

ISSUED FOR BID

SPECIFICATIONS

FOR THE

HADDONFIELD BOARD OF EDUCATION

CONTRACTS #14.0, #14.01, #14.02, & #14.03 –

TOILET ROOM RENOVATIONS

AT

ELIZABETH HADDON ELEMENTARY,

J. FITHIAN TATEM ELEMENTARY, AND

HADDONFIELD MEMORIAL HIGH SCHOOL

STATE PLAN #07-1900-050-21-2000

Haddonfield Board of Education
95 Grove Street
Haddonfield, New Jersey 08033

Attention: Mr. Michael Catalano
School Business Administrator

Telephone #856-429-7510 / Fax #856-429-6015
Email: mcatalano@haddonfield.k12.nj.us

LAN Job #2.20277.14

December 14, 2022

LAN
ASSOCIATES

Engineering,
Planning,
Architecture,
Surveying Inc.

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Email: mcatalano@haddonfield.k12.nj.us

**Responsible for preparation of
Divisions 01, 02, & 06 - 10**

Ronald W. Schwenke 3rd, RA
Registered Architect
NJ RA #21AI02051300

LAN Job #2.20277.14
December 14, 2022



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Email: mcatalano@haddonfield.k12.nj.us

**Responsible for preparation of
Divisions 22, 23, & 26**

Thomas Wighard, PE
Professional Engineer
NJ PE #24GE04901100

LAN Job #2.20277.14
December 14, 2022

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HADDONFIELD BOARD OF EDUCATION

REQUEST FOR BIDS

Contracts #14.0, #14.01, #14.02, & #14.03 – Toilet Room Renovations at

Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School

Bid Advertisement

The Haddonfield Board of Education of Haddonfield, New Jersey, hereby advertises for competitive bids in accordance with N.J.S.A. 18A:18A-21(a) (b) for a single overall contract in accordance with NJSA 18A:18A-18(b) (2):

Contract: #14 - Single Overall Contract for
Title of Bid: Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School

Contract: #14.01 - Single Overall Contract for
Title of Bid: Toilet Room Renovations at Elizabeth Haddon Elementary School

Contract: #14.02 - Single Overall Contract for
Title of Bid: Toilet Room Renovations at Haddonfield Memorial High School

Contract: #14.03 - Single Overall Contract for
Title of Bid: Toilet Room Renovations at J. Fithian Tatem Elementary School

Bidders shall be prequalified by the New Jersey Division Property Management and Construction in the trade categories listed below, or name such prequalified subcontractors:

<u>Trade Category #</u>	<u>Title</u>
C008 or C009	General Construction or General Construction Additions and Alterations

All necessary bid documents may be secured from the Architect, LAN Associates Engineering, Planning, Architecture, Surveying, Inc. (LAN). Bidding Documents will be transmitted through a web link provided to perspective bidder upon receipt of the request via email to the Project Manager at LAN. Email requests must reference the Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Elementary School, and Haddonfield Memorial High School, and must include Bidders Company, Company Address, Point of Contact, Telephone and Facsimile numbers, and Bidder’s email address. Contact Ronald Schwenke, Assistant Vice President of LAN via email at ron.schwenke@lanassociates.com with copy to Shannon Dennis of LAN via email at shannon.dennis@lanassociates.com.

Bidders are requested to submit in accordance with N.J.S.A. 18A: 18A – 18(b)(2) one Lump Sum Bid for all work and materials.

Bids must be sealed and delivered to the Haddonfield Board of Education Offices (Office of the School Business Administrator/Board Secretary, Michael Catalano) located at 95 Grove Street, Haddonfield, New Jersey **on or before** date and time indicated below. It is recommended that bidders send their responses

through the US Postal Service certified mail or overnight mail which provides **certification of delivery to the sender** or to hand deliver bids between 9:00 AM and 2:00 PM daily. The Board shall not be responsible for bids lost in transit, delivered to the wrong address, or otherwise not hand-delivered to the address provided. The envelope to bear the following information:

Title: **Contract #14 – Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School – General Contractor**
Name and Address of the Bidder
Date: **February 17, 2023**
Time: **11:00 a.m.**

Please note that the bid opening process will begin on the above advertised date at **11:00 a.m.** All attendees shall report to the Board of Education Offices and will be escorted to a meeting space by the Owner. Bids may also be submitted to the School Business Administrator/Board Secretary, Mr. Michael Catalano, or his designee at the bid opening meeting, prior to the advertised date and time. On the advertised date and time, the School Business Administrator shall publicly receive and open all bids and announce the names of the vendors and their prices. Bids may be viewed by interested parties on the advertised bid date and time.

No bids shall be received after the time designated in the advertisement. (N.J.S.A. 18A:18A-21(b)). The Board of Education does not accept electronic (e-mail) submission of bids.

There will be a pre-bid meeting on **Wednesday, February 1st, 2023, at 3:00 PM.** While attendance is not mandatory, all prospective bidders are strongly encouraged to attend this important meeting, which will be held at the Haddonfield Memorial High School located at 401 Kings Highway East, Haddonfield, New Jersey 08033. It is the intent of the Pre-Proposal Meeting to offer all interested bidders access to the project site following the pre-proposal meeting. Failure to attend the Pre-Bid meeting will not excuse any bid mistake and/or omission due to bidder's ignorance of information disseminated at the meeting.

Additional time sensitive dates for the project are:

Final Day for Questions to the Architect:	Friday, February 3, 2023, by 5:00 PM
Date of Issuance of Addendum (if necessary):	Tuesday, February 7, 2023, by 5:00 PM
Receive Bids:	Friday, February 17, 2023, by 11:00 AM
Notice of Award/Notice to Proceed, on or about:	Thursday, February 23, 2023 (on or about)
Site Mobilization:	Friday, June 23, 2023 (on or about) - Depending and upon Execution of Contracts, Bonds, and Insurance
Substantial Completion:	Friday, September 1, 2023

All bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq., Affirmative Action Against Discrimination (N.J.A.C. 17:27-1 et seq.) An Initial Project Workforce Report will be required from the successful contractor. (Form AA-201).

The Board of Education recognizes its obligation as it pertains to the Stevens Amendment, Section 8136 of the Department of Defense Appropriations Act (P.L. 104-134, Sec.507) which requires the Board of Education to state clearly the percent of the total cost of this project which will be financed through funds provided under the American Rescue Plan Elementary and Secondary School Emergency Relief Fund

(ARP ESSER II and ESSER III). The Board anticipates that 100% of the estimated total cost of the Renovations Project, will be financed with Federal Funds. In addition to the legal requirements set forth herein, this project is subject to numerous requirements for federally funded contracts, which are set forth in greater detail in the Bid Documents. Contractors will be obligated to adhere to both New Jersey and federal law, and to abide by the more stringent law wherever there is conflicting authority.

Contractors bidding on this project are to comply with the requirements of the Prevailing Wage Rate Determination pursuant to N.J.S.A. 34:11-56.25, or the Davis-Bacon Prevailing Wage Rates, whichever is higher.

A bidder on a public works project for a Board of Education where the cost of the work exceeds \$20,000.00 must first have been qualified by the Department of the Treasury, Division of Property Management and Construction, pursuant to N.J.S.A. 18A:18A-27 through 33, and shall submit with his bid a Prequalification Affidavit, a copy of a valid and active NOTICE OF CLASSIFICATION, a certified copy of a Total Amount of Uncompleted Contracts Form and an Affidavit that subsequent to the latest such statement submitted by him, there has been no material adverse change in his qualification information except as set forth in said Affidavit. Failure to submit these forms may result in the disqualification and rejection of the bid.

Each bid shall be accompanied by a bid bond, cashier's check or certified check made payable to the Haddonfield Board of Education, for ten percent (10%) of the amount of the total bid, however, not to exceed \$20,000.

Bidders are required to provide a Consent of Surety stating that if awarded the bid, said surety will provide a performance bond for 100% of the contract amount.

Corporate bidders are required by law (Chapter 33, Laws of 1977) to submit a list of names and addresses of all stockholders owning 10% or more of their stock.

The bid package will also include other documents that must be completed and returned with the bid. Failure to comply with Instructions to Bidders and to complete and submit all required forms, may be cause for disqualification and rejection of the bid.

All contractors named in this proposal, shall possess a valid Contractor's Registration Certificate pursuant to N.J.S.A. 34:11-56.48 et seq., at the time the proposal is received by the Board of Education.

No bids may be withdrawn, except in accordance with the Public School Contracts Law, for a period of sixty (60) days after the date set for opening of bids.

The Board of Education reserves the right to reject any or all bids, pursuant to N.J.S.A. 18A:18A-18, N.J.S.A. 18A:18A-2(s), (t), (x), (y), 18A:18A-4(a-c), and N.J.S.A. 18A:18A-22, and to waive any informalities that may be in the best interest of the board.

CONFIDENTIALITY OF ELECTRONIC FILE TRANSMISSIONS

The Drawings, renderings, photographs, blueprints, specifications, and bidding documents are considered proprietary and confidential property of the Haddonfield School District. All electronic file transfers of this information to the bidders and/or contractors is specifically designated as "confidential" and "business proprietary," the receiving party shall keep such information strictly confidential and shall not disclose it to any other person except to (1) its employees, (2) those who need to know the content of

such information in order to perform services or construction solely and exclusively for the Project, or (3) its consultants, contractors and subcontractors whose contracts include similar restrictions on the use of such confidential and proprietary information. The information transmitted in the bidding documents relates to a school construction project and the security and confidentiality of those documents is critical to the health and safety of the children. Therefore, any bidder and/or contractor and/or subcontractor discovered to have published or disseminated this information in the public domain, unless pursuant to the exceptions stated above, shall be subject to significant penalty and may not be permitted to bid on the instant project.

As a condition precedent to receipt of the Bid Documents, all bidders must agree to dispose of, destroy and/or return the information forwarded to it within three (3) days of the Bid submission date.

Michael Catalano
School Business Administrator / Board
Secretary
Haddonfield Board of Education
95 Grove Street
Haddonfield, New Jersey 08033
Fax: 856-429-6015
Email: mcatalano@haddonfield.k12.nj.us

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Ethics in Purchasing

School District Responsibility

Recommendation of Purchases

It is the desire of the Board of Education to have all Board employees and officials practice exemplary ethical behavior in the procurement of goods, materials, supplies, and services.

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-1 et seq.

Solicitation/Receipt of Gifts – Prohibited

School district officials and employees are prohibited from soliciting and receiving funds, gifts, materials, goods, services, favors, and any other items of value from vendors doing business with the Board of Education or anyone proposing to do business with the Board of Education.

Vendor Responsibility

Offer of Gifts, Gratuities -- Prohibited

Any vendor doing business or proposing to do business with the Board of Education, shall neither pay, offer to pay, either directly or indirectly, any fee, commission, or compensation, nor offer any gift, gratuity, or other thing of value of any kind to any official or employee of the Board of Education or to any member of the official's or employee's immediate family.

Vendor Influence -- Prohibited

No vendor shall cause to influence or attempt to cause to influence, any official or employee of the Board of Education, in any manner which might tend to impair the objectivity or independence of judgment of said official or employee.

Vendor Certification

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

Michael Catalano
Business Administrator/Board Secretary

HADDONFIELD BOARD OF EDUCATION

ADVISORY INFORMATION FOR BIDDERS

PROMPTNESS OF BID SUBMITTAL

It is the responsibility of the bidder to ensure that their bid is presented in a sealed envelope to the Office of the School Business Administrator/Board Secretary of designee, prior to the advertised bid date and time. The advertised bid date and time for this bid is on **February 17, 2023**, at **11:00 AM**. No bids shall be received after the time designated in the bid advertisement. No extensions or exceptions will be made.

The Business Office is opened Monday through Friday from 9:00 am – 2:00 pm according to the school calendar and 9:00 am – 2:00 pm during the summer. Access to the Business Office may be delayed because of security clearance and/or parking for the Administration Building. Bidders are permitted to submit bids to the School Business Administrator/Board Secretary or his designee prior to the bid opening meeting. It is urged all bidders submit their bids per the below guidelines and recommendations, prior to the advertised bid opening date and time. Once again, bids will not be received after the time designated in the advertisement.

SUBMISSION OF BIDS

All potential bidders are to either 1) send their responses through the US Postal Service certified mail or overnight mail which provides **certification of delivery to the sender** or 2) hand deliver their responses to the below address. Bids must be sealed and submitted via mail or hand delivery up to **11:00 a.m.** on **Friday, February 17, 2023**, prevailing time, in a sealed envelope and plainly marked **“Contract #14 – Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School – General Contractor BID”** addressed to Mr. Michael Catalano, Business Administrator/Board Secretary, Haddonfield Board of Education, 95 Grove Street, Haddonfield, NJ, 08033.

OPENING OF BIDS—ONLINE LIVE STREAMING

The board of education is aware of N.J.S.A. 18A:18A-21 which states the following:

At such time and place the purchasing agent of the board of education shall publicly receive the bids and thereupon immediately proceed to unseal them and publicly announce the contents, which announcement shall be made in the presence of any parties bidding or their agents who are then and there present.

Please note that the bid opening process will begin on the above advertised date at **11:00 a.m.** All attendees shall report to the Board of Education Offices and will be escorted to a meeting space by the Owner. Bids may also be submitted to the School Business Administrator/Board Secretary, Mr. Michael Catalano, or his designee at the bid opening meeting, prior to the advertised date and time. On the advertised date and time, the School Business Administrator shall publicly receive and open all bids and announce the names of the vendors and their prices. Bids may be viewed by interested parties on the advertised bid date and time.

All bids must be submitted on the **bid form** included in the specifications or be subject to rejection.

Bids will be awarded on the basis of the lowest total bidder. All bid prices shall remain firm for a period extending sixty (60) days from the indicated submission date of the opening.

Sealed bids are being solicited through a fair and open process in accordance with N.J.S.A. 19:44a-20.5 et seq.

The Board of Education reserves the right to reject any and/or all bids and to waive any informalities in the bids if that is in the best interest of the school district.

All bids are to be submitted in triplicate; one (1) original; one (1) copy and one (1) copy of the bid on a USB flash drive in a sealed labeled envelope.

HADDONFIELD BOARD OF EDUCATION

BID CHECKLIST (A)

A. Bid packages must be submitted in duplicate on the proposed forms as provided, and in the manner designated. The Board of Education will accept one original bid package, one hard copy and one copy on a USB flash drive of the bid package. Please include all items, organized as follows:

Please include all items, organized as follows:

- Bid Form
- Non-Collusion Affidavit
- Bid Bond
- Consent of Surety
- Stockholder/Partnership Disclosure and Statement of Ownership Form
- Equipment Certification Form
- Contractor Certification Form
- Subcontractors Disclosure Statement
- Prevailing Wage Certification Form
- Political Contributions Disclosure Form
- Disclosure of Investment in Iran Form
- Affirmative Action Compliance Notice Form
- Exhibit B Form
- Appendix A Form
- Total Amount of Uncompleted Contracts Form (Bidder and Subcontractors)
- Statement of No Material Change Form
- Notice of DPMC Classification
- Business Registration Certificate
- Contractor Registration Act Certificate
- Certificate of Authority
- Acknowledgement of Addenda/Clarifications
- Byrd Act Certification Form

For all named subcontractors the following must also be included:

- Contractor's Registration Certificate
- New Jersey Business Registration Certificate
- Political Contribution Disclosure Form
- Notice of DPMC Classification
- Total Amount of Uncompleted Contracts – Certified
- Statement of No Material Change Form

Failure to submit the above listed documents with the bid package may be cause for rejection of the entire bid for being non-responsive (N.J.S.A. 18A:18A:2(y)).

HADDONFIELD BOARD OF EDUCATION

BID CHECKLIST (B)

B. Reminder Checklist

As a courtesy, the Office of the School Business Administrator/Board Secretary has prepared this reminder checklist to items pertaining to this bid. The checklist is not considered to be all-inclusive. Bidders are to read and become familiar with all instructions outlined in the bid package.

<u>Item</u>	<u>Yes</u>	<u>No</u>
1. Have you verified your pricing to ensure accuracy?		
2. Have you answered every question fully and accurately?		
3. Have you signed all your documents (blue ink)? No facsimile signature.		
4. Have you prepared all documents for submission?		
5. Did you make a copy of the bid package for your records?		
6. Did you make a duplicate copy of the bid for the Board of Education as well as include the bid on a USB Flash Drive?		
7. Did you submit a signed Bid Guarantee? Signed Consent of Surety?		
8. Did you correctly address the envelope?		
9. Have you allowed ample time for the bid to reach the Business Office?		

HADDONFIELD BOARD OF EDUCATION

GENERAL SPECIFICATIONS

Michael Catalano

Business Administrator/Board Secretary

Envelope Label Information:

District:	<u>Haddonfield Board of Education</u>
Contract No.:	<u>14</u>
Project:	<u>Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School</u>
Bid Date:	<u>February 17, 2023</u>
Bid Time:	<u>11:00 a.m.</u>
Bidder:	<i>Name of Company Address City, State Zip</i>

Failure to properly label the bid envelope may be cause for the rejection of the bid.

The Board of Education does not accept electronic (e-mail) submission of bids.

4. BID OPENING MEETING

All bids will be publicly received and unsealed by the School Business Administrator opened at the above address and read beginning at **11:00 a.m. on February 17, 2023**. Bidders and/or their authorized agents, and the general public are invited to be present for the bid opening, which will be held at the Haddonfield Board of Education Offices. It is the responsibility of each bidder to ensure that their bid is complete and presented to the School Business Administrator/Board Secretary prior to the advertised bid date and time. No bids received after the advertised bid date and time shall be considered by the Board of Education. (N.J.S.A. 18A:18A:21(b))

BIDDING REQUIREMENTS

5. AFFIRMATIVE ACTION REQUIREMENTS

Pursuant to N.J.A.C. 17:27-3.6 (a) (1) after notification of award, but prior to signing a construction contract, the contractor shall submit to the Public Agency Compliance Officer and the Division of Contract Compliance an initial project workforce report (Form AA-201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C.17:27-7.

All bidders should familiarize themselves with N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq. MANDATORY AFFIRMATIVE ACTION LANGUAGE CONSTRUCTION CONTRACTS, if awarded a contract, your company/firm will be required to comply with the above requirements.

All relevant questions should be related to: Division of Contract Compliance/EEO
Department of the Treasury / P.O. 209
Trenton, New Jersey 08625-0209
(609) 292-5473

6. AMERICAN GOODS

In accordance with N.J.S.A. 18A:18A-20, only manufactured products of the United States, wherever available, and where possible are to be used with this project.

7. AMERICANS WITH DISABILITIES ACT

The contractor must comply with all provisions of the Americans with Disabilities Act (ADA), P.L 101-336, in accordance with 42 U.S.C. S121 01 et seq.

8. **ANTI-BULLYING BILL OF RIGHTS — REPORTING OF HARASSMENT, INTIMIDATION AND BULLYING — CONTRACTED SERVICE**

The contracted service provider shall comply with all applicable provisions of the New Jersey Anti-Bullying Bill of Rights Act—N.J.S.A. 18A:37-13.1 et seq., all applicable code and regulations, and the Anti-Bullying Policy of the Board of Education. The district shall provide to the contracted service provider a copy of the board’s Anti-Bullying Policy.

In accordance with N.J.A.C. 6A:16-7.7 (c), a contracted service provider, who has witnessed, or has reliable information that a student has been subject to harassment, intimidation, or bullying shall immediately report the incident to any school administrator or safe schools resource officer, or the School Business Administrator/Board Secretary.

9. **ANTI-DISCRIMINATION PROVISIONS—N.J.S.A. 10:2-1**

N.J.S.A. 10:2-1. Antidiscrimination provisions. Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

a. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;

b. No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;

c. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and

d. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women’s business enterprise pursuant to P.L.[1985, c.490](#) (C.18A:18A-51 et seq.).

10. **ALTERNATIVE DISPUTE RESOLUTION PROCESS**

All disputes relating to construction contracts or relating to contracts for engineers or architects, surveyors, design or skilled services relating to construction contracts for prompt payment issues shall be submitted to the following Alternative Dispute Resolution process (“ADR”):

All disputes shall first be submitted to the architect of record, if there is one, for a determination. If thirty (30) days pass without a determination by the architect or a determination is made that does not resolve the dispute, then the claims shall be submitted for non-binding mediation by a single mediator.

The mediation shall be held where the project is located before a mediator who is mutually acceptable to the parties. The parties shall share the mediator's fees equally. If the dispute is submitted for mediation the neutral party involved must demonstrate knowledge of the Public School Contracts Law.

Nothing shall prevent either party from seeking injunctive or declaratory relief in a court of law at any time. The alternative dispute resolution practices required by this section shall not apply to disputes concerning the bid solicitation process, or to the formation of contracts.

The Bidder further agrees to include an identical provision in all agreements with independent contractors and consultants retained for the project and to require all independent contractors to include similar mediation provisions in all agreements with subcontractors, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those agreements. The arbitration of claims is expressly excluded under this Contract.

If the parties cannot resolve their dispute through the mediation process, the parties are free to file an action in Camden County Superior Court of New Jersey.

11. **BID GUARANTEE** (N.J.S.A. 18A:18A-24)

Bidders shall submit with their bid package a bid guarantee made payable to the Haddonfield Board of Education ("Board"). The guarantee shall be in the form of a certified check, cashier's check or bid bond in the amount of 10% of the bid, but not in excess of \$20,000. Such deposit shall be forfeited upon refusal of a bidder to execute a contract. Any bid in the form of a check shall be returned when the contract is executed and surety (performance) bond filed with the Board of Education. The bid guarantee check for unsuccessful bidders, if requested, will be returned as soon after the bid opening as possible, but in no event later than (10) days after the bid opening.

Please note: Uncertified business checks, personal checks or money orders are not acceptable.

