is a latching handle with a lock mechanism incorporated into the handle head. On double door cases, the left door has a dummy handle, and the right door has the locking handle. Lock is laboratory grade with a 5-disc tumbler mechanism and a dull chrome plated face. Tumblers and keys are brass, while the plug and cylinder are die cast zinc alloy.

3. Locks:
   a. Lock SL-1 is a laboratory grade, cylinder cam lock, with a 5-disc tumbler mechanism, and a dull chrome plated face. Tumblers and keys are brass, while plug and cylinder are die cast zinc alloy. Lock operates with a 180 degree turn of the key. There are 500 key changes standard. Locks are keyed differently, master keyed and furnished with 2 keys per lock.
   b. Locks are to be furnished on all doors and drawers.

4. Hinges:
   a. Hinge CP-1 is heavy duty, institutional type, 5-knuckle hospital tipped, and made from .095 inch thick, chrome plated mild steel. Hinge is wrap around style, and 2-

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3/4 inches high. The wing for mounting to end panel has 4 holes, two of which are slotted for adjustability; wing for the door has 5 holes, two of which are slotted for adjustability.

b. Elbow catch is a steel, spring loaded catch that releases with finger pressure. The catch and steel strike plate are mounted with screws. Strike plate screw holes are slotted for adjustability and pin hole is provided to help anchor its position.

6. Drawer Slides:
   a. Drawer slides DS-1 are electrostatically epoxy powder coated, cold rolled steel, heavy-duty, side mounted, and have a 150 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic positive stop levers to prevent accidental drawer removal, but allow quick removal without tools.
   b. File drawer slides FD-1 are zinc plated, cold rolled steel, heavy-duty, side mounted, and have a 100 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers. Slides are full extension with a positive stop, and a lift out disconnect.

7. Shelf Clips:
   a. **Shelf support clips shall be "seismic" twin pin type for mounting on interior of cabinet work. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves in all cabinets are adjustable on 32mm centers.**
      1) Single pin support clips and surface mounted metal support strips and clips subject to corrosion are not acceptable.

2.3 FABRICATION

A. Factory assembly of casework in the largest components possible aids in the installation. Mortise and tenon construction with glued and screwed joints is used for maximum strength; and the use of precision jigs and clamps ensures square corners and plumb vertical surfaces.

B. Fabrication of laboratory casework and equipment is completed to dimensions in the final, approved copy of shop drawings.

C. Base Cabinets:

1. All base cabinets are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each base cabinet is completely enclosed without the use of common partitions, and has flush construction with overlapping doors and drawers, which provides a dust resistant interior. A base cabinet has a full horizontal top frame with bored, doweled and glued joints, intermediate front rails and a 3/4 inch plywood bottom; rear horizontal parting rails and separators are provided as required. Horizontal top frame, intermediate parting rails and the bottom are bored, doweled and glued. Separators where indicated, are let into routed intermediate rails. Backs are recessed and encapsulated into dadoed end panels and further secured with glue blocks on each side, except where they need to be removable for access to plumbing. Backs are screwed to the top frame and further secured with glue blocks on each side. An enclosed toe space, 2-1/4 inches by 4 inches, is furnished with the toe rail bored, doweled and glued to end panels.

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D. Wall and Upper Cases:

1. All wall and upper cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels; and glued and screwed to the back. Backs are recessed and encapsulated into dadoed end panels, and further secured with glue blocks on each side. Exterior hanger rails, at the top of the back, are glued to the back and then screwed to the top panel and bored, doweled and glued into end panels. Exterior hanger rails, at the bottom of the back, are glued to the back and then screwed to the bottom panel and bored, doweled and glued into end panels. Adjustable shelves are supported on **"seismic" twin pin type** shelf clips, which fit into holes drilled 32 mm on centers, in the case end panels.

E. Tall Cases:

1. All tall cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels and glued and screwed to the back. An exterior back cross rail is provided at the top of each case, glued to the back, and then screwed to the top panel and bored, doweled and glued into the end panels. Additional back cross rails are provided, as required. Backs are recessed, let into dadoed end panels, and further secured with glue blocks at the sides. An enclosed toe space, 2-1/4 inches by 4 inches high, is furnished with toe rail securely bored, doweled and glued to end panels and bottom panel.

2. Rails:
   a. Interior: 2-1/4 inches by 3/4 inch, solid hardwood
   b. Exterior: 4-1/8 inches by 3/4 inch, solid oak

3. Top panel, bottom panel, dividers, fixed shelf and adjustable shelves:
   a. Cases with exposed interiors: All are 1 inch oak plywood
   b. Cases with unexposed interiors: All are 1 inch hardwood plywood.

4. Backs:
   a. Cases with exposed interiors and exposed exteriors: Back is 1/4 inch oak plywood.
   b. Cases with unexposed interiors and unexposed exteriors: Back is 1/4 inch service tempered hardboard.

5. End panels:
   a. Cases with exposed interiors: End panels are 3/4 inch oak plywood.
   b. Cases with exposed exteriors: end panels are 3/4 inch oak plywood.
   c. Cases with unexposed interiors and one exposed end panel and one unexposed end panel: Exposed end panel is 3/4 inch oak plywood; unexposed end panel is 3/4 inch hardwood plywood.
   d. Cases with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.

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6. Exposed edges of end panels, dividers and shelves are edge-banded with 1/4 inch solid oak.

7. Exterior back cross rails: 3 inches by 3/4 inch hardwood plywood.

F. Drawers:

1. Components:
   a. Drawer front: 13/16 inch oak lumber.
   b. Drawer sides and back: ½ inch hardwood lumber.
   c. Drawer bottom: 1/4 inch service tempered hardboard.
   d. Construction: All four corners of the drawer are dovetailed and glued. Edges of the drawer front are machine radiused to form a lip and overlap the opening 1/4 inch on all sides. Drawer fronts are one piece of lumber, providing consistency in color and grain within each drawer front. The back perimeter of the drawer front is routed so drawer front is recessed into the opening and projects 13/32 of an inch. The top edge of drawer sides and back are radiused. The bottom is let into the box on four sides and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. In cabinets 24 inches or less in width, drawers have one, AL-1aluminum pull which is surface mounted with 2 screws, 4 inches on centers. In cabinets over 24 inches wide, drawers have two AL-1 aluminum pulls. Drawers are supported on DS-1 slides which are side mounted, heavy duty, electrostatically epoxy powder coated, cold rolled steel, and have a 150 lb. load capacity. Slides are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. DS-1 slides have automatic, positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools. File drawers are supported on side mounted FD-1 full extension steel slides. File drawers have an interior, screw mounted, metal bottom track and an adjustable metal file follower. Lock SL-1 is furnished when indicated.

G. Doors:

1. Hinged solid doors, 48 inches or less in height:
   a. Core ply: Solid oak rails on four edges framing a particleboard core.
   b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
   c. Red oak veneer: Face plys; one applied to each side.
   d. Construction: Hinged solid doors, 48 inches or less in height, are 13/16 inch thick and have solid oak rails on the four edges. Doors overlap the opening 1/4 inch on all sides and have machined radiused edges. Doors have one aluminum pull which is surface mounted with two screws. Doors have two, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges, each attached with 5 tempered steel screws into solid oak framing of door, and 4 Euro screws into the end panel. Doors are secured by zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catch and steel strike plate are attached with screws. On lockable double door cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes are slotted for adjustability and a pin hole is provided to help anchor plate's position. Lock SL-1 is furnished when indicated.