All bid bonds submitted must be signed and witnessed with original signatures. The Board will not accept facsimile or rubber stamp signatures on the bid bond. **Failure to sign the bid bond by either the Surety or Principal shall be deemed cause for disqualification of the bid.**

The Attorney-in-Fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the Power of Attorney. The Board of Education will only accept bid bonds from companies that are licensed and qualified to do business in the State of New Jersey. Such a list may be available upon request to the State of New Jersey, Department of Banking and Insurance, P.O. 325, Trenton, New Jersey 08625. **Failure to submit a bid guarantee shall be cause for disqualification and rejection of bid.**

Please note: The name, address and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the Board of Education.

12. **BID PROPOSAL FORM**

All bids are to be written in by typewriter or ink in a legible manner on the official Bid Proposal Form. Any bid price showing any erasure or alteration must be initialed by the bidder in ink, at the right margin next to the altered entry. Failure to initial any erasure or alteration may be cause to disqualify that particular bid entry. If the disqualified entry is a required one, the entire bid may be subject to rejection, so please fill out all entries with care.

The Bid Proposal Form must be duly signed by the authorized representative of the company, at the end of the Bid Proposal Form. **Failure to sign the Bid Proposal Form may be cause to disqualify the entire bid.** If the Bid Proposal Form contains more than one sheet, then bidders are requested to affix the company name and address on each intervening sheet between the front sheet and the signature sheet which already bear the company information. The Board of Education will not consider any bid on which there is any alteration to, or departure from, the bid specifications. Bidders are not to make any changes on the Bid Proposal Form or qualify their bid with conditions differing from those defined in the contract documents. If bidders do make changes on the Bid Proposal Form, except as noted above for initialed clerical mistakes, it may be cause to disqualify that particular bid as non-responsive. (N.J.S.A. 18A:18A-2(y))

The bidder also conveys by submitting a bid that the company he represents is financially solvent, experienced in and competent to perform the type of work so specified.

13. **BIDDER'S RESPONSIBILITY FOR BID SUBMITTAL**

It is the responsibility of the bidder to ensure that their bid is presented to the Board of Education and officially received before the advertised date and time of the bid. It is understood and agreed upon that any person in the Board of Education will be absolved from responsibility for the premature opening of any bid not properly labeled and sealed. Failure to properly label the bid envelope may be cause for the rejection of the bid.

14. **BUSINESS REGISTRATION CERTIFICATE** (N.J.S.A. 52:32-44)

Pursuant to N.J.S.A. 52:32-44 as amended, all bidders or companies providing responses for requested proposals, shall submit with their response package a copy of their "New Jersey Business Registration Certificate" as issued by the Department of Treasury of the State of New Jersey.

The Haddonfield Board of Education requests that all respondents for this bid/proposal submit a current New Jersey Business Registration Certificate with the bid/proposal.

Failure to provide the New Jersey Business Registration Certification prior to the award of contract, will be cause for the rejection of the entire bid or proposal.

Goods, Services and Construction Contracts

N.J.S.A. 52:32-44 imposes the following requirements on contractors and all subcontractors:

A contractor shall provide the contracting agency with the business registration of the contractor and that of any named subcontractor prior to the time a contract, purchase order, or other contracting document is awarded or authorized. At the sole option of the contracting agency, the requirement that a contractor provide proof of business registration may be fulfilled by the contractor providing the contracting agency sufficient information for the contracting agency to verify proof of registration of the contractor, or named subcontractors, through a computerized system maintained by the State.

A subcontractor named in a bid or other proposal made by a contractor to a contracting agency shall provide a copy of its business registration to any contractor who shall provide it to the contracting agency pursuant to the provisions of subsection b. of this section. No contract with a subcontractor shall be entered into by any contractor under any contract with a contracting agency unless the subcontractor first provides the contractor with proof of a valid business registration. For bids and requests for proposals, the contracting agency must retain the proof of business registration in the file where documents relating to the contract are maintained. For all other contracts, proofs of business registration shall be maintained in an alphabetical file.

The contractor shall maintain and submit to the contracting agency a list of subcontractors and their addresses that may be updated from time to time during the course of the contract performance. A complete and accurate list shall be submitted before final payment is made for goods provided or services rendered or for construction of

a construction project under the contract. A contracting agency shall not be responsible for a contractor's failure to comply with this subsection.

A contractor or a contractor with a subcontractor that has entered into a contract with a contracting agency, 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," P.L. [1966, c.30](#) (C.54:32B-1 et seq.) on all their taxable sales of tangible personal property delivered into this State.

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE
FOR STATE AGENCY AND CASINO SERVICE CONTRACTORS

DEPARTMENT OF TREASURY
DIVISION OF REVENUE
PO BOX 352
TRENTON, N.J. 08646-0352

TAXPAYER NAME: TAX REGISTRATION TEST ACCOUNT
TAXPAYER IDENTIFICATION#: 970-097-382/500
ADDRESS: 847 ROEBLING AVE
TRENTON NJ 08611
EFFECTIVE DATE: 01/01/01
FORM-BRC(08-01)

TRADE NAME: CLIENT REGISTRATION
SEQUENCE NUMBER: 0107330
ISSUANCE DATE: 07/14/04

Act. Director
John S. Tully

This Certificate is NOT assignable or transferable. It must be conspicuously displayed at above address.

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Taxpayer Name: TAX REG TEST ACCOUNT
Trade Name:
Address: 847 ROEBLING AVE
TRENTON, NJ 08611
Certificate Number: 1093907
Date of Issuance: October 14, 2004

For Office Use Only:
20041014112823533

**SAMPLES OF
NEW JERSEY
BUSINESS
REGISTRATION
CERTIFICATES**

All respondents are urged to submit with their response, a copy of their firm's New Jersey Business Registration Certificate. Failure to submit the Certificate prior to the award of contract will result in the rejection of the proposal.

15. **CERTIFICATE FROM SURETY COMPANY** (N.J.S.A. 18A:18A-25)

Each bidder must submit with his bid a certificate from a surety company stating that the surety company will provide the contractor with a performance bond in an amount equal to the amount of the contract (N.J.S.A. 18A:18A-25). Such surety company must be licensed and qualified to do business in the State of New Jersey. All certificate (consent) of surety documents must be signed with original signatures.

The Board will not accept facsimile or rubberstamp signatures. The certificate (consent) of surety, together with a power of attorney must be submitted with the bid.

Failure to submit or failure to sign the certificate (consent) of surety shall be cause for disqualification and rejection of bid.

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

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) days prior to the opening of bids. **Challenges filed after that date shall be considered void and having no impact on the Board of Education or the award of a contract.**

17. **CHANGE ORDERS (N.J.A.C. 6A:26-4.9, 4.10 et seq.) (N.J.A.C. 5:30-11.1 et seq.)**

Board of Education Approval Required; Prior to Issuance of Change Order (N.J.A.C. 5:30-11.2)

Change orders may be approved by the Board of Education in an amount up to twenty percent (20%) when necessitated by one of the following:

- Emergencies consistent with N.J.S.A. 18A:18A-7;
- Unforeseeable physical conditions; or
- Minor modification to the project/scope that achieve cost savings, improve service or resolve construction conditions.

Division of Finance (NJDOE) Approval

All other change orders shall be approved by the Division of Finance (NJDOE) when extraordinary circumstances exist such as:

- Change order amounts greater than twenty percent (20%);
- Change orders that eliminate or affect the project scope; or
- Change orders that affect the number, size, configuration, location or use of educational spaces.

Contractors are prohibited to perform any change order unless so directed in writing by the Board of Education.

18. **CONTRACTS**

A. Award of Contract; Rejection of Bid

The contract shall be awarded, if at all, to the lowest responsible bidder as determined by the Board of Education, pursuant to N.J.S.A. 18A:18A-18 (c), 18A:18A-2(s), (t), (x), (y), 18A:18A-4(a), 18A:18A-22. The Board of Education reserves the right to reject any or all bids as authorized by the Public School Contracts Law, and to waive any nonmaterial defects and/or informalities the Board feels are in the best interests of the Board. Pursuant to N.J.S.A. 18A:18A- 36 (a), the Board of Education shall award the contract or reject all bids within sixty (60) days of the advertised date and time noting the exception highlighted in the law. Contractors will be required to execute a form of contract similar to attached AIA A-101-2017 and General Terms and Conditions, AIA 201-2017.

B. Equal Prices

Pursuant to N.J.S.A. 18A:18A-37(d) when two or more bidders submit equal prices and the prices are the lowest responsible bids, the Board may award the contract to the vendor whose response, in the discretion of the Board, is the most advantageous, price and other factors considered.

C. Return of Contracts and Related Contract Documents

Upon written notification of award of contract by the Board of Education, the contractor shall sign and execute a formal contract agreement between Board of Education and Contractor and return the executed contracts along with:

1. Performance Bond in the total amount of the contract.

2. Insurance Certificate with the Board of Education named as an additional insured.
3. Affirmative Action Form AA-201 - Initial Project Workforce Report - Yellow copy.
4. Other required documents as may be outlined in bid specifications.

The above documents may also be required for submission with the official Notice to Proceed. The contracts and related documents shall be returned to the Office of the School Business Administrator/Board Secretary within **ten (10) days of receipt of notification**. Failure to execute the contract and return said contract and related required documents within the prescribed time may be cause for the annulment of award by the Board with the bid security becoming property of the Board of Education.

D. Alterations of Contract

The Board of Education reserves the right to alter or amend the contract by adding to or subtracting from the work herein specified, such additions or omissions being done under the general conditions of these specifications and the terms of the Contract. No changes shall be permitted from the specifications except that the same be in writing and the amount of the extra compensation or credit stipulated therein. Refer to Change Order Section #15.

E. Term of Contract

The contractor, to whom the contract is awarded, will be required to do and perform the work/services and to provide and furnish the materials in connection therewith in accordance with the plans and specifications on or before the date listed in the Technical Specifications.

F. Purchase Order Required

No contractor shall commence any public works project until he is in receipt of an approved purchase order authorizing work to begin. (See Notice (Authorization) to Proceed)

19. CONTRACTOR'S REGISTRATION EVIDENCE

A. Valid Certificate – Receipt of Bid

All contractors must adhere to the provisions of the Public Works Contractor Registration Act – N.J.S.A. 34:11-56.48 et seq. The PWCRA requires that *“No contractor shall bid on any contract for public work . . . unless the contractor is registered pursuant to this act.”* The law requires that all contractors and sub-contractors named in the proposal possess a valid certificate at the time the proposal is received by the contracting unit, in this case the Board of Education.

B. Submission of Certificate – Receipt of Bid; Prior to Award

All bidders shall submit with the bid package or prior to the award of contract, a current Public Works Contractor Registration Certificate that was issued prior to the receipt of the bid.

The contractor who most likely is to be considered for the contract award, must submit a copy of the current Public Works Contractor Registration Certificate, and if applicable, copies of certifications of all listed subcontractors, prior to the award of contract. If the contractor fails to provide copies of certificates prior to the award of contract, the bid may be rejected as non-responsive.

For more information contact: Contractor Registration Unit
Division of Wage and Hour Compliance
New Jersey Department of Labor & Workforce Development
PO Box 389
Trenton, New Jersey 08625-0389
Tel: 609-292-9464
Fax: 609-633-8591
E-mail: contreg@dol.state.nj.us
Web site: www.nj.gov/labor/lssc/lspubcon.html

20. CONTRACTOR/VENDOR REQUIREMENTS—OFFICE OF THE NEW JERSEY STATE COMPTROLLER

Contractors/vendors doing business with the board of education are reminded of the following legal requirements pertaining to the Office of the New Jersey State Comptroller:

A. Access to Relevant Documents and Information—N.J.S.A. 52:15C-14 (d)

Private vendors or other persons contracting with or receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education shall upon request by the State Comptroller provide the State Comptroller with prompt access to all relevant documents and information as a condition of the contract and receipt of public monies. The State Comptroller shall not disclose any document or information to which access is provided that is confidential or proprietary. If the State Comptroller finds that any person receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education refuses to provide information upon the request of the State Comptroller, or otherwise impedes or fails to cooperate with any audit or performance review, the State Comptroller may recommend to the contracting unit that the person be subject to termination of their contract, or temporarily or permanently debarred from contracting with the contracting unit.

B. Maintenance of Contract Records—N.J.A.C. 17:44-2.2

Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by OSC pursuant to N.J.S.A. 52:15C-14(d).

The contractor/vendor to whom a contract has been awarded, shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

21. CRIMINAL HISTORY BACKGROUND CHECKS--REQUIRED

STUDENT AND FACULTY SAFETY REQUIREMENTS: During the performance of this contract, neither the Contractor nor any Subcontractor, where applicable, shall knowingly allow any employee registered pursuant to NJSA 2C:7-1, et seq “Megan’s Law” as a Tier 3 offender (“sex offenders determined to pose a relatively high risk of re-offense”) or a Tier 2 offender (“sex offenders determined to pose a moderate risk of re-offense”), upon the Owner’s property or the Project site. Accordingly, the Contractor will be required, at no additional cost to the Owner, to have all on-site Contractor or Subcontractor employees, screened via an Owner Provided Visitor Management screening and badging system (LobbyGuard, T-Pass or approved equal) in order to conduct security checks on its employees and subcontractors and to ensure compliance with these Student and Faculty Safety Requirements. All employees of the Contractor and any Subcontractor, where applicable, will be required to wear picture identification cards in a visible manner while working on the Owner’s premises. During the performance of this contract, neither the Contractor nor any Subcontractor, where applicable, shall knowingly allow any employee to enter any area of the Project where students or faculty are present, without first providing the Owner with a written list setting forth the identity of the employees.

1. The successful Bidder will be expected after contract award to comply with and complete all required forms, written authorizations and/or other information issued by the District for the disclosure of information in accordance with the mandates of N.J.S.A. 18A:6-7.7 et seq. which concerns prior acts and/or investigations of sexual misconduct and/or child abuse for those contracted service providers who are employed in positions which involve regular contact with students. The successful Bidder is further notified that failure to provide truthful information or willfully failing to disclose information required by N.J.S.A. 18A:6-7.7 et seq., may subject the successful Bidder to discipline up to, and including, termination or denial of employment; may be

a violation of N.J.S.A. 2C:28-3; and may be subject to a civil penalty of not more than \$500, which shall be collected in proceedings in accordance with the "Penalty Enforcement Law of 1999," P.L. 1999, c. 274.

22. DEBARMENT, SUSPENSION, OR DISQUALIFICATION – (N.J.A.C. 17:19-4.1)

The Board of Education will not enter into a contract for work with any person, company or firm that is on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List, or the State of New Jersey Consolidated Debarment Report (www.state.nj.us/treasury/debarred) or the Federal System for Award—SAM.gov.

All bidders are required to submit a sworn statement indicating whether or not the bidder is, at the time of the bid, included on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List or the State of New Jersey Consolidated Debarment Report, or the Federal Debarred Vendor List--Excluded Parties List System, through the System for Award Management portal—SAM.gov.

23. FEDERAL NON-DEBARMENT CERTIFICATION - (N.J.S.A. 52:32-44.1 (P.L. 2019, c. 406)

Pursuant to state law 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.

Bidders are reminded that they must complete the attached Certification of Non-Debarment for Federal Government Contracts Form including all information in the certification sections of Parts II through IV regarding their name and type of contracting unit.

24. DOCUMENTS, MISSING/ILLEGIBLE

The bidder shall familiarize himself with all forms provided by the Board that are to be returned with the bid. If there are any forms either missing or illegible, it is the responsibility of the bidder to contact the School Business Administrator/Board Secretary during regular business hours or the architect of the project as outlined in the bid advertisement for duplicate copies of the forms. This must be done before the bid date and time. The Board accepts no responsibility for duplicate forms that were not received by the bidder in time for the bidder to submit with his bid.

*Forms provided by the Board of Education that must be returned with bid are referenced in the proceeding checklist.

25. DOCUMENT SIGNATURES – ORIGINAL; BLUE INK

All documents returned to the Board shall be signed in ink (blue) with an original signature. Failure to sign and return all required documents with the bid package may be cause for disqualification and for the bid to be rejected pursuant to N.J.S.A. 18A:18A-2(y) (non-responsive). The Board will not accept facsimile or rubber stamp signatures.

Checklist of Required Documents (Forms Provided in Bid Package)

- Acknowledgement of Addenda**
- Bid Proposal Form
- Byrd Certification Form
- Chapter 271 Political Disclosure Form
- Contractor Questionnaire/Certification
- Contractor's Registration Certifications
- Equipment Certification
- Iran Disclosure of Investment Activities

- Non-Collusion Affidavit
- Prequalification Affidavit
- Prevailing Wages Certification
- Stockholder's/Partnership Disclosure Affidavit/Ownership Declaration
- Subcontractor's Disclosure Statement

Please check your bid package for these forms!

Reminder – Original Bid and One Copy of Bid Package and One USB Flash Drive

Bid packages are to be submitted in duplicate on the proposed forms as provided and the manner designated. The Board of Education will accept one original bid package, one copy of the bid package and one USB Flash Drive.

27. EQUIPMENT CERTIFICATION (N.J.S.A. 18A:18A-23)

Each bidder shall provide a certification showing that he owns, leases or controls all the necessary equipment required by the specifications. If the bidder is not the actual owner or lessee of any such equipment, he shall submit a certificate stating the source from which the equipment will be obtained and shall obtain 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 as may be necessary for the completion of that portion of the contract for which it is necessary.

The certificates are to be submitted with the bid. If the contract involves the installation of a manufactured system which requires the contractor to have special knowledge or training, or to be specifically certified by the manufacturer to install their system, this form is used to submit such required evidence of the bidder's approval from the manufacturer.

28. EXAMINATION OF SPECIFICATIONS, ACKNOWLEDGEMENT

The bidder, by submitting a proposal, acknowledges that he has carefully examined the bid specifications, documents, addenda (if any), and the site; and that from his investigation, he has satisfied himself as to the nature and location of the work, the general and local conditions and all matters which may in any way affect the work or its performance, and that as a result of such examination, he fully understands the intent and purpose thereof, his obligations thereunder, and that he will not make any claim for, or have any right to damages, because of the lack of any information.

Each bidder submitting a bid for a service contract shall include in his bid price all labor, materials, equipment, services, and other requirements necessary, or incidental to, the completion of the work, and other pertinent work as hereinafter described, or work that can be reasonably inferred from the specifications and documents, in accordance with the bid specifications and documents.

29. FALSE MATERIAL REPRESENTATION – (N.J.S.A. 2C:21-34-97(b))

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.

30. FORCE MAJEURE

Neither party shall be liable in damages for any failure, hindrance or delay in the performance of any obligation under this Agreement if such delay, hindrance or failure to perform is caused by conditions beyond the control of either party, including, but not limited to, Acts of God, flood, fire, war or the public enemy, explosion, government regulations whether or not valid (including the denial or cancellation of any export or other necessary license),

court order, state funding, or other unavoidable causes beyond the reasonable control of the party whose performance is affected which cannot be overcome by due diligence.

Vendors, and/or contractors who have a contract with the Board of Education to provide goods or services cannot unilaterally claim an increase in the cost of the contract because of Force Majeure.

31. INSURANCE AND INDEMNIFICATION

The bidder to whom the contract is awarded for any service work or construction work shall secure, pay the premiums for and keep in force until the contract expires, insurance of the types and amounts listed below:

- .1 Commercial General Liability, Each Occurrence
 - a. Each Occurrence: \$ 1,000,000.00
 - b. Damage to Rented Premises: \$ 300,000.00
 - c. Medical Expense (Any one person): \$ 15,000.00
 - d. Personal & Adv Injury: \$ 1,000,000.00
 - e. General Aggregate: \$ 2,000,000.00
 - f. Products – Comp/Op Agg: \$ 1,000,000.00

- .2 Excess Umbrella Liability: \$ 5,000,000.00

- .3 Automobile Liability: (Hired autos, scheduled autos, non-owned autos)
 - a. Combined Single Limit (each accident): \$ 1,000,000.00

- .4 Workers Compensation and Employers Liability:
 - a. WC Statutory Limits:
 - 1. E.L. Each Accident: \$ 1,000,000.00
 - 2. E.L. Disease – Each Employee: \$ 1,000,000.00
 - 3. E.L. Disease – Policy Limit: \$ 1,000,000.00

- .5 Builder's Risk Insurance: The Contractor shall provide Builder's Risk Insurance for all risk of physical loss or damage to the property described hereunder in an amount equal to the Total Project Value, and furnished under Construction Contracts for the School Facilities Project; excepting excavations, foundations and other structures customarily excluded by such insurance. The Policy shall name the Owner, State of New Jersey, the New Jersey Department of Education, New Jersey Schools Development Authority, and the New Jersey Economic Development Authority as loss payee as their interests may appear on a primary and non-contributory basis. The Builders Risk Policy is to include coverage for the perils of Earthquake, Flood, Full Windstorm, Equipment Breakdown and Theft (excluding employee theft), contain an endorsement allowing permission to occupy and include coverage for both transit and offsite storage. The policy is also to include all contractors, subcontractors and sub-subcontractors as well as the Owner, State of New Jersey, the New Jersey Department of Education, New Jersey Schools Development Authority, and the New Jersey Economic Development Authority, LAN Associates as Additional Named Insureds on a primary and non-contributory basis. The contractor and all subcontractors are responsible for all policy deductibles and uninsured or underinsured losses.

- .6 The Policy shall name the following as Additional Insured:

Haddonfield Board of Education; LAN Associates Engineering, Planning, Architecture, Surveying, Inc.; the State of New Jersey; the New Jersey Department of Education; New Jersey Schools Development

Authority; and the New Jersey Economic Development Authority as additional insureds on a primary and non-contributory basis

- .7 Contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18 of the AIA General Conditions.
- .8 Workers' Compensation Insurance of not less than statutory limits.
- .9 Completed Operations Insurance written to the limits specified for liability insurance specified under subparagraph .1 above. Coverage shall be required from the date of the start of Beneficial Occupancy until one year after the issuance date of Final Certificate for Payment.
- .10 Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance. Contractor's ACORD Certificate of Insurance must state "Contractual Liability Included" or it will be rejected.
- .11 The successful bidder shall either
 - .1 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 in the preceding paragraph; or
 - .2 insure the activities of their subcontractors under their respective policies.

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 successful bidder shall provide notice to the District of such impending or actual cancellation or expiration.

(B) Indemnification

The contractor shall assume all risk of and responsibility for, and agrees to indemnify, defend, and save harmless the Board and its agents, employees and Board members, from and against any and all claims, demands, suits, actions, recoveries, judgments and costs and expenses (including, but not limited to, attorney's fees) in connection therewith on account of the loss of life or property or injury or damage to any person, body or property of any person or persons whatsoever, which shall arise from or result directly or indirectly from the work and/or materials supplied under this contract or the performance of services by the contractor under the agreement or by a party for the whole contract is liable. This indemnification obligation is not limited by, but is in addition to, the insurance obligations contained in this agreement.

The Contractor is to assume all liability of every sort incident to the work, including property damage caused by him or his men or by any subcontractor employed by him or any of the subcontractor's men.

32. INTERPRETATIONS AND ADDENDA (N.J.S.A. 18A:18A-21(c) (2))

No interpretation of the meaning of the specifications will be made to any bidder orally. Every request for such interpretations should be made in writing to the School Business Administrator/Board Secretary and must be received at least ten (10) business days, not including Saturdays, Sundays and holidays, prior to the date fixed for the opening of bids to be given consideration. Any and all interpretations and any supplemental instructions will be distributed in the form of written addenda to the specifications. The addenda will be provided in accordance with N.J.S.A. 18A:18A-21(c) (2) to the bidder by certified mail or certified fax no later than seven (7) days, Saturdays, Sundays, or holidays prior to the date for acceptance of the bids. All addenda so issued shall become part of the contract document.

33. IRAN DISCLOSURE OF INVESTMENT ACTIVITIES- (N.J.S.A. 18A:18A-49.4)

The Haddonfield Board of Education, pursuant to N.J.S.A. 18A:18A-49.4, shall implement and comply with Public Law 2012, c.25, Disclosure of Investment Activities in Iran—N.J.S.A. 52:32-55 et seq.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract, must complete a certification attesting, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran.

The Chapter 25 list is found on the Divisions website

<http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>.

If the Board determines that a person or entity has submitted a false certification concerning its engagement in investment activities in Iran under section 4 of P.L.2012, c.25 (C.52:32-58), the board shall report to the New Jersey Attorney General the name of that person or entity, and the Attorney General shall determine whether to bring a civil action against the person to collect the penalty prescribed in paragraph (1) of subsection a. of section 5 of P.L.2012, c.25 (C.52:32-59).

In addition, bidders must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes on the lower portion of the enclosed form.

The Board has provided within the specifications, a Disclosure of Investments Activities certification form for all persons or entities, that plan to submit a bid, respond to a proposal, or renew a contract with the board, to complete, sign and submit with the proposal.

Failure to complete, sign and submit the Disclosure of Investment Activities in Iran form with the bid/proposal shall be cause for rejection of the proposal.

34. **LIABILITY – COPYRIGHT**

The contractor (vendor) shall hold and save the Board of Education, its officials and employees, harmless from liability of any nature or kind for or on account of the use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article or appliance furnished or used in the performance of his contract.

35. **LIQUIDATED DAMAGES**

The contractor agrees to substantially complete this public works project to the complete satisfaction of the Board of Education by the stated contract completion date or within the number of working days so specified in the contract.

Failure to complete the project within the specified time frame or contract completion date shall lead to the Board of Education assessing liquidated damages against the contractor in accordance with and pursuant to N.J.S.A. 18A:18A-41 and 18A:18A-19.

For each calendar day thereafter that the work included under this contract remains uncompleted in accordance with the provision of the contract or not completed to the satisfaction of the Board of Education, the Board shall assess liquidated damages in the amount of \$1,000.00 per calendar day.

The Board may assess liquidated damages by deducting the amount from monies which may due or become due to the contract.

The Board may also assess the contractor additional damages for costs the Board may incur because each day the project remains uncompleted. These costs include but are not limited to:

- Construction management fees
- Architect/engineer fees
- Legal Fees
- District administrative costs
- Any inspector or inspectors necessarily employed by the Board of Education on the work, for any number of days in excess of the number allowed in the specifications

The Board of Education may also assess against all monies owed to the contractor, liquidated damages for the violation of any terms and conditions of the contract or agreement by the contractor or the failure to perform said contract or agreement in accordance with its terms and conditions or the terms or conditions of the "Public School Contracts Law," in accordance with and pursuant to N.J.S.A. 18A:18A-19 and 18A:18A-41.

36. MAINTENANCE BONDS

The successful bidder shall furnish a Maintenance Bond for the total sum of the contract price, indemnifying the Board of Education against defects in construction for a period of two (2) years after the completion of the work, general wear and tear excepted.

The condition of this obligation is such that if the successful contractor shall indemnify and hold harmless the Board of Education from and against all losses, costs, damages and expenses, whatsoever, which the Board may suffer or compelled to pay by reason of the failure of the successful contractor to indemnify the Board against defects in construction for a period of two (2) years after the completion of the work.

37. NON-COLLUSION AFFIDAVIT (N.J.S.A. 52:34-15)

A notarized Non-Collusion Affidavit shall be submitted with the bid/proposal. The bidder/respondent has to certify that he has not directly or indirectly, entered into any agreement, participated in any collusion, discussed any or all parts of this proposal with any potential bidders, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named bid, and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge that the Board of Education relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said bid.

The respondent has to 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 of bona fide established commercial or selling agencies maintained by the respondent.

The Haddonfield Board of Education has provided a Non-Collusion Affidavit form here within the specifications package. All respondents are to complete, sign, have the signature notarized and submit the form with the proposal response.

Failure to submit the Non-Collusion Affidavit with the proposal may be cause for the disqualification of the proposal.

38. NOTICE (AUTHORIZATION) TO PROCEED (N.J.S.A. 18A:18A-36(b))

The contractor shall not perform any work, or provide any services, materials, supplies until a Notice (Authorization) to Proceed is received from the Office of the School Business Administrator/Board Secretary. (N.J.S.A. 18A:18A-36(b)).

The Board of Education only recognizes the receipt by the contractor of an approved signed purchase order as a Notice to Proceed. No word of mouth, phone, fax, e-mail, letter or other form of communication to proceed is a valid Notice to Proceed.

It is the intention of the Board to officially notify the Contractor, to whom the contract was awarded, through a Notice to Proceed letter issued by the School Business Administrator/Board Secretary. A purchase order will accompany the Notice to Proceed letter. The contractor shall submit certain documents to the Board as so requested in the Notice to Proceed letter.

39. **PAYMENTS**

Every effort will be made to pay vendors and contractors within thirty (30) to sixty (60) days provided the Board of Education receives the appropriate documentation including but not limited to:

- Signed voucher by vendor
- Packing slips
- Invoices

Payment will be rendered upon completion of services or delivery of full order to the satisfaction of the Board of Education, unless otherwise agreed to by written contract or mandated by N.J.S.A. 18A:18A-40.1. The Board may, at its discretion make partial payments.

All payments are subject to approval by the Board of Education at a public meeting. Payment may be delayed from time to time depending on the Board of Education meeting schedule.

40. **PAYMENT, PARTIAL, WITHHOLDING**

A. Contract Thresholds; Partial Payments/Withholding

1. Contracts – Less than \$100,000 – Lump Sum Payment

Public works contracts less than \$100,000 shall be paid in one lump total sum, upon completion of the project and to the satisfaction of the Board of Education.

2. Contracts – Exceeding \$100,000 – Monthly Payments

Public works contracts that exceed \$100,000 shall be paid with partial payments on a monthly basis for work that was completed to the satisfaction of the Board of Education.
(Ref. N.J.S.A. 18A:18A-40.1)

3. Withholding of Monies – Percentage to be Withheld

The Board of Education shall withhold the following percentages of outstanding balances of monies owed to contractors:

Balances Exceeding \$500,000 -- Two (2%) Per Cent
Balances Less than \$500,000 -- Five (5%) Per Cent

The amounts withheld shall be returned to the contracts upon fulfillment of the terms of the contract.
(Ref. N.J.S.A. 18A:18A-40.1)

B. Prompt Payment

The Board of Education will provide payment in accordance with the “Prompt Payment” law as codified in N.J.S.A. 2A:30A-1 et seq. All payments to contractors are subject to approval by the Board of Education at a public meeting.

The Board of Education generally holds its Regular Public Meeting on the 4th Thursday of each month. It is at these meetings that the Board of Education reviews payment of bills.

All bills submitted to the Board for approval and payment pursuant to N.J.S.A. 2A:30A-1 et seq. must comply with the following provisions. The “billing date” shall be the date that the contractor signs the certification on the voucher/purchase order that the work has been performed. These bills include all bills for improvements to real property and contracts for engineers, architects, surveyors, design or skilled services relating to construction work.

Bills that are required to be approved by an engineering or architecture firm (prior to submission to the Board for approval) for purposes of confirmation of successful completion of construction work, shall be approved or disapproved within twenty (20) days of submission of same to the architect or engineer. If bills are disapproved or monies withheld from payment, the notice of the reason for same shall be given within the same twenty (20) days to the contractor.

The Board must approve payment of all bills. For the Board to consider a bill for approval it must be submitted to the School Business Administrator/Board Secretary at least two weeks prior to a scheduled/or re-scheduled Board meeting date. If the Board, or any agent or officer of the Board, determines that the bill is not approved then notice of the disapproval shall be sent to the contractor with five (5) days of the Board meeting on which the bill was listed for approval.

If the bill is approved by the Board, then payment shall be made to the contractor with seven (7) days of the Board meeting as per the “payment cycle.”

41. **PERFORMANCE BOND/CONTRACT AMOUNT (N.J.S.A. 2A:44-143/2A:44-147)**

- A. The contractor shall furnish a Performance, Payment and Completion Bond in a sum of at least one hundred percent (100%) of the total amount payable by the terms of his Contract. Such written guarantee shall be made payable to the Haddonfield Board of Education and shall be in the form required by Statute. Attached to the performance bond shall be a Surety Disclosure Statement and Certification which shall be complete in all respects and duly acknowledged according to law. A model Surety Disclosure Statement and Certification is presented in the Appendix Section of this proposal.
- B. Such bond shall further carry a stipulation that no advance, premature, excessive or delayed payments by the Board shall in any way affect the obligation of the Surety on its bond.
- C. Such bond shall further stipulate that no payments made to the contractor, nor partial or entire use of occupancy of the work by the Board shall be an acceptance of any work or materials not in accordance with this Contract and the Surety shall be equally bound to the same extent as the Contractor.
- D. It is expressly stipulated that the Surety for the Contractor on the project shall be obligated to make periodic inquiries of the Board at reasonable times, to determine whether its Principal has performed or was performing the Contract in accordance with all of its terms and conditions, particularly in relation to the progress payments scheduled under said Contract with the Board.
- E. In the event the Contractor defaults or fails to perform or finish the work prescribed under the Contract for any reason whatsoever, it shall become the unqualified obligation the Surety for the defaulting contractor to complete the Contract in accordance with its terms following receipt of notice from the Board of such default.
- F. The Board shall only accept one payment and performance bond to cover this public works contract. The performance bond shall contain language as found in N.J.S.A. 2A:44-14. The bond form language is presented in the Appendix Section of this proposal.
- G. Such Performance, Payment and Completion Bond shall be executed and delivered to the Board of Education when so requested by the Notice to Proceed Letter or within ten (10) days after the award of contract.

- H. The Board of Education will only accept performance bonds from surety companies that are licensed and qualified to do business in the State of New Jersey, and if the amount of the bond is \$850,000 but not more than \$3.5 million, the surety shall hold a current certificate of authority, issued by the United States Secretary of the Treasury pursuant to 31 U.S.C. 9305. (N.J.S.A. 2A:44-143 (b))

Please note: The name, address, and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the Board of Education and must be duly signed with original signatures.

42. **POLITICAL CONTRIBUTIONS DISCLOSURE – REQUIREMENTS**

Annual Disclosure

A business entity as defined by law is advised of its responsibility to file an annual disclosure statement on political contributions with the New Jersey Election Law Enforcement Commission pursuant to N.J.S.A. 19:44A-20.13 (P.L. 2005 Chapter 271 section 3) if the business entity receives contracts in excess of \$50,000 from public entities in a calendar year. It is the business entity's responsibility to determine if filing is necessary. Additional information on this requirement is available from the New Jersey Election Law Enforcement commission at 1-888-313-3532 or at www.elec.nj.us.

Chapter 271 Political Contribution Disclosure Form

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

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

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

The Haddonfield Board of Education has provided a Chapter 271 Political Contribution Disclosure Form within the specifications package for use by the business entity. The Board has also provided a list of agencies to assist the contractor. 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 Chapter 271 Political Contribution Disclosure 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.

POLITICAL CONTRIBUTIONS/AWARD OF CONTRACTS

Pursuant to N.J.A.C. 6A:23A-6.3 (a) (1-4) please note the following:

Award of Contract -- Reportable Contributions -- N.J.A.C. 6A:23A-6.3 (a) (1)

“No board of education will vote upon or award any contract in the amount of \$17,500 or greater to any business entity which has made a contribution reportable by the recipient under P.L.1973, c83 (codified at N.J.S.A. 19:44A-1 et seq.) to a member of the board of education during the preceding one-year period.

Contributions During Term of Contract – Prohibited -- N.J.A.C. 6A:23A-6.3 (a) (2-3)

“Contributions reportable by the recipient under P.L. 1973, c83 (codified at N.J.S.A. 19:44A-1 et seq.) to any member of the school board from any business entity doing business with the school district are prohibited during the term of the contract.”

“When a business entity referred in 4.1(e) is a natural person, contribution by that person’s spouse or child that resides therewith, shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity.”

Chapter 271 Political Contribution Disclosure Form – Required -- N.J.A.C. 6A:23A-6.3 (a) (4)

All business entities shall submit with their bid/proposal package a completed and signed Chapter 271 Political Contribution Disclosure Form. The Chapter 271 form will be reviewed by the Board to determine whether the business entity is in compliance with the aforementioned N.J.A.C. 6A:23A-6.3 (a) (2) Award of Contract.

The Chapter 271 Political Contribution Disclosure form shall be submitted with the response to the bid/proposal or no later than ten (10) days prior to the award of contract. Failure to provide the completed and signed form shall be cause for disqualification of the bid/proposal.

43. PRE-BID MEETINGS

The pre-bid meeting is an important part of the bidding process. It allows all bidders to have an equal understanding of the procurement requirements and of the scope of work involved. Although pre-bid meetings are not mandatory, all potential bidders are strongly encouraged to attend. Please review the General Specifications for a pre-bid meeting announcement. Any or all changes to the bid specifications discussed as a result of the Pre-Bid Meeting will be formalized in the form of any written addenda to the specifications and distributed in accordance with N.J.S.A. 18A:18A-21(c) (2).

44. PRE-QUALIFICATION OF BIDDERS

- A. Pursuant to N.J.S.A. 18A:18A-26, 27 et seq., all bidders on any contract for public work(s) which the entire cost of the contract exceeds \$20,000.00, must be pre-qualified by the Department of Treasury, Division of Property Management and Construction, as to character and amount of public work on which they may submit bids. No person shall be qualified to bid on any public work contract with the Board if he has not submitted a statement to the Department of Treasury, Division of Property Management and Construction which fully develops the financial ability, adequacy of plant and equipment, organization and prior experience of the prospective bidder, and such other pertinent and material facts, within a period of one year preceding the date of opening of the bids for such contract.
- B. Every pre-qualified bidder must submit with his proposal, a notarized affidavit setting forth the type of work and the amount of work for which he has been qualified, that there has been no material adverse change in his qualification information, the total amount of completed work on contracts at the time and date of the classification. Any bid not including a copy of this affidavit shall be rejected as being non-responsive to bid requirements. (N.J.S.A. 18A:18A-32) (**Prequalification Affidavit**)
- C. All bidders shall furnish satisfactory evidence that he and his subcontractors have sufficient means and experience in the type of work to complete the project in accordance with the bid specifications. A subcontractor listing and bidder’s personnel and experience sheet shall be submitted to the Board as

part of the bidding documents. Where the bidder intends to subcontract any portion of the project, the cost of which will exceed \$20,000.00, the sub-contractor shall be pre-qualified to perform the work and the bidder shall submit the requisite documentation pertaining to the sub-contractor in accordance with Paragraphs A and B above. The Board may make such additional investigations as it deems necessary to determine the ability, competence and financial responsibility of the bidder to perform the work. The bidder shall furnish the Board with the information and data for this purpose upon request. The Board reserves the right to reject any bid if the information fails to establish to the Board's satisfaction that the bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated here.

D. **Notice Of Classification** (For Contracts Exceeding \$20,000) (N.J.S.A. 18A:18A-26 et seq.)

Each bidder shall submit with his/her bid a copy of a valid and active Notice of Classification letter issued by the Department of Treasury, Division of Property Management and Construction as appropriate to the nature of the bid.

"The Board of Education, through its authorized agent, shall upon completion of the contract report to the State agency listed on the pre-qualification/classification letter as to the contractor's performance and shall furnish such report from time to time during performance if the contractor is then in default".

E. **Uncompleted Contracts** (For Contracts Exceeding \$20,000) (N.J.A.C. 17:19-2.13)

The Board also requires that each bidder submit with his bid a notarized Total Amount of Uncompleted Contracts form as prescribed by law. (Form DPMC 701)

F. **Prequalification Affidavit** (For Contracts Exceeding \$20,000)

Pursuant to N.J.S.A. 18A:18A-32, every bidder shall submit with his bid a prequalification affidavit.

45. **PREVAILING WAGES: CONSTRUCTION, ALTERATIONS, REPAIRS**

The State of New Jersey Prevailing Wage Act, Chapter 150 Laws of 1963 with applicable wage rates for Camden County as published by the Department of Labor and Workforce Development in conformance with N.J.S.A. 34:1156:25, is hereby made a part of these Contract Documents. Copies of these wage rates may be obtained from the State Department of Labor and Workforce Development, and/or viewed at www.state.nj.us/labor, the Prevailing Wages Determination Section.

Contractors bidding on this project are to comply with the requirements of the Prevailing Wage Rate Determination pursuant to N.J.S.A. 34:11-56.25, or the Davis-Bacon Prevailing Wage Rates, whichever is higher. Refer to Attachment #01.

Certified Payrolls

Contractor agrees to submit to the Board of Education a certified payroll for each payroll period within ten (10) days of the payment of wages. Contractor further agrees that no payments will be made to the Contractor if certified payrolls are not received. It is the Contractor's responsibility to insure timely receipt by the district of certified payrolls.

Before final payment, the contractor shall furnish the Board of Education with an affidavit stating that all workers have been paid the prevailing rate of wages in accordance with State of New Jersey requirements. The contractor shall keep an accurate record showing the name, craft, or trade and actual hourly rate of wages paid to each workman employed by him in connection with this work. Upon request, the Contractor(s) and each Subcontractor shall file written statements certifying to the amounts then due and owing to any and all workmen for wages due on account of the work. The statements shall be verified by the oaths of the Contractor or Subcontractor, as the case may be.

Posting of Prevailing Wages

The contractor shall post the prevailing wage rates for each craft and classification involved in the work, including the effective date of any changes thereof, in prominent and easily accessible places at the Site of the work and in such place or places as used to pay workmen their wages. (Ref. 18A:7G-23 and N.J.S.A. 34:11-56.32. The bidder shall submit a Prevailing Wages Certification with its bid package.

46. QUALIFICATION OF BIDDERS - Contractor Questionnaire Certification Form

The Board of Education may make such investigations as it seems necessary to determine the ability of the bidder to perform the terms of the contract. The bidder shall complete a Contractor Questionnaire Certification Form and return same with the bid and shall furnish all information to the Board as the Board may be required to determine the contractor’s ability to perform the duties and obligations as outlined in these specifications.

All bidders are reminded that bids may be rejected as not being responsive pursuant to N.J.S.A. 18A:18A-2(y) and therefore bidders are asked to complete the Questionnaire and to provide any supporting documentation with the bid package.

47. RESIDENT CITIZENS; PREFERRED IN EMPLOYMENT ON PUBLIC WORKS CONTRACTS

All bidders are to familiarize themselves with N.J.S.A. 34:9-2, which requires the contractor of any public work project to give preference in employment on the project, to citizens of the state of New Jersey. If the terms and conditions of N.J.S.A. 34:9-2 are not complied with, the contract shall be voidable. The Board is obligated to file with the Commissioner of Labor, the names and addresses of all contractors holding contracts with this project.

48. RENEWAL OF CONTRACT; AVAILABILITY AND APPROPRIATION OF FUNDS

The Board of Education may, at its discretion, request that a contract that is subject to renewal, be renewed in full accordance with N.J.S.A. 18A:18A-42. The School Business Administrator/Board Secretary may negotiate terms for a renewal of contract proposal and present such negotiated proposal to the Board of Education. The Board of Education is the final authority in awarding renewals of contracts. All multi-year contracts and renewals are subject to the availability and appropriation annually of sufficient funds as may be needed to meet the extended obligation.