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2. Hinged solid doors over 48 inches in height:
   a. Core ply: Solid oak rails on four edges framing a particleboard core.
   b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
   c. Red oak veneer: Face plys; one applied to each side.
   d. Construction: Hinged solid doors over 48 inches in height, are one inch thick and have solid oak rails on the four edges. Doors overlap opening 1/4 inch on all sides, and machined radiused edges. Single doors and right door of double doors have a LH-1 latching handle, which is 4-1/4 inches long, streamline design, with a dull chrome plated finish. Handle operates with 1/4 turn. Left door of double doors has a fixed handle, which is the same size and finish as a LH-1 latching handle. A three point latching system provides single doors and right door of double doors positive engagement at the top and bottom of the door with tapered aluminum rods which engage plastic strike plates and pull the door snug. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors. Right door of double doors lap over the integral machined astragal on left door, securely holding door shut. Doors have three, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 tempered steel screws in to solid oak framing of the door, and 4 Euro screws into the end panel. Left door of double doors is additionally secured with two zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catches and steel strike plates are attached with screws. Catch screw holes are slotted for adjustability, and the strike plate has two nips to help anchor its position. Locking handle LK-1 is furnished when indicated.

H. Casework Finishes:

1. Surfaces to be Finished: Exposed exterior and exposed interior surfaces of cabinets receive the full finishing process. The unexposed interior surfaces of cupboards, drawers, wall cases, upper cases, and tall cases receive a baked on protective coat of moisture and chemical resistant catalyzed sealer, and a top coat of clear, catalyzed conversion varnish. Other unexposed surfaces are processed through standard finishing steps, and receive a baked on protective coat of moisture and chemical resistant catalyzed sealer.

2. Finishing Process: Prior to assembly lumber for doors, drawers and cabinets, and plywood for cabinets, are machine sanded with 120 grit, 180 grit, and finally, 220 grit sand paper. Flat surfaces receive two additional machine sandings: one in an orbital crossbelt sander with 40 micron and 60 micron grit sanding belts; and, one through a rotary polisher with 150 grit sand paper. Door and drawer front edges are machine sanded to a very smooth surface through a profile edge sander utilizing a 100 grit and a 150 grit paper. After assembly, drawers, doors, and casework are thoroughly examined and fine-finished by hand to provide a consistently smooth surface. Prior to the first application in the finishing process, items are placed in the dust-off booth where compressed air is used to remove loose fibers and dust. Selected surfaces are stained with NGR stain to the desired color and allowed to dry. Next a protective coat of moisture and chemical resistant, catalyzed sealer is applied. After flash drying, items are oven baked at 130°F. Following a cool down period, surfaces that receive the final top coat are carefully hand sanded and wiped clean. A top coat of clear, catalyzed, conversion varnish is applied, allowed to dry, and then oven baked at 130°F. The final top coat provides chemical resistance, toughness, durability, and excellent color stability with a smooth finish and high-gloss lustre.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION

A. Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes at corners. Install wall cabinets in accordance with details on Drawings.

B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.

C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING AND PROTECTION

A. Repair or remove and replace defective Work as directed upon completion of installation.

B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the Work of Subcontractor(s) until acceptance of the Work by the Owner. Advise HVAC Subcontractor of the required temperature/humidity conditions which must be maintained during the remainder of the construction period.

C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

D. Clean up cut out pieces, sawdust and debris, packing cases, etc. Leave areas in broom clean condition. Remove all debris as a result of Work of the Contract.

END OF SECTION 11011

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SECTION 12495 - WINDOW ROLLER SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roller shades, motorized operation and accessories.
   1. Intelligent encoded electronic drive system.
   2. Motor controls, interfaces, and accessories.

B. Roller shades, manual operation and accessories.

C. Shade fabric.

1.2 RELATED SECTIONS

A. Section 06100 - Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

B. Section 09250 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.

C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

D. Division 16 - Electrical: Electric service for motor controls. Electrical and low voltage requirements, internal communication, data transfer, and connection to the Internet and local PoE switches as required.

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM G21 and E 2180 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Cradle to Cradle Products Innovation Institute (C2C):
   1. C2C (DIR) - C2C Certified Products Registry.

C. National Fire Protection Association (NFPA):
   1. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
   2. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

D. Underwriters Laboratories (UL):
   1. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.
   2. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

E. Window Covering Manufacturers Association (WCMA):

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1. ANSI/WCMA A100.1-2022- Safety of Window Covering Products; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Where motorized shades are to be controlled by control systems provided under other sections, coordinate the work with other Trades to provide compatible products.
   2. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.

B. Preinstallation Meeting: One week prior to commencing work related to this section. Require attendance of all affected installers.

C. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. “Hold to” dimensions are not acceptable.
   2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. Refer to AIA 232 and Section 00800, for submittal procedures.

B. Bid Submittal: Information Required with Submittal of Bid: In order to evaluate proposals for integrated lighting control and window shade systems, the Architect requires the following information be submitted after the award of the project.
   1. Note all deviations from these Specifications on a line-by-line basis.

C. Product Data: Manufacturer's catalog pages and data sheets for products specified including materials, finishes, dimensions, profiles, mountings, and accessories.
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes, accessories, and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.
   5. Manufacturer's Instructions: Include storage, handling, protection, examination, preparation, and installation.
   6. Project Record Documents: Record actual locations of control system components and show interconnecting wiring.
   7. Motorized Shades: Power requirements. Typical wiring diagrams including integration of EDU controllers with building management system, audiovisual and lighting control systems as applicable.

D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
   1. Prepare shop drawings on AutoCad or MicroStation format using base sheets provided electronically by the Architect.
   2. Prepare control wiring diagrams based on zones, switching and operational requirements provided by the Architect in electronic format.

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3. Include one-line diagrams, wire counts, coverage patterns, and physical dimensions of each item.
4. Provide location plan showing all motor locations, switch locations and control zones as per the performance requirements of the Specifications. All switches, sensors and other control accessories must clearly be shown and called out in a bill of materials.
5. Provide location plan showing all manual shade control locations. Cross-reference furniture plans for optimal positioning of chains.
6. Provide elevation Drawings showing shade band layout. Indicate any necessary seam or batten locations and align with horizontal mullions where possible.

E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements.
7. Shadecloth Sample: Mark face of material to indicate interior faces.
   a. Test reports indicating compliance with specified fabric properties.
   b. Verification Samples: 6 inches (150 mm) square, representing actual materials, color and pattern.

G. Warranty: Provide manufacturer's warranty documents as specified in this Section.

1.6 QUALITY ASSURANCE

A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to Authorities Having Jurisdiction.

B. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.

C. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
1. Requirements for Roller Shade Installer/Subcontractor:
   a. Roller Shade Hardware, shade fabric, motor, and all related controls shall be furnished and installed as a complete two-way communicating system and assembly.
   b. Roller Shade Installer/Subcontractor shall list all components and systems included in their bid, including but not limited to, the prime manufacturer of the motor control and automated equipment and shall be financially responsible for any change orders and/or back charges required by the BMS, AV, or Lighting Control Systems contractors to interface with the motorized roller shade system.