49. RIGHT TO KNOW LAW

All potentially hazardous materials or substances must be properly labeled in full accordance with the New Jersey Right to Know Law - N.J.S.A. 34:5A-1 et seq. All contractors or vendors who need additional information about the New Jersey Right to Know Law are to contact the:

New Jersey Department of Health
Right to Know Program
CN 368
Trenton, New Jersey 08625-0368
rtk@doh.state.nj.us

50. STOCKHOLDERS’ DISCLOSURE (N.J.S.A. 52:25-24.2)

No corporation, partnership or limited liability company, shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, the cost of which is to be paid with or out of any public funds, by the State, or any county, municipality or school district, or any subsidiary or agency of the State, or of any county, municipality or school district, or by any authority, board, or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid, of said corporation, said partnership, or said limited liability company, there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of

any class or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. If one or more such stockholder or partner or member is itself a corporation or partnership, or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every non corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established in this act, has been listed.

To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest. N.J.S.A. 52:25-24.2—as amended P.L. 2016 c.43

The Haddonfield Board of Education has provided within the specifications, a two (2) page form entitled:

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP

All bidders/respondents are to complete, sign and submit both pages for the form.

Failure to complete, sign and submit the Stockholders' Disclosure Form with the bid/proposal, shall be cause for the disqualification of the bid/proposal.

51. SUBCONTRACTING: Subcontractor Disclosure Statement

Pursuant to N.J.S.A. 18A:18A-18(b) any bidder who bids for the overall contract and who will subcontract the following work:

- Plumbing and gas fitting work;
- Refrigeration, heating and ventilating systems and equipment;
- Electrical work, tele-data, fire alarm or security systems; and
- Structural steel and ornamental iron work;

The bidder shall identify the subcontractor that will be used on the form provided by the school district

Qualified Subcontractors

If the cost of the work done by the subcontractors exceeds \$20,000.00, then said contractor shall be qualified in accordance with Article 6 N.J.S.A. 18A:18A-26 et seq. For those subcontractors in the four branches listed above, the bidder shall supply proof that the subcontractor is qualified by submitting with the bid the subcontractor's:

- Notice of Classification Form
- Total Amount of Uncompleted Contractor's Form—Certified (Form DPMC 701)

For all other subcontractors who will perform work valued in excess of \$20,000.00, the bidder shall submit the evidence of the subcontractor's qualifications listed above within ten (10) days of receipt of notice of the award of contract.

Documents to be Submitted: All Subcontractors

The prime contractor (bidders) who will be using a subcontractor on any part of this bid, shall identify the subcontractor(s) on the appropriate form and submit with the bid package the following subcontractor documents at the time indicated in the box below:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
Estimated Value of Contract – Subcontractor	For Subcontractors in the four major branches listed above: <i><u>Submit With Bid</u></i>	For all other Subcontractors: <i><u>Submit Within ten (10 Days of Receipt of Notice of Award)</u></i>
\$2,000 through \$5,999	Contractor’s Registration Certificate	
\$6,000 through \$17,499	Contractor’s Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor’s Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor’s Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Failure to identify in the Subcontractor’s Disclosure Statement the names and addresses of any or all subcontractors required to be named in the bid, or to submit with the bid the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.

Contractors are reminded that the subcontractors listed on the forms provided by the school district may not be changed later, except in the case of failure in performance or other contract breach where a change is needed to protect the school district.

52. SUBCONTRACTING: PROHIBITIONS: HOLD HARMLESS

Prime contractors, with whom the Board of Education have an executed contract, may not subcontract any part of any work done for the Board without first receiving written approval from the Board. Contractors seeking to use subcontractors must first complete the Request to Subcontract Form as provided by the Building Services Department.

Subcontractors Prohibited to Subcontract

It is the responsibility of the prime contractor to ensure that no subcontractor who has received written permission to do work for the Board, subcontracts any of its/their work without first receiving written approval from the prime contractor **and** the Board or their designee.

The prime contractor assumes all responsibility for work performed by subcontractors. The prime contractor must also provide to the Board Business Office the following documents secured from all approved subcontractors:

- Insurance Certificate as outlined in the bid specifications;
- Affirmative Action Evidence as outlined in the bid specifications;
- Written certification that the subcontractor shall adhere to prevailing wages as provided through New Jersey State Law;
- Evidence of Performance Security;
- Documents listed in the Subcontractor Document Submissions list.

In cases of subcontracting, the Board of Education shall only pay the prime contractor. It is the sole responsibility of the prime contractor to ensure that all subcontractors are paid. The Board of Education shall not be responsible for payments to subcontractors and shall be held harmless against any or all claims generated against prime contractors for non-payment to subcontractors.

Penalties – Unauthorized Subcontractors

The Board of Education shall deduct the amount of \$1,000.00 (one thousand dollars) per day as a penalty, for each day a prime contractor uses a subcontractor without first receiving **written** permission from the Building Services Department.

53. TAXES; Contractor’s Use of Board’s Tax Exempt Status

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.

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 for guidance. Again, contractors are not permitted to use the Board’s tax identification number to purchase supplies, materials, services of equipment.

54. TERMINATION OF CONTRACT

If the Board determines that the contractor has failed to comply with the terms and conditions of the bid and/or proposal upon which the issuance of the contract is based or that the contractor has failed to perform said service, duties and or responsibilities in a timely, proper, professional and/or efficient manner, then the Board shall have the authority to terminate the contract upon written notice setting forth the reason for termination and effective date of termination.

Termination by the Board of the contract does not absolve the contractor from potential liability for damages caused the District by the contractor’s breach of this agreement. The Board may withhold payment due the contractor and apply same towards damages once established. The Board will act diligently in accordance with governing statutes to mitigate damages. Damages may include the additional cost of procuring said services or goods from other sources.

The contractor further agrees to indemnify and hold the District harmless from any liability to subcontractors or suppliers concerning work performed or goods provided arising out of the lawful termination of this agreement.

55. WITHDRAWAL OF BIDS

Before The Bid Opening

The School Business Administrator/Board Secretary may consider a written request from a bidder to withdraw a bid if the written request is received by the School Business Administrator/Board Secretary before the advertised time of the bid opening. Any bidder who has been granted permission by the School Business Administrator/Board Secretary to have his/her bid withdrawn cannot re-submit a bid for the same advertised bid project. That bidder shall also be disqualified from future bidding on the same project if the project is re-bid.

After The Bid Opening

The Board of Education may consider a written request from a bidder to withdraw a bid, if the written request is received by the School Business Administrator/Board Secretary within five (5) business days after the bid opening. A request to withdraw a bid after the specified number of days will not be honored.

The contractor/vendor who wishes to withdraw a bid must provide a certification supported by written factual evidence that an error or omission was made by the contractor and that the error or omission was a substantial computational error or an unintentional omission or both.

The request to withdraw a bid after the bid opening may be reviewed by the School Business Administrator/Board Secretary, the Director of Facilities, other interested administrators; and the Architect/Engineer of Record for the project (if necessary) and/or the Board Attorney and a recommendation will be made to the Board of Education. If the Board of Education grants permission to have the bid withdrawn the contractor/vendor shall be disqualified from bidding on the same project if the project is re-bid. If the contractor/vendor fails to meet the burden of proof to have the bid withdrawn the request to withdraw the bid will be denied and if the contractor/vendor fails to execute the contract the bid guarantee will be forfeited and become property of the Board of Education.

56. **AWARD OF CONTRACT**

The Board of Education intends to award the contract for the project: **#14.0 – Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School**, and/or **#14.01 – Toilet Room Renovations at Elizabeth Haddon Elementary School**, and/or **#14.02 – Toilet Room Renovations at Haddonfield Memorial High School**, and/or **#14.03 – Toilet Room Renovations at J. Fithian Tatem Elementary School**

57. **EXPERIENCE**

The Board of Education requires evidence from all bidders that they have completed work or projects of a similar nature as outlined in the bid package. Bidders are to provide evidence of satisfactory completion of work of similar nature as outlined in the bid from Three (3) Boards of Education in New Jersey within the past Ten (10) years.

58. **NUMBER OF WORKING DAYS** -- (N.J.S.A. 18A:18A-19)

The contractor agrees to substantially complete this public works project to the satisfaction of the Board of Education by **Friday, September 1, 2023**. The district has defined a working day as a calendar day.

The number of working days set by the district may be extended by mutual agreement between the contractor and the district. The mutual agreement shall be in writing and will be considered an addendum to the contract.

59. **PRE-BID MEETING**

A pre-bid meeting at the Project Site for this project is scheduled for:

Wednesday, February 1st, 2023
3:00 p.m.
Haddonfield Memorial High School
401 Kings Highway East, Haddonfield, New Jersey

The purpose of this meeting is to review the legal and technical requirements of the bid proposal. While attendance is not mandatory, prospective bidders are strongly encouraged to attend this important meeting. Addenda to this bid proposal may be issued as a result of the pre-bid meeting. Failure to attend the meeting will not excuse any bid mistake and/or omission due to bidder's ignorance of information disseminated at the meeting.

60. **TRADE CLASSIFICATION(S) (Optional)**

A. Bidder:

For the purpose of this Public Works bid, each bidder shall be classified by the State of New Jersey—Division of Property Management and Construction in the following trade(s):

Classification Code

C008 or C009

Classification Trade Name

General Construction or General Construction
Additions and Alterations

Proof of classification shall be submitted with the bid package in the form of a current Notice of Classification as issued by the New Jersey Division of Property Management and Construction.

B. Subcontractor:

Proof of classification, in the form of a current Notice of Classification form, for each sub-Contractor, shall be submitted by the bidder with the bid package for any estimated subcontractor work exceeding \$20,000.00.

HADDONFIELD BOARD OF EDUCATION

**BID DOCUMENTS
AND
REQUIRED DOCUMENTATION**

All documents in this section shall be completed, signed and submitted with the bid package – Failure to submit the bid documents and other documents so specified may be cause to reject the bid for being non-responsive (N.J.S.A. 18A:18A-2(y)).

Michael Catalano

Business Administrator/Board Secretary

BID PROPOSAL FORM

CONTRACT 14.0: Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School

Base Bid in the sum of _____ Dollars (\$ _____) which includes the Allowance No. 1 listed below.

ALLOWANCES (included in the Base Bid value above):

Allowance No. 1: Fifty Thousand dollars (\$50,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

CONTRACT 14.01: Toilet Room Renovations at Elizabeth Haddon Elementary School

Base Bid in the sum of _____ Dollars (\$ _____) which includes the Allowance No. 1 listed below.

ALLOWANCES (included in the Base Bid value above):

Allowance No. 1: Twenty Thousand dollars (\$20,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

CONTRACT 14.02: Toilet Room Renovations at Haddonfield Memorial High School

Base Bid in the sum of _____ Dollars (\$ _____) which includes the Allowance No. 1 listed below.

ALLOWANCES (included in the Base Bid value above):

Allowance No. 1: Ten Thousand dollars (\$10,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

CONTRACT 14.03: Toilet Room Renovations at J. Fithian Tatem Elementary School

Base Bid in the sum of _____ Dollars (\$ _____) which includes the Allowance No. 1 listed below.

ALLOWANCES (included in the Base Bid value above):

Allowance No. 1: Twenty Thousand dollars (\$20,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

BID PROPOSAL FORM (Continued)

Bidder's Authorized Representative:

Name: _____
(Printed/Typed)

Title: _____
(Printed/Typed)

Signature: _____

Date: _____

(Seal)

ACKNOWLEDGEMENT OF ADDENDA AND CLARIFICATIONS

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

The bidder acknowledges receipt of the hereinafter enumerated Addenda which have been issued during period of bidding and agrees that said Addenda shall become a part of this contract. The bidder shall list below the numbers and issuing dates of the Addenda.

<u>ADDENDA NO.</u>	<u>ISSUING DATES</u>
_____	_____
_____	_____

<u>CLARIFICATION NO.</u>	<u>ISSUING DATES</u>
_____	_____
_____	_____

No Addenda Received

No Clarifications Received

Name of Company _____

Address _____ P.O. Box _____

City, State, Zip Code _____

Name of Authorized Representative _____

Signature _____ **Date** _____

BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION
(To be submitted with each bid or offer exceeding \$100,000)

The undersigned, [Company] _____ certifies, to the best of his or her knowledge, that:

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

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

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

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor, [Company] _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 *et seq.*, apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Name and Title of Contractor's Authorized Official

Date

Haddonfield Board of Education

Chapter 271
Political Contribution Disclosure Form
(Contracts that Exceed \$17,500.00)
Ref. N.J.S.A. 19:44-20.26

The undersigned, being authorized and knowledgeable of the circumstances, does hereby certify that _____ (**Business Entity**) has made the following **reportable** political contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26 during the twelve (12) months preceding this award of contract:

Reportable Contributions

<u>Date of Contribution</u>	<u>Amount of Contribution</u>	<u>Name of Recipient Elected Official/ Committee/Candidate</u>	<u>Name of Contributor</u>

The Business Entity may attach additional pages if needed.

No Reportable Contributions (Please check (☑) if applicable.)

I certify that _____ (**Business Entity**) made no reportable contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26.

Certification

I certify that the information provided above is in full compliance with Public Law 2005—Chapter 271.

Name of Authorized Agent _____

Signature _____ Title _____

Business Entity _____

Title of Bid: Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School
Contract No: 14

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Contractor Instructions

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

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

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

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

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

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

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

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

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

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

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

P.L. 2005, c.271

(Unofficial version, Assembly Committee Substitute to A-3013, First Reprint*)

AN ACT authorizing units of local government to impose limits on political contributions by contractors and supplementing Title 40A of the New Jersey Statutes and Title 19 of the Revised Statutes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

40A:11-51 1. a. A county, municipality, independent authority, board of education, or fire district is hereby authorized to establish by ordinance, resolution or regulation, as may be appropriate, measures limiting the awarding of public contracts therefrom to business entities that have made a contribution pursuant to P.L.1973, c.83 (C.19:44A-l et seq.) and limiting the contributions that the holders of a contract can make during the term of a contract, notwithstanding the provisions and parameters of sections 1 through 12 of P.L.2004, c.19 (C. 19:44A-20.2 et al.) and section 22 of P.L.1973, c.83 (C.19:44A-22).

b. The provisions of P.L.2004, c.19 shall not be construed to supersede or preempt any ordinance, resolution or regulation of a unit of local government that limits political contributions by business entities performing or seeking to perform government contracts. Any ordinance, resolution or regulation in effect on the effective date of P.L.2004, c.19 shall remain in effect and those adopted after that effective date shall be valid and enforceable.

c. An ordinance, resolution or regulation adopted or promulgated as provided in this section shall be filed with the Secretary of State.

19:44A-20.26 2. a. Not later than 10 days prior to entering into any contract having an anticipated value in excess of \$17,500, except for a contract that is required by law to be publicly advertised for bids, a State agency, county, municipality, independent authority, board of education, or fire district shall require any business entity bidding thereon or negotiating therefor, to submit along with its bid or price quote, a list of political contributions as set forth in this subsection that are reportable by the recipient pursuant to the provisions of P.L.1973, c.83 (C.19:44A-l et seq.) and that were made by the business entity during the preceding 12 month period, along with the date and amount of each contribution and the name of the recipient of each contribution. A business entity contracting with a State agency shall disclose contributions to any State, county, or municipal committee of a political party, legislative leadership committee, candidate committee of a candidate for, or holder of, a State elective office, or any continuing political committee. A business entity contracting with a county, municipality, independent authority, other than an independent authority that is a State agency, board of education, or fire district shall disclose contributions to: any State, county, or municipal committee of a political party; any legislative leadership committee; or any candidate committee of a candidate for, or holder of, an elective office of that public entity, 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, or any continuing political committee.

The provisions of this section shall not apply to a contract when a public emergency requires the immediate delivery of goods or services.

b. When a 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. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by: all principals, partners, officers, or directors of the business entity or their spouses; any subsidiaries directly or indirectly controlled by the business entity; or any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee, shall be deemed to be a contribution by the business entity.

c. As used in this section:

"business entity" means a natural or legal person, business corporation, professional services corporation, limited liability company, partnership, limited partnership, business trust, association or any other legal commercial entity organized under the laws of this State or of any other state or foreign jurisdiction;

"interest" means the 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, as appropriate; and

"State agency" means any of the principal departments in the Executive Branch of the State Government, and any division, board, bureau, office, commission or other instrumentality within or created by such department, the Legislature of the State and any office, board, bureau or commission within or created by the Legislative Branch, and any independent State authority, commission, instrumentality or agency.

d. Any business entity that fails to comply with the provisions of this section shall be subject to a fine imposed by the New Jersey Election Law Enforcement Commission in an amount to be determined by the commission which may be based upon the amount that the business entity failed to report.

19:44A-20.13 3. a. Any business entity making a contribution of money or any other thing of value, including an in-kind contribution, or pledge to make a contribution of any kind to a candidate for or the holder of any public office having ultimate responsibility for the awarding of public contracts, or to a political party committee, legislative leadership committee, political committee or continuing political committee, which has received in any calendar year \$50,000 or more in the aggregate through agreements or contracts with a public entity, shall file an annual disclosure statement with the New Jersey Election Law Enforcement Commission, established pursuant to section 5 of P.L.1973, c.83 (C.19:44A-5), setting forth all such contributions made by the business entity during the 12 months prior to the reporting deadline.

b. The commission shall prescribe forms and procedures for the reporting required in subsection a. of this section which shall include, but not be limited to:

(1) the name and mailing address of the business entity making the contribution, and the amount contributed during the 12 months prior to the reporting deadline;

(2) the name of the candidate for or the holder of any public office having ultimate responsibility for the awarding of public contracts, candidate committee, joint candidates committee, political party committee, legislative leadership committee, political committee or continuing political committee receiving the contribution; and

(3) the amount of money the business entity received from the public entity through contract or agreement, the dates, and information identifying each contract or agreement and describing the goods, services or equipment provided or property sold.

c. The commission shall maintain a list of such reports for public inspection both at its office and through its Internet site.

d. When a 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. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by: all principals, partners, officers, or directors of the business entity, or their spouses; any subsidiaries directly or indirectly controlled by the business entity; or any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee, shall be deemed to be a contribution by the business entity.

As used in this section:

"business entity" means a natural or legal person, business corporation, professional services corporation, limited liability company, partnership, limited partnership, business trust, association or any other legal commercial entity organized under the laws of this State or of any other state or foreign jurisdiction; and

"interest" means the 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, as appropriate.

e. Any business entity that fails to comply with the provisions of this section shall be subject to a fine imposed by the New Jersey Election Law Enforcement Commission in an amount to be determined by the commission which may be based upon the amount that the business entity failed to report.

4. This act shall take effect immediately.

* Note: Bold italicized statutory references of new sections are anticipated and not final as of the time this document was prepared. Statutory compilations of N.J.S.A. 18A:18A-51 is anticipated to show a reference to N.J.S.A. 40A:11-51 and to N.J.S.A.19:44A-20.26.

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

County Name: Camden

State: Governor, and Legislative Leadership Committees

Legislative District #: 4, 5, 6, & 7

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

County:

Freeholders County Clerk Sheriff Surrogate

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

Audubon Borough	Gloucester City	Pennsauken Township
Audubon Park Borough	Gloucester Township	Pine Hill Borough
Barrington Borough	Haddon Heights Borough	Pine Valley Borough
Bellmawr Borough	Haddon Township	Runnemede Borough
Berlin Borough	Haddonfield Borough	Somerdale Borough
Berlin Township	Hi-nella Borough	Stratford Borough
Brooklawn Borough	Laurel Springs Borough	Tavistock Borough
Camden City	Lawnside Borough	Voorhees Township
Cherry Hill Township	Lindenwold Borough	Waterford Township
Chesilhurst Borough	Magnolia Borough	Winslow Township
Clementon Borough	Merchantville Borough	Woodlyne Borough
Collingswood Borough	Mount Ephraim Borough	
Gibbsboro Borough	Oaklyn Borough	

Boards of Education (Members of the Board):

Audubon Borough	Regional	Oaklyn Borough
Audubon Park Borough	Gibbsboro Borough	Pennsauken Township
Barrington Borough	Gloucester City	Pine Hill Borough
Bellmawr Borough	Gloucester Township	Pine Valley
Berlin Borough	Haddon Heights Borough	Runnemede Borough
Berlin Township	Haddon Township	Somerdale Borough
Black Horse Pike Regional	Haddonfield Borough	Sterling High School District
Brooklawn Borough	Hi Nella	Stratford Borough
Camden City	Laurel Springs Borough	Tavistock
Cherry Hill Township	Lawnside Borough	Voorhees Township
Chesilhurst	Lindenwold Borough	Waterford Township
Clementon Borough	Magnolia Borough	Winslow Township
Collingswood Borough	Merchantville Borough	Woodlyne Borough
Eastern Camden County	Mount Ephraim Borough	

Fire Districts (Board of Fire Commissioners):

Berlin Township Fire District No. 1	Haddon Township Fire District No. 1
Cherry Hill Fire District No. 13	Haddon Township Fire District No. 2
Gloucester Township Fire District No. 1	Haddon Township Fire District No. 3
Gloucester Township Fire District No. 2	Haddon Township Fire District No. 4
Gloucester Township Fire District No. 3	Lindenwold Borough Fire District No. 1
Gloucester Township Fire District No. 4	Pine Hill Borough Fire District No. 1
Gloucester Township Fire District No. 5	Voorhees Township Fire District No. 3
Gloucester Township Fire District No. 6	Winslow Township Fire District No. 1

Haddonfield Board of Education

CONTRACTOR QUESTIONNAIRE/CERTIFICATION

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

Name of Company _____

Street Address _____ P.O. Box _____

City, State, Zip _____

Business Phone Number () _____ Extension _____

Emergency Phone Number () _____

FAX NO. () _____ E-Mail _____

FEIN No. _____

Questionnaire

1. How many years have you been engaged in the contracting business under your present firm or trading name?
_____ Years

2. Have you ever failed to complete any work awarded to your company?

Yes No

If yes, explain _____

3. Have you ever defaulted on a contract?

Yes No

If yes, explain _____

4. Have you or other principals of your company been debarred, suspended, proposed for debarment, declared ineligible, or voluntary excluded from participation in any public works projects by any federal, state, or local agencies, including any **"prior negative experience"** disqualification pursuant to N.J.S.A. 18A:18A-4 (b) (c)?

Yes No

(Form continued on next page)

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

Name of Company

If yes, explain _____

Experience – Educational Facilities:

The Board of Education requires evidence from all bidders that they have completed work or projects of a similar nature as outlined in the bid package. Bidders are to provide evidence of satisfactory completion of work of similar nature as outlined in the bid from up to Three (3) public school districts in New Jersey within the past Ten (10) years. Bidders are to complete the section on experience and provide supporting documentation with the bid package.

A. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

B. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

C. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

(Form continued on next page)

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

Name of Company

References

Architects--List names of architects that you have worked with on projects within the last five (5) years.

<u>Firm</u>	<u>Principal</u>	<u>Phone Number</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____

Bank--List name of principal bank with which your company does business.

<u>Bank</u>	<u>Officer</u>	<u>Phone Number</u>
_____	_____	_____

Trade--List names of companies within your trade with which your company does business:

<u>Firm</u>	<u>Principal</u>	<u>Phone Number</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____

(Form continued on next page)

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. 14

Bid Date February 17, 2023

Name of Company

Certifications

• **Debarment**

I certify that the entity listed on the form or any person 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)

• **Direct/Indirect Interests**

I declare and certify that no member of the Haddonfield Board of Education, nor any officer or employee or person whose salary is payable in whole or in part by said Board of Education or their immediate family members are directly or indirectly interested in this bid or in the supplies, materials, equipment, work or services to which it relates, or in any portion of profits thereof. If a situation so exists where a Board member, employee, officer of the board has an interest in the bid, etc., then please attach a letter of explanation to this document, duly signed by the president of the firm or company.

• **Gifts; Gratuities; Compensation**

I declare and certify that no person from my firm, business, corporation, association or partnership offered or paid any fee, commission or compensation, or offered any gift, gratuity or other thing of value to any school official, board member or employee of the Board of Education.

• **Vendor Contributions**

I declare and certify that I fully understand N.J.A.C. 6A:23A-6.3 (a) (1-4) concerning vendor contributions to school board members.

• **False Material Representation**

I further certify that I understand that it is a crime in the second degree in New Jersey to knowingly make a material representation that is false in connection with the negotiation, award or performance of a government contract.

President or Authorized Agent

Signature

CERTIFICATION OF NON-DEBARMENT FOR FEDERAL GOVERNMENT CONTRACTS

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

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

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

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

PART II – CERTIFICATION OF NON-DEBARMENT: Individual or Organization			
<p>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 <name of contracting unit> 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 <type of contracting unit> to notify the <type of contracting unit> 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 <type of contracting unit>, permitting the <type of contracting unit> to declare any contract(s) resulting from this certification void and unenforceable.</p>			
Full Name (Print):		Title:	
Signature:		Date:	

PART III – CERTIFICATION OF NON-DEBARMENT: Individual or Entity Owning Greater than 50 Percent of Organization	
Section A (Check the Box that applies)	
<input type="checkbox"/>	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of its voting stock, or of the partner in the partnership who owns more than 50 percent interest therein, or of the member of the limited liability company owning more than 50 percent interest therein, as the case may be.
Name of Individual or Organization	
Home Address (for Individual) or Business Address	
OR	
<input type="checkbox"/>	No one stockholder in the corporation owns more than 50 percent of its voting stock, or no partner in the partnership owns more than 50 percent interest therein, or no member in the limited liability company owns more than 50 percent interest therein, as the case may be.
Section B (Skip if no Business entity is listed in Section A above)	
<input type="checkbox"/>	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of the voting stock of the organization’s parent entity, or of the partner in the partnership who owns more than 50 percent interest in the organization’s parent entity, or of the member of the limited liability company owning more than 50 percent interest in organization’s parent entity, as the case may be.
Stockholder/Partner/Member Owning Greater Than 50 Percent of Parent Entity	
Home Address (for Individual) or Business Address	
OR	
<input type="checkbox"/>	No one stockholder in the parent entity corporation owns more than 50 percent of its voting stock, no partner in the parent entity partnership owns more than 50 percent interest therein, or no member in the parent entity limited liability company owns more than 50 percent interest therein, as the case may be.

Section C – Part III Certification			
<p>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 <name of contracting unit> 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 <type of contracting unit> to notify the <type of contracting unit> 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 <type of contracting unit>, permitting the <type of contracting unit> to declare any contract(s) resulting from this certification void and unenforceable.</p>			
Full Name (Print):		Title:	
Signature:		Date:	

Part IV – CERTIFICATION OF NON-DEBARMENT: Contractor – Controlled Entities	
Section A	
<input type="checkbox"/>	<p>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.</p>
Name of Business Entity	Business Address
Add additional sheets if necessary	
OR	
<input type="checkbox"/>	<p>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.</p>

Section B (skip if no business entities are listed in Section A of Part IV)			
<input type="checkbox"/>	Below are the names and addresses of any entities in which an entity listed in Part III A owns greater than 50 percent of the voting stock (corporation) or owns greater than 50 percent interest (partnership or limited liability company).		
Name of Business Entity Controlled by Entity Listed in Section A of Part IV	Business Address		
Add additional Sheets if necessary			
OR			
<input type="checkbox"/>	No entity listed in Part III A owns greater than 50 percent of the voting stock in any corporation or owns greater than 50 percent interest in any partnership or limited liability company.		
Section C – Part IV Certification			
<p>I hereby certify that the Organization listed above in Part I does not own greater than 50 percent of any entity that that is debarred by the federal government from contracting with a federal agency and, if applicable, does not own greater than 50 percent of any entity that in turns owns greater than 50 percent of any entity debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the <name of contracting unit> 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 <type of contracting unit> to notify the <type of contracting unit> 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 <type of contracting unit>, permitting the <type of contracting unit> to declare any contract(s) resulting from this certification void and unenforceable.</p>			
Full Name (Print):		Title:	
Signature:		Date:	

CONTRACTOR REGISTRATION CERTIFICATION

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

It is the determination of the Board of Education that this is a public works project that in total will exceed \$2,000.00 (two thousand dollars), therefore pursuant to the Public Works Contractor Registration Act -- N.J.S.A. 34:11-56.48 et seq., no contractor shall bid on any project for public works unless the contractor is registered pursuant to the act.

I certify that our company understands that the project of the Board of Education requires that all contractors and subcontractors listed in this proposal possess a valid Contractor Registration Certificate at the time the proposal is received by the Board and furthermore certify that I will provide copies of the valid certificate prior to the award of contract.

Name of Company _____

Authorized Agent _____

Authorized Signature _____

EQUIPMENT CERTIFICATION

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

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 _____

Authorized Signature _____

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

Quote Number:

Bidder/Offeror:

PART 1: CERTIFICATION

BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

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

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

PLEASE CHECK THE APPROPRIATE BOX:

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

OR

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

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

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

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

Name	<input type="text"/>	Relationship to Bidder/Offeror	<input type="text"/>
Description of Activities	<input type="text"/>		
Duration of Engagement	<input type="text"/>	Anticipated Cessation Date	<input type="text"/>
Bidder/Offeror Contact Name	<input type="text"/>	Contact Phone Number	<input type="text"/>

ADD AN ADDITIONAL ACTIVITIES ENTRY

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

Full Name (Print):

Signature:

Do Not Enter PIN as a Signature

Title:

Date:

AFFIRMATIVE ACTION QUESTIONNAIRE

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

This form is to be completed and returned with the proposal. However, the Board will accept in lieu of this Questionnaire, a current Affirmative Action Evidence - Certificate of Employee Information Report.

1. Our company has a federal Affirmative Action Plan approval Yes No

If yes, please attach a copy of the plan to this questionnaire.

2. Our company has a N.J. State Certificate of Employee Information Report Yes No

If yes, please attach a copy of the certificate to this questionnaire.

3. If you answered "NO" to both questions No. 1 and 2, you must apply for an Affirmative Action Employee Information Report – Form AA302.

Please visit the New Jersey Department of Treasury website for the Division of Public Contracts Equal Employment Opportunity Compliance: www.state.nj.us/treasury/contract/compliance

- Click on "Employee Information Report"
- Complete and submit the form with the appropriate payment to:

Department of Treasury
Division of Public Contracts/EEO Compliance
P.O. Box 209
Trenton, NJ 08625-0002

All fees for this application are to be paid directly to the State of New Jersey. A copy shall be submitted to the Board of Educations within seven (7) days of the notice of the intent to award the contract or the signing of the contract.

I certify that the above information is correct to the best of my knowledge.

Name: _____

Signature _____

Title _____ Date _____

Name of Company _____

Address _____

City, State, Zip _____

NON-COLLUSION AFFIDAVIT

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

Re: Bid Proposal for the Haddonfield Board of Education.

STATE OF _____

:SS:

COUNTY OF _____

I, _____ of the City of _____

in the County of _____ and the State of _____

of full age, being duly sworn according to law on my oath depose and say that:

I am _____ (Position in Company)

of the firm of _____ and the bidder making the Proposal for the above names contract, and that I executed the said Proposal with full authority so to do; that I have not, directly or indirectly, entered into any agreement, participated in any collusion, discussed any or all parts of this proposal with any potential bidder, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named bid, and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge that the Board of Education relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said bid.

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 of bona fide established commercial or selling agencies maintained by

(Print Name of Contractor)

Subscribed and sworn to: _____
(SIGNATURE OF CONTRACTOR)

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

NOTARY PUBLIC SIGNATURE

Print Name of Notary Public

My commission expires _____, _____ - Seal -
Month Day Year

PRE-QUALIFICATION AFFIDAVIT

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

The below affidavit must be submitted with your bid for projects over \$20,000.00 pursuant to N.J.S.A. 18A:18A-32:

I, _____ of the City of _____
in the County of _____ and the State of _____
of full age, being duly sworn according to law on my oath depose and say that:

No Material Adverse Change in Qualification—N.J.S.A. 18A:18A-32

I am _____ (*Position in Company*), and the bidder for the above named project and the answers to the following statements are true and correct and that there has been no material adverse change in the qualification information subsequent to the latest statement submitted as required (N.J.S.A. 18A:18A-32 et seq.) as amended, except as set forth herewith:

Notice of Classification

_____ (*Name of Company*) is classified by the State of New Jersey under Chapter 105, Laws of 1962, as amended. This Classification became effective _____ (*Date*)

Type of Contract/Trade Classified: _____

Classification Approved Amount \$ _____

A copy of my valid and active prequalification/classification certificate from the Department of Treasury, Division of Property Management and Construction is attached.

Total Amount of Uncompleted Contracts

The total amount of uncompleted work on contracts is \$ _____

A copy of the company’s Total Amount of Uncompleted Contracts form is required to be submitted with the bid.

Signature of Authorized Representative **Date**

Sworn and subscribed to before me this _____ day of _____ in the Year _____.

Signature of Notary **Print Name of Notary** Notary Public of _____

My Commission Expires: _____ **-SEAL-**
Month Day Year

This affidavit does not take the place of the “Notice of Classification” or the “Total Amount of Uncompleted Contracts” issued by the State of New Jersey, both of which must be submitted with the bid package of each bidder.

PREVAILING WAGES CERTIFICATION

Title of Bid

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

It is the determination of the Board of Education 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.

CERTIFICATION

- 1. I certify that our company understands that this project of the Board of Education requires prevailing wages to be paid in full accordance with the law.
- 1. I further certify that all subcontractors named in this bid understand that this project requires the subcontractor to pay prevailing wages in full accordance with the law.

NOTIFICATION OF VIOLATIONS – New Jersey Department of Labor

Has the bidder or any person having an “interest” with the bidder, been notified by the New Jersey Department of Labor by notice issued pursuant to N.J.S.A. 34:11-56:37 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 NJDOL within the last five (5) years.

Please include any pending administrative proceedings with the NJ Department of Labor, if any.

Submission of Certified Payroll Records

All certified payroll records are to be submitted to the person named below who is coordinating the activities for the project:

Barbara Noble
Haddonfield Board of Education

Name of Company _____

Authorized Agent _____

Authorized Signature _____

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP

Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School

No corporation, partnership or limited liability company, shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any material or supplies, the cost of which is to be paid with or out of any public funds, by the State or any county, municipality or school district, or any subsidiary or agency of the State, or by an authority, board or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid of said corporation, said partnership, said limited liability company, there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. If one or more such stockholder, partner or member is itself a corporation or partnership or limited liability company, the stockholder holding 10 percent or more of that corporation's stock or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company as the case may be, shall also be listed. The disclosure shall be, continued until names and addresses of every non-corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established in this act, has been listed.

Please check one type of Ownership, complete the form, and execute where provided.

- | | |
|--|--|
| <input type="checkbox"/> <u>Corporation--</u>
<input type="checkbox"/> <u>Partnership--</u>
<input type="checkbox"/> <u>Sole Proprietorship--</u>
<input type="checkbox"/> <u>Sub Chapter S Corp.--</u> | <input type="checkbox"/> <u>Limited Partnership--</u>
<input type="checkbox"/> <u>Limited Liability Company--</u>
<input type="checkbox"/> <u>Limited Liability Partnership--</u>
<input type="checkbox"/> Other- _____ |
|--|--|

IT IS MANDATORY THAT THIS FORM BE COMPLETED AND SUBMITTED WITH BID/PROPOSAL. In the event that there are no persons who own ten percent or more of the stock or ownership of the bidder, then such fact should be certified below as part of this disclosure.

Name of Company _____

List of Owners with Ten Percent (10%) or More Interest

<u>Owner's Name</u>	<u>Home Address</u>

NOTE: If you need more space than that provided above, please use an extra sheet for furnishing the above required information for any remaining persons or entities.

Signature _____ **Date** _____

This form shall be completed, signed and submitted with the bid/proposal. The form continues on the next page.

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP (cont.)

If your firm is not a corporation and/or partnership, please explain below how your firm is organized and include a list of the various principals.

Our firm, _____, is organized

Names of Principals

Title

Use additional paper if needed. Check here if additional sheets are attached.

Name of Company _____

Address _____

City, State, Zip _____

Authorized Agent _____ Title _____

SIGNATURE OF AUTHORIZED AGENT

This form shall be completed, signed and submitted with the bid/proposal.

SUBCONTRACTOR'S DISCLOSURE FORM

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. **14**

Bid Date **February 17, 2023**

The _____ (Name of Bidding Company)

Please Check One! _____ will sub-contract a portion of this project.
 _____ will not sub-contract any portion of this project.

Authorized Agent _____ **Title** _____

Signature of Bidder _____ **Date** _____

If the bidder is not going to subcontract any portion of this project, the bidder need not complete any further part of this document.

If the bidder will subcontract any of the following:

- Plumbing/gas fitting work;
- Structural steel/ornamental iron work
- Electrical work, tele-data, fire alarm or security systems
- Refrigeration/heating/ventilating systems & equipment

the bidder must do the following:

- Identify the contract number and type of work he intends to subcontract;
- Provide the name, address and other pertinent information about the subcontractor;*
- If the cost of the work by the subcontractor shall exceed the amounts listed below, the bidder shall provide in the bid package submission the following documents:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
<u>Estimated Value of Contract – Subcontractor</u>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Please list subcontractor(s) on the following pages. Bidders may make extra copies of the following pages.

* Failure to identify the names and addresses of any subcontractors required to be named in the bid, or to submit the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.

(Form continued on next page)

Subcontractor's Disclosure Statement (Continued)

**Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School,
and Haddonfield Memorial High School**

Cont. No. 14

Bid Date February 17, 2023

Name of Trade/Type of Work _____

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No: _____

Authorized Agent _____ Title _____

Will the cost of sub-contract exceed \$20,000.00?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
<i><u>Estimated Value of Contract – Subcontractor</u></i>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

SUBCONTRACTOR'S DISCLOSURE FORM

Toilet Room Renovations at Elizabeth Haddon Elementary School

Cont. No. **14.01**

Bid Date **February 17, 2023**

The _____ *(Name of Bidding Company)*

Please Check One! _____ will sub-contract a portion of this project.
 _____ will not sub-contract any portion of this project.

Authorized Agent _____ **Title** _____

Signature of Bidder _____ **Date** _____

If the bidder is not going to subcontract any portion of this project, the bidder need not complete any further part of this document.

If the bidder will subcontract any of the following:

- Plumbing/gas fitting work;
- Structural steel/ornamental iron work
- Electrical work, tele-data, fire alarm or security systems
- Refrigeration/heating/ventilating systems & equipment

the bidder must do the following:

- Identify the contract number and type of work he intends to subcontract;
- Provide the name, address and other pertinent information about the subcontractor;*
- If the cost of the work by the subcontractor shall exceed the amounts listed below, the bidder shall provide in the bid package submission the following documents:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
<i>Estimated Value of Contract – Subcontractor</i>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	Submit With Bid	Submit Within ten (10 Days of Receipt of Notice of Award
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Please list subcontractor(s) on the following pages. Bidders may make extra copies of the following pages.

** Failure to identify the names and addresses of any subcontractors required to be named in the bid, or to submit the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.*

(Form continued on next page)

Subcontractor's Disclosure Statement (Continued)

Toilet Room Renovations at Elizabeth Haddon Elementary School

Cont. No. 14.01

Bid Date February 17, 2023

Name of Trade/Type of Work _____

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No: _____

Authorized Agent _____ Title _____

Will the cost of sub-contract exceed \$20,000.00?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
<i><u>Estimated Value of Contract – Subcontractor</u></i>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

SUBCONTRACTOR'S DISCLOSURE FORM

Toilet Room Renovations at Haddonfield Memorial High School

Cont. No. **14.02**

Bid Date **February 17, 2023**

The _____ (Name of Bidding Company)

Please Check One! _____ will sub-contract a portion of this project.
 _____ will not sub-contract any portion of this project.

Authorized Agent _____ **Title** _____

Signature of Bidder _____ **Date** _____

If the bidder is not going to subcontract any portion of this project, the bidder need not complete any further part of this document.

If the bidder will subcontract any of the following:

- Plumbing/gas fitting work;
- Electrical work, tele-data, fire alarm or security systems
- Structural steel/ornamental iron work
- Refrigeration/heating/ventilating systems & equipment

the bidder must do the following:

- Identify the contract number and type of work he intends to subcontract;
- Provide the name, address and other pertinent information about the subcontractor;*
- If the cost of the work by the subcontractor shall exceed the amounts listed below, the bidder shall provide in the bid package submission the following documents:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
<u>Estimated Value of Contract – Subcontractor</u>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award)</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Please list subcontractor(s) on the following pages. Bidders may make extra copies of the following pages.

** Failure to identify the names and addresses of any subcontractors required to be named in the bid, or to submit the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.*

(Form continued on next page)

Subcontractor's Disclosure Statement (Continued)

Toilet Room Renovations at Haddonfield Memorial High School

Cont. No. 14.02

Bid Date February 17, 2023

Name of Trade/Type of Work _____

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No: _____

Authorized Agent _____ Title _____

Will the cost of sub-contract exceed \$20,000.00?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
<i><u>Estimated Value of Contract – Subcontractor</u></i>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

SUBCONTRACTOR'S DISCLOSURE FORM

Toilet Room Renovations at J. Fithian Tatem Elementary School

Cont. No. **14.03**

Bid Date **February 17, 2023**

The _____ (Name of Bidding Company)

Please Check One! _____ will sub-contract a portion of this project.
 _____ will not sub-contract any portion of this project.

Authorized Agent _____ **Title** _____

Signature of Bidder _____ **Date** _____

If the bidder is not going to subcontract any portion of this project, the bidder need not complete any further part of this document.

If the bidder will subcontract any of the following:

- Plumbing/gas fitting work;
- Structural steel/ornamental iron work
- Electrical work, tele-data, fire alarm or security systems
- Refrigeration/heating/ventilating systems & equipment

the bidder must do the following:

- Identify the contract number and type of work he intends to subcontract;
- Provide the name, address and other pertinent information about the subcontractor;*
- If the cost of the work by the subcontractor shall exceed the amounts listed below, the bidder shall provide in the bid package submission the following documents:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
<u>Estimated Value of Contract – Subcontractor</u>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award)</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Please list subcontractor(s) on the following pages. Bidders may make extra copies of the following pages.

** Failure to identify the names and addresses of any subcontractors required to be named in the bid, or to submit the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.*

(Form continued on next page)

Subcontractor's Disclosure Statement (Continued)

Toilet Room Renovations at J. Fithian Tatem Elementary School

Cont. No. **14.03**

Bid Date **February 17, 2023**

Name of Trade/Type of Work _____

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No: _____

Authorized Agent _____ Title _____

Will the cost of sub-contract exceed \$20,000.00?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

<u>SUBCONTRACTOR DOCUMENT SUBMISSIONS</u>		
<i><u>Estimated Value of Contract – Subcontractor</u></i>	<i>For Subcontractors in the four major branches listed above</i>	<i>For all other Subcontractors</i>
	<u>Submit With Bid</u>	<u>Submit Within ten (10 Days of Receipt of Notice of Award</u>
\$2,000 through \$5,999	Contractor's Registration Certificate	
\$6,000 through \$17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
\$17,500 through \$19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
\$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

APPENDIX A

AMERICANS WITH DISABILITIES ACT OF 1990 Equal Opportunity for Individuals with Disability

The contractor and the Board of Education (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.

Initial On Above Line

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 affectional 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 Americans 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.
- (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:

EXHIBIT B (Continued)

- (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 and submitted promptly to 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 ratio 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.