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D. Product Listing Organization Qualifications: Organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to Authorities Having Jurisdiction.

E. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

F. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to Authorities Having Jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

G. Requirements for Electronic Hardware, Controls, and Switches: Roller shade hardware, shade fabric, EDU (Electronic Drive Unit), and all related controls shall be furnished and installed as a complete two-way communicating system and assembly.

H. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC9644 and ATCC9645, and E2180.

I. ShadeCloth Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.

J. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified. Initial submittals, which do not include the Environmental Certification will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.

K. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

L. Recycling Characteristics: Provide documentation that the shade cloth can, and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.

M. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

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N. Turn-Key Single-Source Responsibility for Wiring Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of Electrical Drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the Contractor ("GC"), not roller shade installer/dealer (Window Coverings Subcontractor or "WC"), in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:

1. GC shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the Mechanical and Electrical Drawings.
2. GC shall coordinate with requirements of WC, before inaccessible areas are constructed.
3. GC shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by WC.
4. GC shall provide and run all line voltage (from the terminating points) to the motor controllers. WC shall wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit (provided by Electrical Subcontractor), as required by the Electrical Code Having Jurisdiction.
5. GC shall provide conduit with pull wire in all areas, which might not be accessible to Roller Shade Subcontractor due to building design, equipment location or schedule.
6. GC shall provide wiring and labor cost difference between power requirements for AC and DC motor options in overall cost comparison of AC and DC motorized shades.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in Window Treatment Schedule.

B. Store and handle products per manufacturer's recommendations.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Power and control wiring shall be complete and certified, fully operational with uninterrupted communication on the lines and minimal noise certified by a commissioning agent specified in other sections.

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1. 485, ICON, Lonmark and Dry Contract Network: Noise on the line not to exceed shade manufacturer's limits.

1.9 WARRANTY

A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating, transferrable warranty for interior shading.
   1. Shade Hardware – **Ten (10) years** unless otherwise indicated:
      a. Mecho/5 and Mecho/5x with EcoVeil, Chelsea or 0800 Distinctive; or approved equal, shade fabric: **Twenty-five (25) years**.
      b. ElectroShade with EcoVeil, Chelsea or 0800 Distinctive; or approved equal, shade fabric: **Twenty-five (25) years**.
   2. All Mecho Shadecloth: Manufacturer's standard **twenty-five (25) year** warranty.
   3. Roller Shade Motors, Motor Control Systems, and Accessories: Manufacturer's standard non-depreciating **ten (10) year** warranty for AC motors and controls and **ten (10) year** warranty for DC motors, power panels and controls.
   4. Roller Shade Installation: Special Warranty **Two (2) year** from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed Owner's responsibility.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer for Window Shade Control System as basis of design, performance and warranty: Mecho; or approved equal.

B. Requests for substitutions will be considered after project award in accordance with provisions of AIA A232 and Section 00800.

2.2 APPLICATIONS/SCOPE

A. Roller Shade Schedule:
   1. **Shade Type 1**: Motor operating room darkening opaque single roller shades and related motor control systems, mounting systems (4124 Recessed Pocket) and accessories as indicated on Drawings.
   2. **Shade Type 2**: Manual operating, chain drive, sunscreen roller and room darkening opaque double roller shades and related mounting systems (Wall-Mounted) and accessories as indicated on Drawings.
   3. **Shade Type 3**: Manual operating, chain drive, sunscreen roller and room darkening opaque double roller shades and related mounting systems (Jamb-Mounted) and accessories as indicated on Drawings.
   4. **Shade Type 4**: Motor operating skylight shades and related motor control systems, mounting systems and accessories as indicated on Drawings. Install location to be coordinated to meet local fire safety code for sprinkler quantities and locations.
   5. **Shade Type 5**: Motor operating room darkening opaque single roller shades and related motor control systems, mounting systems (Wall-Mounted) and accessories as indicated on Drawings.

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6. **ADA Compliance**: All spaces requiring full ADA compliance to be motorized with an accessible wall switch.
7. **CPSC Compliance**: All manually operated window coverings with accessible cords, chains, continuous loop cords, etc. shall meet all current Federally mandated CPSC (Consumer Products Safety Commission) safety standards at time of manufacturing. Depending on the product type, additional hardware components may be required and added to meet new regulatory compliant anti-ligature requirements.
8. **WCMA Compliance**: Chain tensioning device complying with ANSI/WCMA A100.1-2022 manufacuted on every manual roller shade.

2.3 ROLLER SHADES, MANUAL OPERATION AND ACCESSORIES

A. Shade System; General:
   1. Components capable of being removed or adjusted without removing mounted shade brackets, or cassette support channel.
   2. Smoothly operation raising or lowering shades.
   3. Cradle-to-Cradle certified and listed in C2C (DIR).
   4. Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.

B. Basis of Design: **WT-2, WT-3** Mecho/5 System as manufactured by Mecho; or approved equal.
   1. Description: Manually operated fabric window shades.
      a. Shade Type: Double Roller.
      b. Universal drive capability to offset drive chain for reverse or regular roll shades.
      c. Drop Position: Regular roll.
      d. Mounting: **WT-2** Wall Mounted.
      e. Mounting: **WT-3** Window Jamb Mounting.
      f. Size: As indicated on Drawings.
      g. Fabric: As indicated under Shade Fabric article.
   2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
      a. Material: Steel, 1/8 inch (3 mm) thick.
      b. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
         1) Light-Filtering Fabric: Room-side of opening.
         2) Room-Darkening Fabric: Glass-side of opening.
         3) Operating chain pulls for both fabrics configured for the same side of the window.
   3. Roller Tubes:
      a. Material: Extruded aluminum.
      b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.

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c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.

4. Hembars: Designed to maintain bottom of shade straight and flat.
   a. Style: 0270 Chelsea; or approved equal - Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
   b. Style: 0800 Distinctive Skylight/1350 EcoVeil; or approvd equal - Exposed aluminum bottom bar with matching finials.
      1) Profile: Rectangular.
      2) Color: To be selected by Architect from manufacturer's standard color selection.
5. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
   a. Heavy-duty, 1/8″ steel mounting bracket and integrated steel brake, clutch and sprocket assembly rigidly affix the shade support and user control to the building structure fully independent of the roller tube components.
   b. Permanently lubricated maintenance-free brake assembly employs an oil-impregnated steel hub with wrapped spring clutch.
   c. Brake must withstand minimum pull force of 50 pounds (22.7 kg) in the stopped position.
   d. Direct drive clutch requires no interstitial gear stages or plastic parts between the building structure and clutch ensuring reliable operation across the full range of shade sizes.
   e. Maximum shade hanging weight of 18 pounds (8.2 kg).
6. Drive Chain: Continuous loop stainless steel beaded ball chain, 100 pound (45 kg) minimum breaking strength. Provide upper and lower limit stops.
   a. Chain Tensioner: Chain tensioning device complying with ANSI/WCMA A100.1-2022.
   b. Limit stops: Bead stops affixed to the chain maintain consistent shadeband alignment at the top and bottom of shade travel across multiple shades, and help prevent shade damage resulting from unmanaged user control.
7. Accessories:
   a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
      1) Finish: TBD.
      2) Can be installed across two or more shade bands in one piece.
      3) Single Fascia: Accommodate regular roll shades.
      4) Profile: Square.