EXHIBIT B (Continued)

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.

Initial On Above Line

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: http://www.state.nj.us/treasury/contract_compliance/pdf/aa201ins.pdf

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

Sample - AA201

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 to 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**

Appendix Section

A. Model Performance Bond Form - *Sample*

B. Surety Disclosure Statement and Certification - *Sample*

Model Performance Bond Form

N.J.S.A. 2A:44-147

SAMPLE

2A:44-147. The bond required by this article shall be in substantially the following form:

"Know all men by these presents, that we, the undersigned as principal and as sureties, are hereby held and firmly bound unto in the penal sum of dollars, for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

"Signed this _____ day of _____, 20 ____

"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 _____, which said contract is made a part of this the bond the same as though set forth herein;

"Now, if the said _____ shall well and faithfully do and perform the things agreed by _____ 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 stipulates 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 therefor shall in anywise affect the obligation 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.

L.1951 (1st SS), c.344; amended [1996, c.81](#), s.6.

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)

L.1951 (1st SS), c.344; amended [1979, c.408](#); [1989, c.316](#); [1991, c.454](#); 1995, c.38, s.2; [1995, c.384](#), s.1; [1996, c.81](#), s.2.

TO All Bidders:

REMINDER!

Did you sign all of the bid documents?

All bid documents returned to the Board shall be signed with original signatures. Please try to use **blue ink**.

The Board will not accept facsimile or rubber stamp signatures.

Failure to sign and submit all bid documents may be cause for disqualification and rejection of the bid.

DRAFT AIA® Document A101™ – 2017

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

AGREEMENT made as of the « » day of February in the year Two Thousand Twenty Three

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

Haddonfield Board of Education
95 Grove Street
Haddonfield, New Jersey 08033

and the Contractor:

(Name, legal status, address and other information)

To Be Determined

« »

« »

« »

for the following Project:

(Name, location and detailed description)

Contract #14 – Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School

Elizabeth Haddon Elementary School
501 Redman Avenue
Haddonfield, New Jersey 08033

J. Fithian Tatem Elementary School
1 Glover Avenue
Haddonfield, New Jersey 08033

Haddonfield Memorial High School
401 Kings Highway East
Haddonfield, New Jersey 08033

Contract #14.01 – Toilet Room Renovations at Elizabeth Haddon Elementary School

Elizabeth Haddon Elementary School
501 Redman Avenue
Haddonfield, New Jersey 08033

Contract #14.02 – Toilet Room Renovations at Haddonfield Memorial High School

Haddonfield Memorial High School
401 Kings Highway East
Haddonfield, New Jersey 08033

Contract #14.03 – Toilet Room Renovations at J. Fithian Tatem Elementary School

J. Fithian Tatem Elementary School
1 Glover Avenue
Haddonfield, New Jersey 08033

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.

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

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

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

The Architect:

LAN Associates Engineering, Planning, Architecture, Surveying, Inc.
1018 Laurel Oak Road, Suite 11
Voorhees, New Jersey 08043

The Owner and Contractor agree as follows.



TABLE OF ARTICLES

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

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- 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.

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

§ 3.3 Substantial Completion

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

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

[] By the following date: **Friday, September 1, 2023**

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

Portion of Work	Substantial Completion Date
Not Applicable	Not Applicable

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item	Price
Not Applicable	Not Applicable

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

Item	Price	Conditions for Acceptance
Not Applicable	Not Applicable	

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

Item	Price
Contract 14.0: Toilet Room Renovations at Elizabeth Haddon ES, J. Fithian Tatem ES, and Haddonfield Memorial HS: Allowance No. 1 – Unforeseen Conditions	\$50,000.00
Contract 14.01: Toilet Room Renovations at Elizabeth Haddon ES: Allowance No. 1 – Unforeseen Conditions	\$20,000.00
Contract 14.02: Toilet Room Renovations at Haddonfield Memorial HS: Allowance No. 1 – Unforeseen Conditions	\$10,000.00
Contract 14.03: Toilet Room Renovations at J. Fithian Tatem ES: Allowance No. 1 – Unforeseen Conditions	\$20,000.00

§ 4.4 Unit prices, if any: SEE ATTACHED UNIT PRICE SCHEDULE
(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)
Not Applicable	Not Applicable	Not Applicable

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

The Contractor understands and agrees that all work must be performed in an orderly and closely coordinated sequence so that the dates for Substantial Completion and Final Completion are met. 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, he shall pay the Owner, as liquidated damages and not as a penalty, One Thousand Dollars (\$1,000.00) per day, which is 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 for the milestone dates.

The Owner will suffer significant financial loss if the project is not substantially complete on time. Liquidated Damages will be assessed if the Project is not substantially complete by **Friday, September 1, 2023**. The Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sum of \$1,000.00 stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is substantially complete.

Final Completion must be reached Thirty (30) days following the date fixed in the contract for Substantial Completion. The Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sum of \$1,000.00 stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is finally complete.

{PER SCHEDULE IN SPECIFICATIONS}

Substantial Completion will be determined by the Architect as defined in paragraph 9.8.1 of the General Conditions.

For damage occurring at the time of delay, the Owner may retain the amount due to him under this clause from any payments due to the Contractor.

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

Not Applicable

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents. An application for Payment shall include all work performed in one calendar month.

§ 5.1.2 Contractor shall submit a Pencil Copy / Rough Draft of the Application for Payment to the Owner's Representative and Construction Manager for review no later than the 15 calendar days prior to the first Friday of the month payment is requested from Owner.

Owner's Representative and Construction Manager will review the Pencil Copy / Rough Draft of the Application for Payment and return to the Contractor within five (5) calendar days from their receipt of same.

§ 5.1.3 Certified Application for Payment.

.1. Within three (3) calendar days after receipt of accepted Pencil / Rough Draft of the Application for Payment the Contractor shall submit three (3) Certified Applications for Payment to the Owner's Representative for signatures.

.2. The Owner's Representative shall sign the Certified Application for Payment within five (5) calendar days upon receipt and shall transmit one (1) Certified Application for Payment to Owner on the first Friday of the month payment is requested. The Owner's Representative shall transmit one (1) Certified Application for Payment to the Contractor and retain one (1) Certified Application for Payment for its records. (Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.3.1 The form for Applications for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA document G703 Continuation Sheets. Each Application for Payment must be accompanied by three (3) sets of 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.

§ 5.1.3.2 All Applications for Payment, Certified Payroll Records and Manning Reports shall include the relevant purchase order number and project number.

§ 5.1.3.3 Pursuant to N.J.S.A. 2A:30A-1, et seq. ("the Act"), the Owner is not required to approve the Contractor's Application for Payment until the next scheduled public meeting of the Board of Education following the Owner's receipt of the Architect's Certificate for Payment. Under said Act, the Owner shall not make payment to the Contractor for the payment amount until the Owner's subsequent payment cycle following its approval of the Application for Payment.

§ 5.1.3.4 Pursuant to the above Act, if a payment due pursuant to the provisions herein is not made in a timely manner, the Owner shall be liable for the amount of money owed under the Contract, plus interest at a rate equal to the prime rate plus one percent (1%), notwithstanding anything to the contrary in the Contract Documents. Interest on amounts due pursuant to the Act shall be paid to the prime Contractor for the period beginning on the day after the required payment date and ending on the day on which the check for payment is received by the Contractor.

§ 5.1.3.5 Disputes regarding whether a party has failed to make payments required by the Act must be submitted to a process of alternative dispute resolution, notwithstanding anything to the contrary in the Contract Documents. Alternative dispute resolution permitted by the Act shall apply to disputes over payment only and shall not apply to disputes concerning any other matters that may arise under or from this Contract. Any civil action brought to collect payments shall be conducted in Camden County, State of New Jersey, and the prevailing party shall be awarded reasonable costs and attorneys' fees. See Article 6 of this Agreement regarding Claims and Disputes.

§ 5.1.4 The Architect may decide to disapprove an Application for Payment, or withhold payment, in whole or in part, to the extent reasonably necessary to protect the Owner if, in the Architect's opinion, the representations as described in Section 5.1.4.1 below cannot be made to the Owner. If the Architect withholds a Certificate for Payment, the Architect will notify the Contractor and Owner as provided in Article 5 hereof. The Architect may also decide to withhold certifying payment in whole or in part, because of subsequently discovered evidence or subsequent observations, to such extent as may be necessary to protect the Owner from loss because of:

1. Defective Work which has not been remedied;
2. Third party claims filed or reasonable belief probable filing of such claims;
3. Failure of the Contractor to make payments properly to vendors, subcontractors or for labor, materials and equipment;
4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract sum;
5. Damage to the Owner or another contractor;
6. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
7. Failure to carry out the Work in accordance with the Contract Documents;
8. Avoidable delay in the progress of the Work;
9. Deliberate delay in the submission for approval of names of Subcontractors, material men, sources of supply, shop drawings and samples;
10. Failure to maintain the Project Site in a safe and satisfactory condition in accordance with good construction practices as recommended by the Architect after consultation with the Contractor; and
11. Failure to submit updates as requested by the District or as required by the General Conditions, attached hereto.

When the foregoing reasons for withholding payment are resolved, certification will be made for amounts previously withheld in the manner set forth in Section 5.1.3 above.

§ 5.1.4.1 The issuance of a separate Certificate for Payment will constitute representations made separately by the Architect to the Owner, based on its individual observations at the Site and the data comprising the Application for Payment submitted by the Contractor, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Architect. The issuance of a separate Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a separate Certificate for Payment will not be a representation that the Architect has: (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures; (3) reviewed copies of requisitions received from Subcontractors and material 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.

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

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

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

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

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

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

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

§ 5.1.7 Retainage

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

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

Retainage shall be determined as follows: Pursuant to N.J.S.A. 18A:18A-40.3, the Owner will withhold two percent (2%) of the amount due on each partial payment when the outstanding balance of the Contract exceeds Five Hundred Thousand Dollars (\$500,000.00). The Owner will withhold five percent (5%) of the amount due on each partial payment when the outstanding balance of the Contract is Five Hundred Thousand Dollars (\$500,000.00) or less. 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.

§ 5.1.7.1.1 The following items are not subject to retainage: **NOT APPLICABLE**

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

Not Applicable

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

Not Applicable

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

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

« »

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

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

§ 5.2 Final Payment

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

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

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

« »

§ 5.3 Interest

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

(Insert rate of interest agreed upon, if any.)

0 % «Zero Percent

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

« »
« »
« »
« »

§ 6.2 Binding Dispute Resolution

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

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

[XX] Litigation in Superior Court of New Jersey in Camden County

[« »] Other *(Specify)*

« »

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

LAN Associates Engineering, Planning, Architecture, Surveying, Inc.
Mr. Ronald Schwenke, AIA, LEED AP
1018 Laurel Oak Road, Suite 11
Voorhees, New Jersey 08043
E: ron.schwenke@lanassociates.com
C: 267.279.0783

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

To Be Determined
« »
« »
« »
« »

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

§ 8.5 Insurance and Bonds

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

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A201™-2017 and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below: **NOT APPLICABLE**

(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

1. Payments due and unpaid under the Contract shall in no instance bear interest, except as required by law pursuant to section 5.1.3.4 of this Agreement.
2. The contractor shall ensure that the Project Site is maintained in a clean and safe condition at all times. If the contractor fails to keep the Project Site in a clean and safe condition, said failure shall result in the following:
 - a. All claims resulting from the Contractor's failure shall be the Contractor's sole responsibility;
 - b. Said failure shall constitute an act of default and a substantial breach of the Contract giving the Owner remedies under the Contract Documents; and
 - c. The Owner shall have the right to withhold any payments until the Contractor cures its failure.

Failure to cure shall authorize the Owner to withhold any Certifications for Payment until such time as the Contractor has rectified same. Further, if the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3. The within contract shall be governed by and interpreted pursuant to the laws of the State of New Jersey.
4. The Contractor shall comply with the anti-discrimination provisions of N.J.S.A. 10:2-1, et seq., the New Jersey Law Against Discrimination, N.J.S.A. 10:5-1, et seq., and all provisions regarding equal employment opportunity, N.J.S.A. 10:5-31, et seq., N.J.A.C. 17:27-1.1, and N.J.A.C. 6A:7-1.8. The Owner and the Contractor guaranty to afford equal opportunity in the performance of this Contract in accordance with an affirmative action program approved by the State Treasurer and shall provide the documents required for this Project.
5. To perform the services provided for herein, the Contractor and its prime subcontractors shall be prequalified/classified by the New Jersey Department of Treasury, Division of Property, Management and Construction. The failure to possess or obtain such classifications shall result in the immediate termination of this Agreement.
6. The Contractor represents that, to the best of its knowledge, information and belief, none of its employees in engaged in conduct that constitutes a conflict of interest under, or a violation of, the School Ethics Act, N.J.S.A. 18A:12-21, et seq., and N.J.A.C. 6A:28-1.1, et seq.

7. The Contractor shall provide written notice to its subcontractors and suppliers of the responsibility to submit proof of business registration in the State of New Jersey to the Contractor. The requirement of proof of business registration extends down through all levels (tiers) of the Project.
8. Before final payment on the contract is made by Owner, the Contractor shall submit an accurate list and the proof of business registration in the State of New Jersey of each subcontractor or supplier used in the fulfillment of the contract, or shall attest that no subcontractors were used.
9. For the term of the Agreement, the Contractor, any subcontractor and each of their affiliates, so designated pursuant to N.J.S.A. 52:32-44(g)(3), shall collect and remit to the New Jersey Director of the Division of Taxation in the Department of Treasury, the use tax due pursuant to the Sales and Use Tax Act, N.J.S.A. 52:32B-1, et seq., on all of their sales of tangible personal property delivered into the State of New Jersey, regardless of whether the tangible personal property is intended for a contract with a contracting agency. For purposes herein, "affiliate" shall mean any entity that: (a) directly, indirectly or constructively controls another entity; (b) is directly, indirectly or constructively controlled by another entity; or, (c) is subject to the control of a common entity. For purposes of the immediately preceding sentence, an entity controls another entity if it owns, directly or indirectly, more than fifty percent (50%) of the ownership interest of that entity.
10. It is the obligation of the Contractor to provide a full and complete copy of all insurance policies held by it at the Contractor's sole expense, upon reasonable request by the Owner, in the amounts specified in the Bid Documents (see Article 11 of modified AIA Document A201-2017 General Conditions of the Contract for Construction). The Contractor's failure to obtain or maintain adequate insurance coverage shall result in the immediate termination of this Agreement. The Owner will have the right to request copies of the Contractor's insurance policies or any part thereof for the duration of the contract period.
11. This Agreement and the General Conditions of the Contract as modified or supplemented in writing, shall control in the case of conflict between these documents and the Project Specifications, the Project Manual and any other exhibits incorporated by reference into this Agreement in Article 9 herein.
12. See Attachment #1 of the Contract Specifications, titled Supplemental Contract Terms for Contracts Supported by Federal Funds.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds – **NOT APPLICABLE – SEE THE A201-2017**
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below: **NOT APPLICABLE**
(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

- .5 Drawings (by LAN Associates) **SEE ATTACHED DRAWING INDEX**

Number	Title	Date

- .6 Specifications **SEE ATTACHED TABLE OF CONTENTS**

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

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

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

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

The Sustainability Plan:

Title	Date	Pages

Supplementary and other Conditions of the Contract: **THESE ARE INCORPORATED DIRECTLY INTO THE AIA A201.**

Document	Title	Date	Pages

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

Mandatory Equal Employment Opportunity Language, annexed hereto and made a part hereof

Supplemental Contract Terms for Contracts Supported by Federal Funds

New Jersey Department of Labor and Workforce Development Prevailing Wage Rate Determination or the Davis-Bacon Prevailing Wage Rates, whichever is applicable

Bidder's Bid Submission

Board Resolution for Award of Contract

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

OWNER *(Signature)*

Mr. Michael Catalano,
 School Business Administrator

(Printed name and title)

CONTRACTOR *(Signature)*

To Be Determined

(Printed name and title)

DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

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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.

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

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

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NOTE: THE WORD "CONTRACTOR" SHALL MEAN THE PRIME CONTRACTOR WITH WHOM THE CONTRACT HAS BEEN EXECUTED.

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 do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.~~

§1.1.1.1 The Contract Documents shall include the Bidding Requirements, including, but not be limited to advertisement or Invitation to Bid, Instructions to Bidders, the Contractor's Bid Proposal Form and other bidding forms, Addenda or portions of the Addenda relating to any Bidding Documents. The Contract Documents shall apply to all Prime Contractors for the Project and each Prime Contractor is responsible for the content of all.

§ 1.1.2 The Contract

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

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

§ 1.1.3 The Work

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

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

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

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

- .1 The right is reserved by the Architect to make any reasonable change in location of equipment, ductwork, and piping prior to roughing in without involving additional expense to the Owner.***
- .2 Contractor shall coordinate his Work with the Work of others and shall be responsible for the coordination work, so that interference between mechanical, electrical and other work and architectural and structural work does not occur.***
- .3 Contractor shall furnish and install supports, hangers, offsets, bends, turns, and the like in connection with this Work to avoid interference with work of other Contractors, to conceal Work where required, and to secure necessary clearance and access for operation and maintenance without involving additional expense to the Owner.***

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

- .1 Where on any drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to other like portions of the work.***

.2 Where detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the work unless otherwise indicated.

.3 In case of differences between small and large-scale drawings, the larger scale drawings shall take precedence. Dimensions given shall take precedence over scale measurements.

.4 Any discrepancies or questions as to the application of, and interpretations related to 1.2.1.1, shall be referred to the Architect for adjustment before any work affected thereby has been performed.

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

§1.2.1.3 It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Architect may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work. In the event of such ambiguity or discrepancy subject to any Architect's interpretation, the Contractor shall comply with the more stringent requirement, and supply the better quality or greater quantity of work.

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

§1.2.2.1 The various materials and products specified in the specifications by name or description are given to establish a standard of quality and of cost for bid purposes. It is not the intent to limit the acceptance to any one material or product specified, but rather to name or describe it as the absolute minimum standard that is desired and acceptable, all determinations as to equality of a proposed product or material shall be at the discretion of the Architect and/or the Owner.

.1 A material or product of lesser quality will not be acceptable.

.2 Where "Basis of Design" products or manufacturer's names are used, whether or not followed by the words "or approved equal," they shall be subject to approved equals and authorized only by the Architect and/or the Owner.

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

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

§1.2.2.4 In addition to the Specifications, it shall be understood that details on Drawings shall become part of the Specification in determining the required "standard of quality."

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

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect’s consultants. *Drawings, specifications and other documents, including those in electronic form, prepared by the Architect and the Architect’s consultants are Instruments of Service for use solely with respect to this Project, except that Owner shall be authorized to use any Instruments of Service for future additions or alterations to this Project or for other Projects. The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service and shall retain all common law, statutory and other reserved rights, including copyrights.*

§ 1.5.3 *The Contractor will be furnished free of charge two (2) sets of signed and sealed drawings and specifications. If more documents are required by the Contractor, the additional documents may be obtained at the cost of \$2.00 per sheet and \$100.00 per specification.*

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

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

§ 1.9 EXECUTION OF CONTRACT DOCUMENTS

§ 1.9.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request. The Agreement shall be signed in not less than triplicate by the Owner and Contractor.

§ 1.9.2 Execution of the Contract by the Contractor is a representation that said Contract Documents are full and complete, are sufficient to have enabled the Contractor to determine the cost of the Work therein to enter into the Contract and that the Contract Documents are sufficient to enable it to construct the Work outlined therein, and otherwise to fulfill all its obligations hereunder, including, but not limited to, Contractor's obligation to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Substantial Completion established in the Agreement. The Contractor further acknowledges and declares that it has visited and examined the site, examined all physical, legal, and other conditions affecting the Work and is fully familiar with all of the conditions thereon and thereunder affecting the same. 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 Project and the site, including, without limitation, the surface and subsurface conditions of the site and all structures and obstructions thereon and thereunder, both natural and man-made, and all surface and subsurface water conditions of the site and the surrounding area; (2) 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 (3) the quality and quantity of all 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. In connection with the foregoing, and having carefully examined all Contract Documents, as aforesaid, and having visited the site, the contractor acknowledges and declares that it has no knowledge of any discrepancies, omissions, ambiguities, or conflicts in said Contract Documents and that if it becomes aware of any such discrepancies, omissions, ambiguities, or conflicts, it will promptly notify Owner and Architect of such fact.

§ 1.9.3 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 reasonable 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 and Architect 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 and 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 reasonable inferable therefrom as being necessary to produce the intended results.

1.9.3.1 The term "reasonably inferable" includes work necessary to "provide" work indicated or specified, as defined in section: Definitions and Standards; that is: furnish and install, complete, in place and ready for use.

1.9.3.2 Details referenced to portions of the Work shall apply to other like portions of the Work not otherwise detailed.

1.9.3.3 The Contractor shall request, from the Architect/Engineer's interpretation of apparent discrepancies, conflicts, or omissions in the Specifications and Drawings. Subcontractors shall forward such requests through the Contractor. Such requests, and the Architect/Engineer's interpretation, shall be in written form; other forms of communications shall be used to expedite resolution of concerns, but will not be binding.

§1.9.4 Explanatory notes shall take precedence over conflicting drawn note indications. Large scale drawings shall take precedence over small scale drawings. Figured dimensions shall take precedence over scaled measurements. Should contradictions be found, the Architect shall determine which indication is correct.

§1.9.5 When more than one material, brand, or process is specified for a particular item of Work, the choice shall be the Contractor's. Contractor may, after notifying the Architect and Owner, select the one it considers to be the

best. Approval by Architect or Owner of materials, suppliers, processes, or Subcontractors does not imply a waiver of any Contract requirements including, without limitation, Contractor's warranty.