2.4 ROLLER SHADES, MOTORIZED OPERATION AND ACCESSORIES

A. Shade System; General:
   1. Motorized Shades: Comply with NFPA 70.
   2. Components capable of being removed or adjusted without removing mounted shade brackets or cassette support channel.

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3. Operates smoothly when raising or lowering shades.
4. Cradle-to-Cradle certified and listed in C2C (DIR).
5. Electrical Components: Listed, classified, and labeled as suitable for intended purpose. Test as total system. Individual component testing is acceptable.
    a. Components: FCC compliant where applicable.

B. Basis of Design: ElectroShade with WhisperShade IQ2 EDU. As manufactured by MechoShade Systems LLC; or approved equal. Motor operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
1. Voltage: 120 VAC
2. Description: **WT-1/WT-5** Single roller.
3. Drop Position: Regular roll.
4. Mounting: Ceiling mounted.
5. Mounting: **WT-1** Recess mounted in ceiling pocket.
6. Mounting: **WT-4/WT-5** Wall mounted.
7. Size: As indicated on Drawings.
8. Fabric: As indicated under Shade Fabric article.
9. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
    a. Material: Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade. Plastic components without use of steel angle construction do not meet the intent of this Specification and shall not be accepted. Styrene based plastics, and /or polyester, or reinforced polyester shall not be accepted.
    b. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
    c. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer's design criteria).
    d. All bands within a single motor group shall be aligned within ¼ inch.
    e. Multiple Shade Operation: Provide hardware as necessary to operate more than one shade using a single motor.
10. Roller Tubes:
    a. Material: Extruded aluminum.
    b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
    c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
11. Hembars: Designed to maintain bottom of shade straight and flat.

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a. Style: Chelsea 0270; or approved equal - Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
b. Style: 0800; or approved equal, Distinctive - Exposed aluminum bottom bar with matching finials.
1) Profile: Rectangular.
2) Color: To be selected from manufacturer's standard color selection.

12. Accessories:
a. Fascia: **WT-4/WT-5** Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
1) Finish: TBD.
2) Capable of installation across two or more shade bands in one piece.
3) Profile: Square.
b. Ceiling Pockets: **WT-1** Premanufactured metal shade pocket with removable closure panel, for recess mounting in acoustical tile or drywall ceilings; size and configuration as indicated on Drawings.
a) Removable closure panel.
b) 7/8" ceiling tile support.
c) Use 2" closure assembly by Mecho; or 2" ceiling tile receiver by others in lieu of 7/8" ceiling tile support; or approved equal, where applicable by code (i.e.: projects in seismic zones).

2.5 INTELLIGENT ENCODED ELECTRONIC DRIVE SYSTEM

A. Electronic Drive Unit (EDU) System General Requirements:
1. A UL 325 listed solution.
a. Component certification in lieu of system testing is not acceptable.
2. Listing Label and Motor Rating: To be visible for inspection without dismounting of shade assembly to remove motor or EDU from shade roller tube.
3. Size and Configuration: As recommended by manufacturer for type, size, and arrangement of shades.
4. Conceal EDU inside shade roller tube.
5. EDU Rated Speed: The same nominal speed for shades in the same room.
6. Hanging Weight of Shade Band: 80 percent of rated lifting capacity of shade EDU and tube assembly.
7. Capable of upgrading firmware from anywhere on network without touching the motor.

B. Line Voltage EDU (120 VAC):
1. Basis of Design: MechoShade Systems LLC; WhisperShadeIQ2+ System; or approved equal. Tubular, asynchronous, integral AC motor and reversible capacitor. 120 VAC, single phase, 60 Hz; temperature Class B, thermally-protected, totally enclosed, maintenance-free. Powered by line voltage power supply connection equipped with locking disconnect plug assembly furnished with EDU.
2. Audible Noise: 46 dBA measured 3 ft (914 mm) from motor unit, depending on motor torque.
3. Nominal Speed: 34 RPM. Not to vary due to load/lift capacity.

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4. Isolated, low voltage power supply for powering external accessories connected to either the dry contact or network port.
    a. Products requiring accessories to be powered by a plug-in or externally-supplied power supply are not acceptable.

C. Modes of Operation:
1. Uniform Mode: Shades move to defined intermediate stop positions in order to maintain aesthetic uniformity.
2. Normal Mode: Shades move to defined intermediate stop positions and any position between defined upper and lower limits.
3. Maintenance Mode: Prevents shade from moving via dry contact or network control commands mode has been cleared/disabled.

D. Control Methods: Local isolated dry contact input and network control.
1. Local Isolated Dry Contact Inputs:
    a. Local switch control, third party system integration without separate interface.
    b. Moving EDU/shade to upper and lower limits and local switch preset positions.
    c. Configuration of upper and lower limits, custom presets, and key modes of operation without a PC or microprocessor-based tools.
    d. Configuration under protected sequences to prevent changes by casual user.
    e. Switch Personalities: Configuration of dry contact control port over network such that any type of dry contact keypad/third-party interface and actuation methodology (maintained and/or momentary actuation) can be used to operate shade.
    f. Dry Contact Control Connection Options to Include:
        1) One-button.
        2) Two-button.
        3) Three-button. Able to support configuring limits, presets, and key operating modes (default).
        4) Three-button. No configuration capability to prevent accidental changes in settings.
2. Network Control:
    a. Bi-directional network communication to enable commanding operation of large groups of shades over a common backbone.
    b. Each EDU:
        1) Support eight network addresses capable of being employed for various levels of group control.
        2) Dry Contact Ports: Assigned its own local switch address which can be matched by other EDU's within eight network addresses in order to support group control when dry contact commands are received.
            a) The EDU receiving dry contact commands may or may not be configured to operate based on commands coming through its own dry contact input port.
        3) To have an independent unique identifier address (UID) enabling EDU to be independently controlled and configured over network via handheld configurator and/or PC controller.

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c. Network Communication Card: Integral with tubular EDU assembly.
d. Support configuration of upper and lower limits using either a handheld removable program module/configurator or a local switch.
e. Support configuration of addresses using a handheld removable program module/configurator.

E. Alignment Positions:
1. Repeatable and precisely aligned shade positions and limits.
a. Support positioning commands from 0 to 100 percent in 1 percent increments.
b. Customizable Presets: 32.
c. Include three intermediate dry contact presets
2. Shades on same switch circuit or same network group address with same opening height, to align at each intermediate stopping position when traveling from any position, up or down.
3. Shades of differing heights: Capable of custom, aligned intermediate stop positions when traveling from any position, up or down.
4. Alignment of shade bands mechanically aligned on same EDU: Plus or minus 0.125 inch (3 mm).
5. Alignment of standard shades on adjacent EDU's: Plus or minus 0.25 inch (6 mm) when commanded to same alignment position.

F. Local Switch Presets:
1. Minimum of three customizable preset positions accessible over the local dry contact control inputs and over the network connection.
2. Preset positions: Customizable to any position between and including defined upper and lower limits (initially defaults to 25, 50, and 75 percent of shade travel).
3. Configuration of Custom Preset Positions: A handheld removable program module/configurator or a local switch.

G. Network Presets:
1. Minimum of 32 customizable preset positions (including the three local switch presets) accessible via network commands.
2. Preset positions: Customizable to any position between and including defined upper and lower limits (initially defaults to defined lower limit).
3. Configuration of Custom Preset Positions: A handheld removable program module/configurator or a local switch.

2.6 MOTOR CONTROLS, INTERFACES, AND ACCESSORIES

A. Unless indicated to be excluded, provide required equipment as necessary for a complete operating system providing the control intent specified. Provide components and connections necessary to interface with other systems as indicated.

B. Digital Network Controls:
1. Basis of Design: MechoShade Systems LLC; MechoNet; or approved equal. Low-voltage network utilizes standard Category 5/6 UTP cable; maximum of 4,000 feet (1,219 m), 250 nodes.
2. Reprogram control without requiring wiring modifications.

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3. Ten-year non-volatile power failure memory for system configuration settings.
4. Network Interface Components:
    a. IQ2 Dual Splitter; or approved equal: Two motor/EDU ports; two switch ports.

C. Low-Voltage Wall Controls; IQ Switch; or approved equal:
1. Momentary dry contact switch enables manual local control or network control of any individual shade motor or shade group/sub-group on MechoNet network; or approved equal.
2. Control Functions:
    a. Open: Automatically open controlled shades to fully open position when button is pressed.
    b. Close: Automatically close controlled shades to fully closed position when button is pressed.
    c. Presets: For selection of predetermined shade positions.
    d. Dual Stations: For individual control of two shades/groups.
3. Finish: White.
4. Single Station: 5-button (open, close, and three intermediate stop positions).
5. Double Station: Provide 10-button switching for Vocal Music 58, one column for each elevation in room (open, close, and three intermediate stop positions for each of two shades/groups).

2.7 ROLLER SHADE FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
1. Vertical Dimensions: Fill Opening from Head to Sill: 1/2 inch (13 mm) space between bottom bar and window sill.
2. Horizontal Dimensions: Outside mounting.
    a. Cover window frames, trim, and casings completely.

C. Openings Requiring Continuous Multiple Shade Units with Separate Rollers: Locate roller joints at window mullion centers; butt rollers end-to-end.

2.8 SHADE FABRIC

A. Basis of Design: Shade fabric as manufactured by MechoShade Systems LLC; or approved equal.
1. Solar Shadecloths:
    a. Fabric: EcoVeil: Solar Fabric - 1350 series; or approved equal. TPO Cradle to Cradle Certified, fabric, non-PVC, 1 X 1, basket-weave pattern at 5 percent open, also 126 inches (3200 mm) wide.
        1) Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
        2) Health Product Declaration (HPD): Published declaration with full disclosure of known hazards.
        3) Cradle to Cradle Material Health Certificate:
            a) Achievement Level: Bronze.

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4) Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.

b. Color: Selected from manufacturer's standard colors.

2. Blackout Shadecloths:
   a. Fabric: **WT-4** Distinctive Blackout: 0800 series; or approved equal. Opaque.
      1) Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
      2) Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.
   b. Fabric: Chelsea: 0270 series; or approved equal. Opaque. Solid white-colored backing.
      1) Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
      2) Health Product Declaration (HPD): Published declaration with full disclosure of known hazards.
      3) Cradle to Cradle Material Health Certificate:
         a) Achievement Level: Silver.
      4) Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.
   c. Color: Selected from manufacturer's standard colors.
3. Performance Requirements:
   a. Flammability per NFPA 701: Pass. Large or small scale test.
   b. Fungal Resistance: No growth when tested per ASTM G21.
   c. Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.
4. Fabrication:
   a. Battens: Manufacturer's standard material, full width of shade, and enclosed in welded shade fabric pocket; locate as indicated on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect and Construction Manager of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

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3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

C. Coordinate with window installation and placement of concealed blocking to support shades.

3.3 SYSTEM STARTUP

A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

B. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: Design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified is to be performed by a single manufacturer and their authorized installer/dealer.

1. The Architect will not provide a set of Electrical Drawings for installation of control wiring for motors, or motor controllers of motorized roller shades.
2. Contractor (GC) To Provide the Following:
    a. Power Panels and Circuits: Size to accommodate roller shade manufacturer's requirements, as indicated on Mechanical and Electrical Drawings.
    b. Coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
    c. Line voltage as dedicated home runs, of sufficient quantity, and capacity as required. Terminate in junction boxes at locations designated by roller shade installer/dealer.
    d. Run line voltage from terminating points to motor controllers. Wire roller shade motors to motor controllers.
        1) Above-ceiling and concealed wiring to be plenum-rated, or in conduit, as required by the Electrical Code Having Jurisdiction.
    e. Use conduit with pull wire in areas, not accessible to Roller Shade Subcontractor due to building design, equipment location or schedule.
    f. Verify that wiring conditions, which have been previously installed under other sections or at a previous time, are acceptable for product installation in accordance with manufacturer’s instructions.
    g. Comply with manufacturer’s current product data, including shop drawings, technical bulletins, product catalog installation instructions, and product carton instructions for installation.
    h. Protect installed product and finished surfaces from damage during all phases of installation including preparation, testing, and cleanup.
    i. Be responsible for all other required electrical work including but not limited to roof penetrations, conduits, fireproofing, etc.
    j. Provide conduit with pull wire in all areas, which might not be accessible to subcontractor due to building design, equipment location or schedule.
3. Window Covering Subcontractor (WC) responsibilities:

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a. Shade Control Subcontractor shall furnish, install and fully program shade controllers, interfaces, splitters, coupler, sensors, switches, etc. mounted on the wall, in the ceiling, in shade pocket, etc. Locations for all visible devices to be coordinated with Architect. The Shade Control Subcontractor shall inspect all material included in this Contract prior to installation. Manufacturer shall be notified of unacceptable material prior to installation.
b. Run low voltage control wiring from motor controllers to switch/control locations designated by Architect.

3.4 INSTALLATION

A. Subcontractor Furnish and Install Responsibilities:
1. Window Covering Subcontractor (WC) shall provide an on-site, Project Manager, and shall be present for all related jobsite scheduling meetings.
2. WC shall supervise the roller shade installation, and setting of intermediate stops of all shades to assure the alignment of the shade bands within a single EDU group, which shall not exceed +/- 0.125 inches (3.175mm), and to assure the alignment between shade groups, which shall not exceed +/- 0.25" inches (6.35mm).
3. WC shall be responsible for field inspection on an area-by- area and floor-by-floor basis during construction to confirm proper mounting conditions per approved shop drawings.
4. Verification of Conditions: examine the areas to receive the work and the conditions under which the work would be performed and notify Contractor, Construction Manager, Architect and Owner of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of installation shall constitute acceptance of substrate conditions by the installer.
5. WC shall provide accurate to 0.0625" inch (1.5875mm); field measurements for custom shade fabrication on the Roller Shades manufacturers input forms.
6. WC Installer shall install roller shades level, plumb, square, and true according to manufacturer's written instructions, and as specified here in. Blocking for roller shades furnished and installed under the Contract of the Contractor shall be installed plumb, level, and fitted to window mullion as per Architect's Bid Documents and in accordance with industry standard tolerances. The horizontal surface of the shade pocket shall not be out-of-level more than 0.625" (15.875mm) over 20 linear feet (6.096 meters)
7. Shades shall be located so the shade band is not closer than 2 inches (50 mm) to the interior face of the glass. Allow proper clearances for window operation hardware.
8. Adjust, align and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
9. Installer shall set Upper, Lower and up to 3 intermediate stop positions of all motorized shade bands, and assure alignment in accordance with the above requirements.
10. WC shall certify the operation of all motorized shades and turn over each floor for preliminary acceptance.
11. The WC shall participate and cooperate with the electrical, low voltage and commissioning agent to verify and certify the installation is in full conformance with

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the Specifications and is fully operational. This work to occur during the commissioning stage and is in addition to preliminary acceptance required for each floor.

12. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
13. WC shall train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.
    a. Use operation and maintenance manual as a reference, supplemented with additional training materials as required.

3.5 PROTECTION AND CLEANING

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.
   1. Clean soiled shades and exposed components as recommended by manufacturer.
   2. Replace shades that cannot be cleaned to "like new" condition.

3.6 MAINTENANCE

A. Provide Owner a proposal for a separate renewable maintenance Contract for service and maintenance of motorized shade system.
   1. Include a complete description of preventive maintenance, systematic examination, adjustment, parts and labor, cleaning, and testing, with a detailed schedule.
      a. Contract Duration: One year from date of Substantial Completion.

END OF SECTION 12495

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PART 3 – STRUCTURAL & MISCELLANEOUS STEEL WORK

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1. 1 SUMMARY

A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, 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" as modified here and as otherwise shown on drawings.

1. Section 2.1 to include “Lintels shown or otherwise enumerated or scheduled.”
2. Section 4.4, The first two sentences of this section are to be replaced with the following, “Shop drawings are to be made by the fabricator, prints thereof are to be submitted to the structural engineer and architect for their examination and approval. These shop drawings are to be submitted in minimum of the following three phases: Anchor bolt plans and advanced shipment pieces; Erection plans and thirdly; Piece details (maximum of 100 sheets per submission). The fabricator is to await the receipt of the previous phase prior to submission of the next phase. The fabricator is to include an allowance of fourteen (14) calendar days in his schedule for the review of these drawings by the structural engineer for the return of shop drawings. These calendar days start from the time the drawings are received by the engineer.”

C. Miscellaneous Metal Fabricators are specified elsewhere in Division 5.

D. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.

E. 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.

F. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

1. 2 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.

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. 3 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

B. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.

C. AISC "Specifications for Architecturally Exposed Structural Steel".

D. 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.

E. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".

F. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

G. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

1. If recertification of welders is required, retesting will be Contractor's responsibility.

1. 4 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 cast-in-place concrete or 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. Other Structural Steel Shapes, Plates and Bars: ASTM A 36.

D. Cold-Formed Steel Tubing: ASTM A 500, Grade C.

E. Anchor Bolts: ASTM F 1554, Grade 36, nonheaded type unless otherwise indicated.

F. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts and hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
2. Direct tension indicator washers may be used at Contractor's option.

G. Electrodes for Welding: Comply with AWS Code.

H. Structural Steel Primer Paint: SSPC-PS Guide 7.00

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 or bolt shop connections, as indicated.

E. Bolt field connections, except where welded connections or other connections are indicated.

1. Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.

F. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

G. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds and methods used in correcting welding work.

H. 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.

I. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

J. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

K. Field drill holes in existing steel members for connection of new steel as noted on the drawings.

2. 3 SHOP PAINTING

A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar or to receive fire-proofing. 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. 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 concrete and 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. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

D. 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.

E. Level and plumb individual members of structure within specified AISC tolerances.

F. Splice members only where indicated and accepted on shop drawings.

G. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

H. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.

I. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only as acceptable to Architect.

K. Touch-Up Painting: Immediately after erection,,clean field welds, bolted connections and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

L. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3. 2 QUALITY CONTROL

A. Owner to engage an independent testing and inspection agency to inspect high-strength bolted connections and 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 noncompliance of original work, and as may be necessary to show compliance of corrected work.

F. Shop Bolted Connections: Inspect or test in accordance with AISC specifications.

G. 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.

H. Field Bolted Connections: Inspect in accordance with AISC specifications.

I. 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.

J. Testing agency shall confirm that the structure is square, plumb and level in accordance with AISC tolerances.

K. In addition to visual inspection, field-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

1. Liquid Penetration Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
4. Ultrasonic Inspection: ASTM E 164.

3.3 STEEL ALLOWANCE

A. Provide and include in this bid a lump sum of $12,000 (2 tons of steel @ $6,000. 00 per ton) of fabricated and erected steel. This steel shall be provided at any time until final acceptance of this contract by the Architect. This steel may consist of W. F. Sections, angles, frames or various miscellaneous steel. Include shop drawings, fabrication and erection in this item.

1. Upon completion of the project, any of the allowance work not used shall be credited to the Owner against the contract price at the rate of three dollars ($3.00) per pound.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SCOPE

A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

B. The extent of steel joists is shown on the drawings, including basic layout and type of joists required.

1.2 QUALITY ASSURANCE

A. Provide joists fabricated in compliance with the following, and as herein specified.

1. AISC-SJI "Standard Specifications and Load Tables" for:

a. K-Series Open Web Steel Joists
b. LH-Series Steel Joists

B. Steel joist manufacturer shall be an approved member of the Steel Joist Institute for the types of joists supplied.

C. Qualification of Welding Work:

1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure".
2. Joists welded in place are subject to inspection and testing. Expense of removing and replacing any portion of the steel joists for testing purposes will be borne by the Owner if welds are found to be satisfactory. Remove and replace any work found to be defective and provide new acceptable work.

D. Workmanship:

1. Steel Inspection and Testing Service: Employ, at Contractor's expense, a testing laboratory acceptable to the Architect to inspect welded connections and to perform tests and submit inspection and test reports to the Architect.

1.3 SUBMITTALS

A. Manufacturer's Data, Steel Joists:

1. Submit two (2) copies of manufacturer's specifications and installation instructions for each type of joist and its accessories. Include manufacturer's certification that joists comply with AISC-SJI "Specifications".

B. Shop Drawings, Steel Joists:

1. Submit detailed drawings showing layout of joist units, special connections, jointing and accessories. Include the mark, number, type, location and spacing of joists and bridging.

Provide templates or location drawings for installation of anchor bolts.

C. Delivery, Storage and Handling:

1. Deliver, store and handle steel joists as recommended in AISC-SJI "Specifications". Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with AISC-SJI "Specifications".

B. Steel Prime Paint: Comply with SJI "Specifications".

2.2 FABRICATION

A. General: Fabricate steel joists in accordance with AISC-SJI "Specifications".

B. Extended Ends: Provide extended ends on joists where shown, complying with the manufacturer's standards and requirements of applicable AISC-SJI "Specifications" and load tables.

C. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support the ceiling construction. Extend ends to within 1/2" of the finished wall surface unless otherwise indicated.

D. Bridging: Provide horizontal or diagonal type bridging for "open web" joists, complying with AISC-SJI "Specifications". Provide bridging anchors for ends of all bridging lines terminating at walls or beams.