§1.9.6 In all cases, the details, drawings, and specifications shall be checked with existing conditions and with work in place, and variations, if any, shall be referred by the Contractor to the Architect for adjustment, as the Contractor will be responsible for the fit or work in place.

§1.9.7 When a profile, section or other finished condition is shown, furring or other method of obtaining such finished conditions shall be provided. The drawings may show work fully drawn out or only a portion thereof, the remainder being in outline. The drawn-out portions apply to other like or similar places.

§1.9.8 Where it is required in the specifications that materials, products, processes, equipment, or the like be installed or applied in accordance with manufacturers' instructions, directions, or specifications, or words to this effect, it shall be construed to mean that said application or installation shall be in strict accordance with printed material concerned for use under conditions similar to those at the job site. Three copies of such instructions shall be furnished to the Architect and his written approval thereof obtained before work is begun.

§1.9.9 Any material specified by reference to the number, symbol, or title of a Commercial Standard, Federal Specification, ASTM Specification, trade association standard, or other similar standards, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect one month prior to the date on which bids are opened and read, except as limited to type, class, or grade, or modified in such reference. The standards referred to, except as modified in the specifications, shall have full force and effect as though printed in the specifications. The Architect will furnish upon request information as to how copies of the standards referred to may be obtained.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start up, plus interest as provided in the Contract Documents.

~~§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

~~§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as “confidential,” the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose “confidential” information, after seven (7) days’ notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose “confidential” information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.~~

§ 2.3 Information and Services Required of the Owner

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

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

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

§ 2.3.4 The Owner shall 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 Owner nor the Architect shall be required to furnish Contractor with any information concerning subsurface characteristics, utilities or conditions of the areas where the Work is to be performed. When the Owner or Architect has made investigations of subsurface characteristics or conditions of the areas where the Work is to be performed, such investigations, if any, were made solely for the purposes of Owner's study and Architect's design. Neither such investigations nor the records thereof are a part of the Contract between Owner and Contractor. To the extent such investigations or the records thereof are made available to Contractor by the Owner or Architect, such information is furnished solely for the convenience of Contractor. Neither Owner nor Architect assumes any responsibility whatsoever in respect of the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the Owner or Architect in its use thereof, and there is no warranty or guaranty, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout the areas where the Work is to be performed, or any part thereof, or that unforeseen developments may not occur, or that materials other than or in proportions different from those indicated may not be encountered. The Contractor shall undertake such further investigations and studies as may be necessary or useful to determine subsurface characteristics and conditions. In connection with the foregoing, Contractor shall be solely responsible for locating (and shall locate prior to performing any Work) all utility lines, telephone company lines and cables, sewer lines, water pipes, gas lines, electrical lines, including, without limitation, all buried pipelines and buried telephone cables and shall perform the Work in such a manner so as to avoid damaging any such lines, cables, pipes, and pipelines.***

§ 2.3.5 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.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2 ***and 1.5.3.***

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or ~~repeatedly~~ fails to carry out Work in accordance with the Contract Documents, ***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 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.~~

§ 2.4.1 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 put the Contractor on notice of the issue threatening education, safety or security, and their intent to remedy immediately with other resources and to back charge the contractor for the cost of said service, but there are no notice provisions required for the corrective actions necessary to protect the School District.

§ 2.5 Owner's Right to Carry Out the Work

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

§ 2.5.1 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 put the Contractor on notice of the issue threatening education, safety or security, and their intent to remedy immediately with other resources and to backcharge the contractor for the cost of said service, but there are no notice provisions required for the corrective actions necessary to protect the School District.

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. ***The Term "Contractor" shall mean the respective Prime Contract person or entity identified as such in the Owner Contractor Agreement, for each respective Prime Construction Contract, as responsible for the supervisory control over allocation, coordination of all Subcontractors or trades, performance and completion of all portions of the Work, including cooperation with those doing portions of the Work under Separate Contract with the Owner.***

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

- .1 If the Contractor requires clarification of the intent of the Contract Documents after award, the Contractor shall be responsible to issue a type written request for information (RFI) to the Architect utilizing the Architect's sample form via acceptable methods set forth in Article 4.2.*
- .2 All RFI's shall clearly identify the Architect's project number, the construction company's name, author's name, date issued, address, phone numbers, facsimile number and the addressee of the communication.*

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. ***In addition to and not in derogation of Contractor's duties under Paragraphs 1.9.2 and 1.9.3, the Contractor shall carefully study and compare the Contract Documents with each other and shall at once report to the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner or Architect 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 of items described in and intended to be covered in Paragraphs 1.9.2 and 1.9., 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 performs any construction activity involving an error, inconsistency or omission in the Contract Documents that the Contractor recognized or reasonably should have recognized without such notice to the Architect, the Contractor shall assume complete responsibility for such performance and shall bear the full amount of the attributable costs for correction.***

§ 3.2.2.1 *If any errors, inconsistencies, or omissions in Contract Documents are recognized or reasonably should have been recognized by the Contractor, any member of its organization, or any of its Subcontractors, the Contractor shall be responsible for notifying the Architect in writing of such error, inconsistency, or omission before proceeding with the Work. The Architect will take such notice under advisement and within a reasonable time commensurate with job progress render a decision. If Contractor fails to give such notice and proceeds with such Work, it shall correct any such errors, inconsistencies, or omissions at no additional cost to the Owner.*

§ 3.2.2.2 Conditions Precedent – Notice

- .1 Notice of any alleged Conflict that have been reasonably identified prior to submitting a Bid shall be provided to the Architect immediately in order that the Architect in its discretion, may issue an Addendum.*
- .2 A Bidder's failure to do so constitutes an absolute waiver of any Conflict that may thereafter be asserted with respect thereto, and shall bar any recovery regarding such Conflict.*
- .3 If any errors, inconsistencies or omissions appear in the drawings, specifications or other Contract Documents, which should reasonably have been discovered and concerning which interpretation had not been obtained from the Architect during the Bidding Period, the Contractor shall within ten (10) days after 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, Contractor and its Surety may be required to indemnify Owner for the costs of any such errors, inconsistencies or omissions and the cost of rectifying same including attorney's fees. Interpretation of this procedure after the ten-day period will be made by the Architect and his decision will be final. By Submission of a bid, the Contractor acknowledges that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and that the Drawings, the Specifications and all addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws,*

statutes, ordinances, building codes and regulations, and otherwise to fulfill all of its obligations under the Contract Documents.

- .4 Contractor acknowledges, except as to any reported error, inconsistencies or omissions, and to concealed or unknown conditions defined in elsewhere, by executing the Agreement, the Contractor represents the following:*

- .1 The Contract Documents are sufficiently complete and detailed for the Contractor to perform the Work and comply with all requirements of the Contract Documents.*
- .2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedures, and techniques necessary to perform the Work, use of materials, selection of equipment, and requirements of products by manufacturers are consistent with;*
 - .1 good and sound practices within the construction industry;*
 - .2 generally prevailing and accepted industry standards applicable to Work;*
 - .3 requirements of any warranties applicable to the Work; and*
 - .4 all laws, ordinances, regulations, rules, and orders which bear upon the Contractor's performance of the Work*
- .3 The Contractor has read, understands and accepts the Contract Documents and its bid was made in accordance with them.*
- .4 The Contract Sum is based upon the products, materials, systems and equipment required by the Contract Documents without exception. Where the Contract Documents list one or more manufacturer or brand name products, materials, systems and equipment as acceptable, the Contract sum is, in each instance, based upon one of the listed manufacturers or brand name products, materials, systems, and equipment, or, if the contract Sum is based upon the substitution of an "or equal" manufacturer or product, material, system or equipment, the Contractor has in each such instance sought and received the Architect's approval for the substitution either:*
 - .1 prior to the Bid in accordance Architect's Addenda;*
 - .2 after commencement of the Work, under in conformance with substitution procedure elsewhere in the Contract Documents.*
- .5 The Contract Sum is firm and all inclusive, and no escalation is contemplated for any reason whatsoever.*
 - .1 The Contract Sum includes any and all costs associated with completion by those dates and times, including any and all costs associated with out-of-sequence work, come-back work, stand-by work, stacking of trades, coordination with the schedules and work of separate Contractors, allowing sufficient time, work and storage areas, and site access for separate Contractors to timely progress and complete their work, overtime, expediting and acceleration that may be required to complete the work by those dates and times.*
 - .2 The Contractor has reviewed the completion dates and times, and Milestone Dates set forth in the Contract Documents, agrees that such dates and times are reasonable and commits to achieve them.*
- .6 The Contractor shall satisfy itself as to the accuracy of all dimensions and locations. In all cases of interconnection of its work with existing or other work, it shall verify at the site, all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to verify all such locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.*

Deviations from the construction documents must be noted by the Prime Contractor at the time of shop drawing submission. Failure to do so will result in the implication of the above Sections 3.2, 3.2.1, 3.2.2, 3.2.2.1 and 3.2.2.2.

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

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.3.4 *The Contractor, when requested by the Architect, shall meet with representative of the Architect at all times and furnish all information requested; he shall allow the Architect to inspect the work at all times. Neither the Owner, nor the Architect shall be liable to the Contractor for extra compensation or damages for interference or delays on account of any such meetings, information, or inspections so requested or other acts of the Architect done in good faith and within the scope of their employment by the Owner. In addition, the Contractor is entrusted with the oversight, management control, and general direction of this project to ensure that all contract completion dates are met. In the event that there are any delays caused to any subcontractor on this project, liability shall lie with the Contractor and not with the Owner.*

§ 3.3.5 *The Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work with that of all others on the Project including deliveries, storage, installations, and construction utilities. The Contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation.*

§ 3.3.6 *The Contractor shall establish and maintain bench marks and all other grades, lines, and levels necessary for the Work, report errors or inconsistencies to the Architect before commencing Work and review the placement of the building(s) and permanent facilities on the site with the Owner and Architect after all lines are staked out and before foundation Work is started. Contractor shall provide access to the Work for the Owner, the Architect, other persons designated by Owner, and governmental inspectors. Any encroachments made by Contractor or its Subcontractor (of any tier) on adjacent properties due to construction as revealed by an improvement survey, except for encroachments arising from errors or omissions not reasonably discoverable by Contractor in the Contract Documents, shall be the sole responsibility of the Contractor, and Contractor shall correct such encroachments within thirty (30) days of the improvement survey (or as soon thereafter as reasonably possible), at Contractor's sole cost and expense, either by the removal of the encroachment (and subsequent reconstruction on the Project site) or agreement with the adjacent property owner(s) (in form and substance satisfactory to Owner in its sole discretion) allowing the encroachments to remain.*

§ 3.3.7 *Coordination:*

1. *The Lump Sum Single Prime Contractor "The Contractor" is the sole responsible party for the coordination of the entire project.*
2. *The Contractor shall be responsible to coordinate and expedite the total construction process and all of its parts. The Owner relies upon the organization, management, skill, cooperation and efficiency of the Contractor to supervise, direct, control and manage the work and to coordinate and expedite the efforts of the other prime contractors and subcontractors so as to deliver the work conforming to the contract within the scheduled time. The Contractor is responsible for proper sequence and coordination. It shall determine the location of work and resolve conflicts amongst Contractors.*
3. *The Contractor shall provide a qualified full-time staff member or members to manage the project. THIS PROJECT MANAGER shall coordinate, organize and manage the project from the contractor's main office and oversee the shop drawing process signing off for quality assurance and conformance with the Contract Documents on each shop drawing. The project manager shall be subject to the approval of the Owner and Architect who at all times have the right to require the contractor to replace this project manager if they fail to perform.*

The project manager shall conduct an onsite meeting at least once a week with the construction superintendent and all other prime and/or subcontractors in attendance to coordinate the project and review the schedule. The Architect may attend but is not responsible for organizing or taking minutes. The project manager shall provide a meeting agenda and issue minutes within four (4) working days of each meeting.

4. *The Contractor shall provide a qualified full-time staff member or members to manage the project on site. THIS CONSTRUCTION SUPERINTENDENT shall coordinate, organize and manage the project from the on site and oversee their own work and the work of their sub-contractors. Should the contractor be responsible for multiple projects at different sites, or multiple locations on one large site, then the contractor shall provide a separate qualified superintendent for each of the projects or locations. This determination shall be made by and subject to the approval of the Owner and Architect who at all times may require additional manpower. The superintendent shall be responsible for onsite safety, quality assurance, conformance with the Contract Documents and perform coordination with all on site construction personnel and/or subcontractors. The construction superintendent shall be subject to the approval of the Owner and Architect who at all times have the right to require the contractor to replace this construction superintendent if they fail to perform.*
5. *The subcontractors shall also have a designated superintendent and/or foreman who will at all times be subject to the approval of the Owner and Architect. The Owner and Architect reserves the right to require the contractor to replace the superintendent and/or foreman if, in the opinion of the Owner and Architect, the superintendent and/or foreman is not performing satisfactorily.*
6. *Each subcontractor shall coordinate his activities with the activities of other contractors.*
7. *All questions pertaining to the work are to be made to the A/E sufficiently in (via an RFI Form) advance of construction to permit comparisons investigation or references to drawings and shop drawings as necessary.*
8. *The Contractor is required to submit a site logistics plan coordinating all Owner functions with the access and safety of the job site.*

9. *The Contractor is required to coordinate all the inspection and material testing to meet the contract documents specifications.*
10. *The Contractor has full and sole responsibility for construction methods and implementation of a "quality control system" to insure coordination.*
11. *The Contractor is responsible for field verification of all dimensions/measurements for the coordination of materials and trades. Check field dimensions, clearances, relationships to available space, and anchors.*
12. *The Contractor shall make all necessary arrangements to conduct work so that all parts shall be carried on harmoniously and simultaneously or sequentially, so as components or increments of the same shall not interfere or retard the progress of others.*
13. *Minor changes in locations of equipment, parts, etc. due to field conditions shall be made, if so directed, at no additional cost.*
14. *The Contractor shall coordinate the delivery, unloading, movement, relocation, storage and protection of all materials.*
15. *The Contractor shall examine the drawings and dimensions and is responsible for satisfactory joining and fitting of all parts of the work.*
16. *Accurate dimensions, sleeved and opening drawings are to be submitted prior to placement in the field.*
17. *The Contractor is responsible for any omissions of the subcontractors and is required to provide a complete operating facility.*
18. *The Architect /Engineer and Owner shall assist in resolution of any coordination items.*

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive *and the provisions of Section 01300 of the Contract Specifications.*

§ 3.4.2.1 STANDARD OF QUALITY: *The various materials and products specified in the specifications by name or description are given to establish a standard of quality and of cost for bid purposes.*

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

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

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

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

§ 3.4.4 *The Contractor must provide suitable storage facilities at the site for the proper protection and safe storage of his materials. Such storage facilities must be approved in advance in writing by the Architect.*

§ 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 Architect's consent; but the Contractor shall remove all surplus materials upon completion of each phase of the work and as directed by the Architect.*

§ 3.4.6 *When any room is used as a shop, storeroom, etc., during the progress of the work, the Contractor making use of the space will be responsible for any repairs, patching, or cleaning arising from such use. Prior approval of Architect for use of such areas is mandatory.*

§ 3.4.7 *Not later than seven (7) days from the Notice to Proceed, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the Specifications Divisions 1-16, and if applicable, the installing Subcontractor's name.*

§ 3.4.8 *The Contractor will be held to be to be thoroughly familiar with all conditions affecting labor in the locale of the Project, including, but not limited to, trade jurisdictions and agreements, incentive and premium time, pay, procurement, living and commuting conditions. Contractor shall assume responsibility for costs resulting from his failure to verify conditions affecting his labor.*

§ 3.4.9 *Contractor shall be responsible for labor peace on the Project and shall at all times make its best efforts and judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances, and shall at all times maintain Project-wide labor harmony. Except as specifically provided in Subparagraph 8.3.1, Contractor shall be liable to Owner for all damages suffered by Owner occurring as a result of work stoppages, slowdowns, disputes, or strikes.*

§ 3.5 Warranty

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

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

§ 3.5.2 *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 the Owner, execute any document reasonably requested by Owner to effectuate such assignment. If the Owner attempts to enforce a claim based upon a manufacturer's or suppliers 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 obligations under this Subparagraph 3.5.2 shall survive the expiration or earlier termination of the Contract. The warranty period for all work of each Contractor shall be two (2) years from the date of final inspection and acceptance by the Owner unless otherwise specified.*

§ 3.6 Taxes

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

§ 3.6.1 *The owner is exempt from all taxes including Federal Excise Tax, fuel tax, transportation taxes and State Sales or Use Tax.*

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.~~ *The Contractor shall be required to secure permits or government approvals necessary for the proper execution and completion of the work. The Contractor shall obtain business licenses required by the State, County and/or City/Township and shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work.*

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

3.7.1.1 *The required Building Permit or Permits shall be secured by the Contractor for his trade; or by the Prime Contractor in charge of the Work when the Contract combines more than one trade under a Single Contract.*

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

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

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than ~~14 days~~ *three (3) days* after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

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

§ 3.8 Allowances (See Specification "Section 012100 – Allowances")

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

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a **full time** competent superintendent and necessary assistants **acceptable to the Owner and Architect** who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

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

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

§ 3.9.4 A superintendent for the contractor shall be required for the overall project and a Foreman shall be at the project site. The number of necessary Assistants to the superintendent shall be the areas where work is in progress shall be adequately supervised by the Contractor's superintendent or one of his assistants. If, in the Architect or Engineer's opinion, the quality or progress of the work are adversely affected by lack of adequate supervision, the Contractor shall be required to increase the number of supervisory personnel at no increase in the Contract sum.

§ 3.10 Contractor's Construction and Submittal Schedules (See Specification Section 013100, "Contractor's Construction Schedules.")

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. **The schedule which is prepared by the Contractor shall indicate the proposed starting and completion date for the various subdivisions of the Work as well as the totality of the Work. The schedule shall be updated every thirty (30) days and must be submitted to the Architect with Contractor's Applications for Payment. If the schedule is not submitted with the payment application, no payment will be processed. Each schedule shall contain a comparison of actual progress with the estimated progress for such point in time started in the original schedule. If any schedule submitted sets forth a date for Substantial Completion for the Work or any phase of the Work beyond the Date(s) of Substantial Completion established in the Contract (as the same may be extended as provided in the Contract Documents), then Contractor shall submit to Architect and Owner for their review and approval a description of the means and methods which Contractor intends to employ to expedite the progress of the Work to ensure timely**

completion of the various phases of the Work as well as the totality of the Work. To ensure such timely completion, Contractor shall take all necessary action including, without limitation, increasing the number of personnel and labor on the Project and implementing overtime and double shifts. In that event, Contractor shall not be entitled to an adjustment in the Contract Sum or the schedule.

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

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

§ 3.10.4 Schedules shall comply with the requirements of the Division 1 "Section 013200 – Construction Progress Documentation."

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed. ***See Specification "Section 013300 – Submittal Procedures," and "Section 017700 – Closeout Procedures," for specific details and requirements.***

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors. ***Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.***

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

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

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

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

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

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

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

§ 3.12.11 Detailed requirements are specified in Specification "Section 013300 – Submittal Procedures."

§3.12.12 All shop drawings are to include manufacturer's data. All shop drawings and samples are to be submitted by the Contractor to the Architect for review. Each sheet of the shop drawings shall identify the project, contractor, subcontractor, and fabricator or manufacturer and the date of the drawings. All shop drawings shall be numbered in consecutive sequence and each sheet shall indicate the total number of sheets in the set.

§ 3.12.13 Substitutions: All substitutions or deviations from plans and specification must be clearly noted as such on all shop drawings. Contractor shall identify, coordinate and pay for any additional requirements as a result of substitutions, deviations, etc., including necessary change orders. In addition, substitution submittals shall be made no later than 30 days after Notice to Proceed in order to provide time for comparison review. All submittals after 30 days shall be in strict accordance with the basis of design / specified products.

§ 3.13 Use of Site

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

§ 3.13.1 Location and weights of all equipment and materials and the Contractor intends to place on the slab shall be submitted to the Architect for review.

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

§ 3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

§ 3.13.4 Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work or (2) the Building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§ 3.13.5 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such and suggest alternatives through which the same results can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirement of the rules and regulations. The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building.

§ 3.13.6 The Contractor shall provide a temporary construction fence weather shown on the contract documents or not as required to separate the area or areas under construction from the Owners area or areas used by the public. The temporary fencing shall be approved by the Owner prior to installation.

§ 3.14 Cutting and Patching (See Specification "Section 024119 – Selective Demolition")

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

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

§ 3.15 Cleaning Up

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

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

§ 3.15.3 *The Contractor shall perform all daily clean up and removal of debris from the site including that of his subcontractors. The Contractor shall maintain an adequate supply of laborers to accomplish daily clean up and removal of debris from the site and work areas. No debris will be allowed to accumulate in or around the building including masonry debris. The building site must be maintained free of all litter, dirt, dust and debris on a daily basis. The Owner's Team may stop all work and require all personnel on site to clean up. No accumulation of flammable material is permitted. Prior to installation of finishes the floors will be swept or vacuumed and kept free of dust and dirt until turned over to the Owner.*

§ 3.15.4 *Cleaning and debris removal may be considered a safety concern by judgment of the Owner or his agents and as such the work may be stopped to provide time and labor for immediate clean up.*

§ 3.15.5 *Final Clean-Up: The Contractor has the responsibility for the final clean-up and policing of the entire site after other contractors have removed their own waste materials, rubbish, equipment, tools and plant. In addition, thereto, the General Construction Contractor shall have a professional cleaning company perform 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, finger prints, other soil, dust, dirt, from painted, decorated, or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.*
- .4 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 entire site, including staging areas.*

§ 3.16 Access to Work

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

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

§ 3.16.2 *Contractor shall be responsible for snow plowing and snow removal as required to maintain access/egress to construction area.*

§ 3.16.3 *Contractor shall keep only necessary equipment on site and shall cooperate with the Owner regarding location of stored material.*

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is

caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§3.18.1.1 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, Architects, Engineers, harmless from, and against any and all claims, demands, damages, actions or causes of action by any party, together with any and all losses, costs or expenses in connection therewith or related thereto, including, but not limited to, attorney fees and costs of suit, for bodily injuries, death or property damage arising in or in any manner growing out of the work performed, or to be performed under this Contract. Contractor and its successors and assigns agree to indemnify the Owner, its individual members (past, present and future), its successors, assigns, employees, agents, Architects, and Engineers against all fines, penalties or losses incurred for, including, but not limited to, attorney fees and costs of suit, or by reason of the violation by Contractor in 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, Architects, or Engineers, 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, Engineers due to, or arising out of the work performed by the Contractor.