E. End Anchorage: Provide end anchorages to secure joists to adjacent construction, complying with AISC-SJI "Specifications", unless otherwise indicated.

F. Header Units: Provide header units to support tail joists at openings not framed with steel shapes.

G. Shop Painting: Shop paint all steel joist work, except contact surfaces which are to be welded or high-strength bolted.

H. Surface Preparation: After inspection and before shipping, clean steelwork to be painted complying with SJI "Specifications" unless otherwise indicated.

I. Application: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of 1.5 mils. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART 3 - EXECUTION

3.1 ERECTION

A. Place and secure steel joists in accordance with AISC-SJI "Specifications", final shop drawings and as herein specified.

B. Furnish anchor bolts and other devices to be built into the concrete and masonry construction. Furnish templates for the accurate location of anchors in other work.

1. Furnish unfinished threaded fasteners for anchor bolts, unless otherwise indicated.
2. Refer to Division 3 sections for installation of anchors set in concrete.
3. Refer to Division 4 sections for installation of anchors set in masonry.

C. Placing Joists:

1. Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.
2. Provide temporary bridging, connections and anchors to ensure lateral stability during construction. Where "open web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.

D. Bridging: Install bridging simultaneously with joist erection, before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

E. Fastening Joists: Field weld or high-strength bolt joists to supporting steel framework in accordance with AISC-SJI "Specifications" and as shown on drawings for the type of joists used. Coordinate welding sequence and procedure with the placing of joists.

F. Touch-Up Painting: After joist installation, paint all field bolt heads and nuts, and welded areas, abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before painting. Use the same type of paint as used for shop painting.

3.2 FIELD QUALITY CONTROLS

A. The testing agency shall conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations therefrom.

1. Provide access for the testing agency to places where steel joist work is being fabricated or produced so that required inspection and testing can be accomplished.
2. The testing agency may inspect steel joist work at the plant before shipment; however, the Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

B. Inspection of Shop Painting:

1. Visually evaluate surface preparation by comparison with pictorial standards in accordance with SSPC-Vis 1.
2. Measure dry film thickness with a magnetic film thickness gage in accordance with SSPC-PA 2.

3. Visually inspect dried film for runs,sags, dry spray, overspray and missed areas.

C. Correct deficiencies in steel joist 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 the original work, and as may be necessary to show compliance of corrected work.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1. 1 SUMMARY

A. Extent of metal decking is indicated on drawings, including basic layout and type of deck units required.

1. 2 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.

B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.

C. Provide acoustical inserts for metal deck for installation by others.

1. 3 QUALITY ASSURANCE

A. Code and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated or specified:

1. AISI "Specification for the Design of Cold-Formed Steel Structural Members".
2. AWS D1.3 "Structural Welding Code - Sheet Steel".
3. SDI "Design Manual for Floor Decks and Roof Decks"

B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1.

C. Welded decking in place is subject to inspection and testing. Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

PART 2 - PRODUCTS

2. 1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following.

1. Metal Roof Deck Units:
    a. Roof Deck, Inc.
    b. Canam-United Steel Deck
    c. New Millennium Building Systems
    d. Nucor-Vulcraft Group
    e. Epic Metal Inc.
    f. Or approved equal.

2. Composite Metal Floor Deck Units:
   a. Canam-United Steel Deck
   b. New Millennium Building Systems
   c. Nucor-Vulcraft Group
   d. Or approved equal.

2. 2 MATERIALS

A. Steel for Galvanized Metal Deck Units: ASTM A 653, Grade 33 or higher – Roof Decking; ASTM A 652, Grade 40 or higher – Floor Decking.

B. Steel for Painted Metal Deck Units: ASTM A 1008, Grade 33 or higher – Roof Decking; ASTM A 652, Grade 40 or higher – Floor Decking

C. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

D. Galvanizing: ASTM A 653, G60.

E. Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces complying with Military Specifications MIL-P-21035 (Ships).

F. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

2. 3 FABRICATION

A. General: Form deck units in lengths to be continuous over three (3) or more spans, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated.

B. Roof Deck Units: Provide deck configurations complying with SDI "Roof Deck Specifications" of metal thickness, depth and width as shown.

C. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045" min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

D. Roof Sump Pans: Fabricate from single pieces of .071" min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

PART 3 - EXECUTION

3. 1 INSTALLATION

A. General: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.

B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

C. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

D. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.

F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

G. Fastening Deck Units:

1. Fasten roof deck units to steel supporting members by not less than 5/8" diameter fusion welds or elongated welds of equal strength, spaced not more than 12" o.c. In addition, secure deck to each supporting member in ribs where side laps occur.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds and methods used in correcting welding work.

I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

J. Mechanically fasten side laps of adjacent deck units between supports, at intervals not exceeding 36" o.c. using self-tapping No. 10 or larger machine screws, unless a closer spacing or a larger screw is called for on the drawing.

K. Uplift Loading: Install and anchor roof deck units to resist gross uplift of 45 lbs. per sq. ft. at eave overhang, building corners and perimeter, and 30 lbs. per sq. ft. for other roof areas.

L. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.

M. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.

N. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" o.c. with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size indicated.

O. Edge Finish Strips: Provide metal finish strips at edges of roof decking, parallel to flutes. Weld into position to provide a complete deck installation.

P. Touch-Up Painting: After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.

1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
2. Touch-up painted surface with same type of shop paint used on adjacent surfaces.

Q. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

R. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas and rust spots, as required after erection and before proceeding with field painting, is included in Division 9 under Painting.

3. 2 QUALITY CONTROL

A. The owner shall employ a testing laboratory satisfactory to the Architect to perform the following tests and to submit testing and inspection reports.

1. Welding: Inspect welding to determine if welds are at proper locations, are proper size and material, and meet AWS standards.
2. Sidelap Connections: Inspect sidelap connections to determine if the connections are in accordance with contract documents.
3. Shear Connectors: All shear connectors shall be visually inspected and tapped with a hammer. All/ any studs which do not appear to have a sound weld or which produce a dull sound rather than a ringing sound when tapped shall be further tested as follows:

    a. The stud shall be struck with a hammer and bent approximately 15 degrees off perpendicular towards the nearest end of the beam. Studs meeting this test without coming loose shall remain on the beam. Studs failing this test shall be replaced.

END OF SECTION 053100

SECTION 05400 - MISCELLANEOUS 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 DESCRIPTION OF WORK

A. Definition: Miscellaneous structural steel includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of Structural Steel or other metal fabrication systems specified elsewhere.

B. Extent of miscellaneous structural steel fabrications is indicated on Drawings.

1. Work of this section shall include miscellaneous structural steel framing and supports for wall and roof openings whether or not shown on Structural Drawings.
    a. Refer to Architectural, Mechanical and Electrical Drawings for the following:
        1) Locations and sizes of roof penetrations, roof top supported mechanical and electrical equipment, roof drains, ducts, piping, raceways, etc.
        2) Locations and sizes of wall penetrations, wall chases, louvers, duct penetrations, etc.
        3) Locations and sizes of floor penetrations; ducts, piping, raceways, etc.
        4) Locations of all steel handrails, railings and guardrails.
    b. All miscellaneous structural steel supports shall be in accordance with typical structural steel details and schedules shown on Structural Steel Drawings and/or as directed by the Architect.
    c. All miscellaneous structural steel supports shall meet indicated load requirements and/or as directed by the Architect.
    d. In existing building where alteration and/or renovation Work is indicated, refer to Division 1 Sections for miscellaneous structural steel framing and supports which may be assigned to be provided and installed by Subcontractor(s).

C. Type of Work in this section includes metal fabrications for:

1. Loose Steel lintels, bearing and leveling plates and miscellaneous steel framing and supports.

2. Steel guardrails.

D. Related Sections:

1. Section 01400 - Testing Laboratory Service
2. Section 04200 - Unit Masonry
3. Section 05120 - Structural Steel
4. Section 05210 - Steel Joists
5. Section 05300 - Metal Decking
6. Section 05500 - Metal Fabrications
7. Section 07800 - Roof Specialties and Accessories

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8. Section 09900 - Painting
9. Division 15 - Mechanical Work

1.3 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrications might delay Work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Delegated Design:

1. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Bid Documents, provide products and systems complying with specific performance and design criteria indicated. Designated Design includes, but is not limited to:
   a. Miscellaneous steel framing, metal framing, hangers, columns, clips, brackets, bearing plates and other components.
   b. Handrails, guardrails, brackets, bearing plates and other components.

2. Professional Engineer Qualifications: A professional engineer legally authorized to practice in the jurisdiction where the Project is located, (State of New Jersey), and experienced in providing engineering services of the kind indicated that have resulted in the installation of structural assemblies, similar to this Project in material, design, and extent and that has a record of successful in-service performance. Provide analysis data and signed & sealed documents.

3. Conform to all applicable State and Local Codes for design loads and all other requirements.

4. Refer to paragraph 1.4 - SUBMITTALS (below).

D. Regulatory Requirements: Products and finished installations to be used by persons with disabilities must comply with requirements of the Uniform Construction Code, American National Standard, Accessible and Usable Buildings and Facilities, ICC/2021, NJ ed., / ANSI A117.1-2017.

E. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's Specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous steel fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

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1. Submit shop drawings for miscellaneous steel framing and supports. Signed and sealed shop drawings shall be submitted by a qualified professional Structural Engineer, licenced in the state where the project is located.

C. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.

D. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of miscellaneous structural steel Work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

B. Steel

1. Steel Plates, Shapes and Bars: ASTM A36.

2. Steel Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.

3. Structural Steel Sheet: Hot-rolled, ASTM A570; or cold-rolled ASTM A611, Class 1; of grade required for design loading.

4. Galvanized Structural Steel Sheet: ASTM A446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

5. Steel Pipe: ASTM A53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

6. Gray Iron Castings: ASTM A48, Class 30.

7. Malleable Iron Castings: ASTM A47, grade as selected by fabricator

C. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

E. Grout:

1. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588, Type M.

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2. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

F. Fasteners:

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.

3. Lag Bolts: Square head type, FS FF-B-561.

4. Machine Screws: Cadmium plated steel, FS FF-S-92.

5. Wood Screws: Flat head carbon steel, FS FF-S-111.

6. Plain Washers: Round, carbon steel, FS FF-W-92.

7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

G. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

1. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

H. Paint:

1. Surface Preparation: SSPC-2P6 commercial Blast Cleaning.

2. Primer: Tnemec Series 90-97 Tneme-Zinc, or equal, @ 2.5 - 3.5 mils (dry)

3. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.

2.2 FABRICATION, GENERAL

A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of Work.

B. Form exposed Work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.

C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

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D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.

E. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

F. Galvanizing:

1. Provide a zinc coating for exterior items and those items indicated or specified to be galvanized, as follows:
   a. ASTM A 153 for galvanizing iron and steel hardware.
   b. ASTM A 123 for galvanized rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
   c. ASTM A 386 for galvanizing assembled steel products.

G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

1. The primary reason for vent and drain holes is to allow air to be evacuated from within and around the fabrication, allowing it to be completely immersed in the cleaning solutions and molten zinc and for the excess zinc and solutions to drain out and away from the part.

2. The secondary reason is that if fabrications to be galvanized are not properly vented, cleaning solutions or rinse waters trapped in overlapping or contacting surfaces flash to steam. The resulting pressure increase (up to 3600 psi [25MPa]) can rupture the fabrication. Additionally, trapped moisture that flashes to steam can result in localized uncoated surfaces.

3. Plugging Vent / Drainage Holes as manufactured by “The Steel Supply Company”, “Bruce Reichelt Enterprises”; or approved equal.
   a. The fabricator is responsible for installing the vent hole plugs.
   b. Plugs are usually aluminum or zinc vent plugs in sizes ranging from ¼” to 1-1/16" in 1/16" increments.

H. Shop Painting

1. Shop paint miscellaneous structural steel, except members or portions of members to be embedded in masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.

2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-6.

3. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.

4. Apply one shop coat to fabricated metal items, except apply two coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

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2.3 MISCELLANEOUS STRUCTURAL STEEL

A. Steel Guard Railings: Provide guardrails to comply with applicable State and Local Regulatory Requirements and in accordance with minimum requirements indicated in the Uniform Construction Code, American National standard, Accessible and Usable Buildings and Facilities, ICC/2021, Nj ed., / ANSI A117.1- 2017.

1. Structural Performances: Provide guardrails assemblies which, when installed, shall comply ASCE standards for minimum design loads for Guardrail Systems and capable of withstanding the following loads applied as indicated:
   a. To resist a load of 50 pound per linear foot applied in any direction at the top and to transfer this load through the supports to the structure.
   b. To resist a single concentrated load of 200 pounds applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this loading to the building structural assemblies. This load shall act concurrently with loads indicated in paragraph “a” above.
   c. Intermediate rails (all those except the handrail), balusters and panel fillers shall withstand a horizontally applied normal load of 50 lb. On an area not to exceed one square foot area including openings and space between rails. Reactions due to this loading are not required to be superimposed with those of paragraphs “a” and “b” above.

2. Fabricate pipe guardrails to design, dimensions, and details indicated. Provide guardrails members formed of pipe of sizes and wall thickness indicated, or if not shown, as required to support indicated design loading. Unless otherwise indicated all shown dimensions for pipes, rails and other round shapes are outside diameter.
   a. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
   b. At tee and cross intersections provide coped joints.
   c. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radiuses indicated.
   d. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
   e. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
   f. Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in masonry construction. Coordinate delivery of such items to project site.

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1. Coordinate Work of this section with other Work affected by Subcontractor(s).

2. Obtain locations, opening sizes, weighs and other required information from affected Trades.

3. Comply with coordination requirements indicated in Division 1 Sections.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors, as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set Work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into masonry or similar construction.

C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding Work.

E. Set loose lintels weighing more than 200 pounds, leveling and grouting as for plates. Deliver loose lintels weighing less than 200 pounds to the Contractor, allow sufficient time for scheduling the installation.

3.3 ROOF GUARD RAILINGS

A. Contractor shall field verify locations of all rail post roof supports before fabrication of roof guard railing to ensure matching alignment. Plumb posts in each direction. Secure posts to roof structure, as indicated on the Drawings.

3.4 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

B. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

C. For galvanize surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION 05400

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