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

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

§3.19 Re-design

§3.19.1 If the Contractor makes, or causes to be made, due to approval of substitute equipment or otherwise, any substantial change in the form, type, system and details of construction from those shown on the Drawings, he shall pay for all costs arising from such changes. The Contractor shall pay all Legal and 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.

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

- .1 that he/she is authorized to do business in the State, County, and / or City where construction will take place at the Project and is properly licensed by all necessary governmental and public authorities having jurisdiction over him/her and over the Work and the site of the Project;**

- .2 *that he/she is familiar with all Federal, State, Municipal and Department laws, ordinances and regulations, which may in any way affect the work of those employed herein, including but not limited to any special acts relating to the work or to the project of which it is a part;*
- .3 *that such temporary and permanent work required by the Contract Documents as is to be done by him/her, can be satisfactorily constructed and used for the purposes for which it is intended;*
- .4 *that he/she is familiar with local trade jurisdictional practices at the site of the project;*
- .5 *that he/she has carefully examined the plans; the specifications and the site of the work, and that from his own investigations, he/she has satisfied himself/herself as to the nature and location of the work, the character, quality and quantity of the surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the work, and the general local conditions, and all other materials which may in any way affect the work or his/her performance;*
- .6 *that he/she has determined what local ordinances, if any, will affect his work. He/She has checked for any County, City, Borough, or Township rules or regulations applicable to the area in which the Project is being constructed and in addition, for any rules or regulations of other organizations having jurisdiction, such as chambers-of-commerce, planning commission, industries, or utility companies who have jurisdiction over property on which the Work will be performed. Any costs of compliance with local controls are included in the prices bid, even if documents of such local controlling agencies are not listed specifically in the Contract Documents.*

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. *The term "Architect" means the Architect or the Architect's authorized representative.*

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

§ 4.1.3 *If the employment of the Architect is terminated, the Owner shall employ a successor architect whose status under the Contract Documents shall be that of the Architect.*

§ 4.2 Administration of the Contract

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

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

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

§ 4.2.4 Communications

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

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections *13.4.1*, 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

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

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

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

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

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

§4.2.15 Reference in the technical provisions of the specifications to standard specifications and test methods, including those of the American Society for Testing and Materials, 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 nationally recognized technical societies and agencies shall refer to the editions and revisions current with the date of the Contract Documents.

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

*§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14 day period shall constitute notice of no reasonable objection. **Identification of Subcontractors required by N.J.S.A. 18A:18A-18 shall be provided with the bid specifications in accordance with that statute. The names of all subcontractors and material suppliers not covered by N.J.S.A. 18A:18A-18 shall be submitted to the Architect for approval not later than seven (7) days after the date of the notice to proceed. 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 the Article shall not relieve the Contractor from conformance to the Contract Requirements***

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

5.2.2.1 The Architect will promptly reply in writing to the Contractor stating whether the Owner or Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides further data. Failure of the Owner or Architect to reply promptly shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

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

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

§ 5.3 Subcontractual Relations

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

§ 5.3.1 The Contractor shall obligate 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 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 shall obligate each Sub-Contractor to comply with the Public Works (the Public Works 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~~

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

§ 6.1.3 ~~The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.~~ ***THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL WORK. All trades have a mutual obligation to coordinate their work with the other trades and cooperate as necessary with the Contractor and the Construction schedule – to complete the work as required by the School District. The Architect will provide assistance to the Contractor for coordination between their work and the Owner. The Contractor is required to have their superintendent or foreman on site at all times when their work or that of their subs is in progress***

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

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent. ***Should the Contractor be damaged by any other separate Contractor on the work by reason of such other Contractor's failure to perform properly his Contract with the Owner, no action will lie against the Owner and the Owner shall have no liability therefore, but the Contractor may assert his claim for damage against such separate Contractor as a third party beneficiary under the Contract between such other Contractor and the Owner.***

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

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5 *or to other completed or partially completed construction or property on the site or to property of any adjoining Owner or other party.*

6.2.4.1 Should the Contractor cause damage to the work or property of any separate Contractor on the Project, the Contractor shall, upon due notice, settle with such other Contractor by agreement or Court of Law if he will so settle. If such separate Contractor sues the Owner, or the Architect or initiates a Court of Law proceeding on account of any damage alleged to have been so sustained, the Contractor agrees that he will hold the Owner or Architects harmless against any such suit, and that he will reimburse to the Owner or Architect, as the case may be, the cost of defending such suit, including reasonable attorney's fee and if judgment against Owner or Architect arises therefrom, the Contractor shall pay all judgment cost incurred by the Owner or Architect.

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

§ 6.3 Owner's Right to Clean Up

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

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 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 therefor unless it shall, prior to complying with same and in no event no later than five (5) working days from the date such direction or order was given, submit to the Owner's Team its change proposal for the Owner's approval.

7.1.1.2 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 including a specific number of days for a time extension. If the Change Order Request does not provide an additional time request, the Contractor shall not be entitled to an extension of time. The Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets if requested of any Subcontractors. The Contractor may not claim additional time at a later date and shall remove any language to that effect from his/her Change Order Request.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone *in accordance with Paragraph 7.4.*

§ 7.1.2.1 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, any alleged waiver of the Owner's right under this Contract or any increase in any amounts due under the Contract or any or a change in any time period provided for in the Contract Documents.

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

§ 7.1.4 *A directive or order from the Owner or the Architect, other than a Change Order, a Construction Change Directive or any Order for a minor change pursuant to this Article 7, shall not be recognized as having any impact on the Contract Sum or the Contract Time and the Contractor shall have no claim therefore. If the Contractor believes that a directive or order would require it to perform work not required by the Contract Documents, the Contractor shall so inform the Owner and Architect in writing prior to complying with the same and in no event, any later than five (5) working days from the day such direction or order was given, and shall submit to the Owner and Architect for the Owner's and Architect's approval its change proposal.*

§ 7.2 Change Orders

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

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

§ 7.2.2 *Methods used in determining adjustments to the Contract Sum include those listed in Subparagraph 7.3.4. The total for overhead and profit shall NOT exceed 15%.*

§ 7.2.3 *Any change in work authorized in writing by the Owner and Architect that will require a change in the cost of the work, whether an additive or deductive change in cost, shall show a complete cost breakdown of labor, material, appropriate overhead and profit (15% maximum) and contract time.*

§ 7.2.4 *When a Change Order involves both additions and deletions in material, the net quantity is to be determined and the 15% overhead and profit is to be applied to the net quantity.*

§ 7.2.5 *When any change in the Work, regardless of the reason therefore, requires or is alleged to require an adjustment in Contract Time, such request for time adjustment shall be submitted by the Contractor as part of the change proposal. Any Change Order approved by the Owner and for which payment is accepted by the Contractor, in which no adjustment in Contract Time is stipulated, shall be understood to mean that no such adjustment is required by reason of the change, and any and all rights of the Contractor or any subsequent request for adjustment of Contract Time by reason of the change is waived.*

§ 7.2.6 *Request by the Contractor for adjustment of the Contract Amount regardless of the reason therefore, shall be submitted to the Architect and the Owner with itemized labor and material quantities and unit prices to permit proper evaluation of the request. A submission by the Contractor containing unsubstantiated lump sum requests for adjustment of the Contract Amount will not be considered by the Owner and Architect. The Owner and Architect will not be liable for any delay incurred by reason of the Contractor's failure to submit satisfactory justification and back-up with any request for adjustment to the Contract Amount.*

§ 7.2.7 *Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the initial Work which is the subject to the Change Order, including, but not limited to, all direct, indirect and impact costs associated with such change and any and all adjustment to the Contract Sum and the Construction Schedule. The Contractor will not be entitled to any compensation for additional work, impact costs or delays in the Construction Schedule not included in the Change Order.*

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

§ 7.2.9 *Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the initial Work which is the subject to the Change Order, including, but not limited to, all direct, indirect and impact costs associated with such change and any and all adjustment to the Contract Sum and the Construction Schedule. The Contractor will not be entitled to any compensation for additional work, impact costs or delays in the Construction Schedule not included in the Change Order.*

§ 7.3 Construction Change Directives

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

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

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

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

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement **not to exceed 15%**. ~~or if no such amount is set forth in the Agreement, a reasonable amount.~~ In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- 1 Costs of labor **shall be in accordance with the New Jersey Prevailing Wage Rates at the time of the Contract commencement with no additional "labor burden", future increases or any other considerations.** ~~including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;~~
- 2 Costs of materials, supplies, and equipment, ~~including cost of transportation,~~ whether incorporated or consumed;
- 3 Rental costs of machinery and equipment, exclusive of hand tools, **only when machinery or equipment is not already on site** ~~whether rented from the Contractor or others;~~
- 4 Costs of premiums for all bonds and insurance **shall be limited to 1.5%**, ~~permit fees, and sales, use, or similar taxes,~~ directly related to the change; **and**
- 5 Costs of supervision and field office personnel directly attributable to the change: **NOT PERMITTED!**

§ 7.3.4.1 **The allowance for overhead and profit combined, included in the total cost to the Owner, may only include a Contractor, his Subcontractor and shall be limited to a total of 15% of the cost.**

§ 7.3.4.2 **In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs, including labor, materials and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontractors, they shall be itemized.**

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

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

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

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

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

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

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect *within five (5) calendar days* and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 ~~The date of commencement of the Work is the date established in the Agreement.~~ *The work to be performed under this Contract shall commence after the required insurance has been obtained and approved and within three days after issuance of the notice to proceed by the Owner. The Contract Time shall commence as of the date of the Notice to Proceed unless otherwise specified in the agreement.*

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

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

§ 8.2 Progress and Completion

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

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

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

§ 8.2.4 Owner, or his/her representative, in coordination with the Contractor, shall set work hours. Contractor may be required to work nights, weekends or holidays as necessary to complete the work in accordance with the

Schedule or in coordination with School Activities. Under no circumstances shall the Contractor begin or continue with work that is adversely impacting School activity or operations. All utility shutdowns, interruptions, work in or adjacent to existing buildings will be coordinated through the Owner, or his representative, and may have to be performed during hours when the School is not in operation. All cutting, hammering or other activity that is noisy, produces smoke or fumes or is otherwise disruptive to the School may have to be done during hours when the School is not in operation. Work required to be performed during non-school operating hours, as determined by the Owner or his representative, will be performed at no additional cost to the Owner.

§ 8.2.5 Contractor agrees to increase manpower, increase work hours, and to increase equipment necessary to maintain the Project Construction Schedule, and when also requested by the Architect and the Owner, and shall be without additional cost or charge to the Owner.

§8.2.6 Work shall commence within ten (10) days of the issuance by Owner of a Notice to Proceed and shall proceed uninterrupted to Final Completion. The Contractor further acknowledges and agrees that if the Contractor fails to complete substantially or cause the Substantial Completion of any portion of the Work as required by the Project Construction Schedule and/or within the Contract Time, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, the Owner and the Contractor agrees as set forth below.

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

§8.2.7 Adherence to Schedule

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; or by occurrences beyond the control and without the fault or negligence of the Contractor and which by the exercise of reasonable diligence the Contractor is unable to prevent or provide against, including labor disputes (other than disputes limited to the work force of, or provided by, the Contractor or its Subcontractors), fire, unusual delay in deliveries not reasonably anticipatable, unavoidable casualties, or by other occurrences which the Architect, subject to the Owner's approval, determines may justify delay, then, provided that the Contractor is in compliance with Subparagraph 8.3.3 hereof, the Contract Time shall be extended by Change Order or Construction Change Directive for the length of time actually and directly caused by such occurrence as determined by the Architect and approved by the Contractor and Owner (such approval not to be unreasonably withheld, delayed, or conditioned); provided, however, that such extension of Contract Time shall be net of any delays caused by or due to the fault or negligence of the Contractor or which are otherwise the responsibility of the Contractor and shall also be net of any contingency or "float" time allowance included in the Contractor's construction schedule. The Contractor shall, in the event of any occurrence likely to cause a delay, cooperate in good faith with the Architect and Owner to minimize and mitigate the impact of any such occurrence and do all things reasonable under the circumstances to achieve this goal (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. Any claim for extension of time shall be made in writing to the Architect not more than five (5) days after the commencement of

the delay, otherwise, it shall be waived. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the work. No claim made beyond the five (5) days shall be considered valid.

§ 8.3.2.1 The Contractor agrees that if any delay in the Contractor's works unnecessarily delays the work of any other Contractor or Contractors, the Contractor shall in that case pay all costs and expenses incurred by such parties due to such delays and hereby authorizes the Owner to deduct the amount of such costs and expenses from any moneys due or to become due the Contractor under this Contract. The Architect shall be responsible for ascertaining whether the Contractor is responsible for delaying any of the work of any other Contractor. His decision shall be final.

§ 8.3.3 Notwithstanding anything to the contrary in the Contract Documents, any extension of the Contract Time, to the extent permitted under Paragraph 8.3.1, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity or (4) other similar claims (collectively referred to in this Paragraph 8.3.3. as "delays"), whether or not such delays are foreseeable, unless a delay is caused by acts of the Owner constituting active interference with the Contractor's performance of the Work and only to the extent such acts continue after the Contractor furnishes the Owner with written notice of such interference. In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any delay including without limitation consequential damages, lost opportunity cost, impact damages or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including without limitation ordering changes in the Work or directing suspension, rescheduling or correction of the Work) regardless of the extent or frequency of the Owner's exercise of such rights or remedies shall not be construed as an act of interference with the Contractor's performance of the Work. This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

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

§ 8.3.5 Where the cause of delay is due to weather conditions, an 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 previous sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five years.

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.

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

§ 9.1.3 *Payment procedures shall be as follows:*

- 1. Contractor shall submit Schedule of Values to Architect for review*
- 2. Prior to end of each pay period, Contractor shall submit a rough draft ("pencil copy") for their payment application for review and approval by the Architect.*
- 3. Upon approval of pencil copy, Contractor shall submit at least three copies of their payment application to the Architect for approval along with their certified payrolls and monthly manning reports.*
- 4. Architect will approve payments and forward to the Owner.*

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work *which in the aggregate equals that total Contract Sum, divided so as to facilitate payments to Subcontractors, supported by such evidence of correctness as the Architect may direct or as required by the Owner. The schedule, when approved by the Architect and Owner, shall be used to monitor the progress*

of the Work and as a basis for Certificates for Payment. All items with entered values will be transferred by the Contractor to the "Applications and Certificate for Payment," and shall include the latest approved Change Orders and Construction Change Directives. Change Order values and Construction Change Directive values shall be broken down to show the various subcontracts. The Application for Payment shall be on AIA Document G702 and G703 and the approved Voucher obtainable from the Owner. 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. All blanks and columns must be filled in, including every percentage complete figure. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.2.2 The Contractor shall include the following separate items in his/her schedule of values:

*Punch List Work - Minimum of 2% of contract value
Value for Record Drawings and manuals
Value for final clean-up by the Contractor
Value for shop drawings
Safety protections
Allowance*

§ 9.3 Applications for Payment

§ 9.3.1 The Contractor shall submit to the Architect an itemized Application for Payment for their Contract on AIA Document G702 and G703 and the approved Voucher obtainable from the School District. Payroll Certification for all employees of all of the workers on the project shall be submitted as well as other such data for the purposes of summarizing the work and tracking the project. The Architect will process the application and forward it with his recommendations to the Owner At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

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

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

§ 9.3.1.3 Until substantial completion, the Owner will pay 98% of the amount due the Contractor on account of progress payments until a balance of \$500,000 is due the Contractor. The retainage will then be increased to Five Percent (5%) of the \$500,000.00 balance of the contract until final completion. The retainage will be held until final acceptance of the project by the Architect and the Owner. The Contractor shall submit a separate voucher for the full amount of the retainage along with the Consent of Surety, A.I.A. Form G707A and the Contractor shall be required to furnish a Maintenance Bond for 100% of the Project Cost for a period of two (2) years from the Date of Final Acceptance.

§ 9.3.1.4 Upon acceptance of the work performed pursuant to this Contract for which the Contractor has agreed to the withholding of payments pursuant to Article 9 of this Contract, all amounts being withheld by the Owner shall be paid in accordance with Paragraph 9.3.1.3 without further withholding of any amounts for any purposes whatsoever, provided that the Contract has been satisfactorily completed.

§ 9.3.1.5 Each application for payment shall be accompanied by the following, all in form and substance satisfactory to the Owner and Architect:

1. *A current contractor's lien waiver and duly executed and acknowledged sworn statement by an officer of the Contractor showing all subcontractors and materialmen with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any subcontractor and materialmen in the requested progress payment and the amount to be paid to the Contractor from such progress payment.*
2. *A Purchase Order or Voucher if required by the Owner.*
3. *A Schedule Update approved by the Architect.*
4. *An updated Shop Drawing Log showing the status of all of the required Shop Drawings.*

§ 9.3.2 ~~Unless otherwise provided in the Contract Documents,~~ *At the Owner's Option*, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with ~~procedures~~ *Paragraphs 9.3.2.1, 9.3.2.2, 9.3.2.3 and 9.3.2.4* and satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.2.1 *With each Application for Payment the Contractor shall submit to the Architect and Owner a written list identifying each location where materials are stored off the Project site and the value of materials at each location. The Contractor shall procure insurance satisfactory to the Owner for materials stored off the Project site in an amount not less than the total value thereof.*

§ 9.3.2.2 *The consent of any surety shall be obtained to the extent required prior to the payment for any materials stored off the Project site.*

§ 9.3.2.3 *Representatives of the Owner shall have the right to make inspections of the off-site storage areas at any time.*

§ 9.3.2.4 *Materials stored off site shall be protected from diversion, destruction, theft and damage to the satisfaction of the Owner, shall specifically be marked for use on the Project and shall be segregated from other materials at the storage facility.*

§ 9.3.3 *The Contractor warrants and agrees that title to all Work will pass to the Owner either by incorporation in the construction or upon receipt of payment therefor by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests, or encumbrances whatsoever, that the vesting of such title shall not impose any obligation on Owner or relieve Contractor of any of its obligations under the Contract, that the Contractor shall remain responsible for damages to or loss of the Work, whether completed or under construction, until responsibility for the Work has been accepted by Owner in the manner set forth in the Contract Documents, and that no Work covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person* ~~The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.~~

§ 9.3.4 *The Contractor acknowledges that actual payments pursuant to any Application for Payment and Certificate for Payment must be voted upon by the Owner at a public meeting. Typically, the Owner has monthly public business meetings. Provided an Application for Payment is received by the Architect not later than the date required by the Owner, and upon issuance of a Certificate of Payment for all or part of the Application for Payment, the Owner shall make payment to the Contractor not later than the tenth (10th) day after the Owner's regular public meeting held during the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than ten (10)*

calendar days after the next regular public meeting of the Owner held after the late submitted Application for Payment has been reviewed and certified for payment by the Architect.

§ 9.3.4.1 Contractor shall comply with the terms of the agreement between Owner and Contractor with reference to Applications for Payment.

§ 9.3.4.2 Certification shall be subject to Consent of Surety presented by the Contractor for each application.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within ~~seven~~ **Fourteen** days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. ***The Architect must receive this information in accordance with the schedule set forth at the Pre-Construction Meeting***

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

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.
- .8 ***The failure of any Contractors 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.***
- .9 ***Shop drawings not submitted as required by the Contract Documents.***

- .10 Failure to cooperate with Owner or Architect relative to construction schedule, material storage, coordination with the School District, clean up or safety.**

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

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

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

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

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents and shall so notify the Architect. ***Notwithstanding Certification by the Architect, the Owner may refuse to make payment based on any default by the Contractor including, but not limited to those defaults set forth in Subparagraphs 9.5.1 through 9.5.1.11. The Owner shall not be deemed in default by reason of withholding payment while any of such defaults by the Contractor remain uncured.***

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

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

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

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

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

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

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

§ 9.6.9 *The Owner will issue timely payments to the Contractor in accordance with the requirements of "The Prompt Payment Act", N.J.S.A. 2A:30A-1, et seq. The Contractor is hereby notified that the Owner, as a public entity, requires all payments to be approved at scheduled public Board of Education 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.*

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not ***for reasons other than a default of the Contract, including but not limited to those defaults set forth in Subparagraphs 9.5.1.1 through 9.5.1.11*** pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by ***a court of law binding dispute resolution***, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately ~~and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.~~

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof ***which the Owner agrees to accept separately*** is sufficiently complete in accordance with ***this definition and*** the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. ***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 of the 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 requires 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 as agreed upon following the date of substantial completion. In addition to any other definitions of Substantial Completion as defined by the contract documents, the following is required before the project is considered "Substantially Complete":

In addition to the above the following items must be completed in order to deem the work Substantially Complete:

1. All required final inspections have been completed by the authority having jurisdiction resulting in a TCO or CO.

§ 9.8.2 "PUNCH LIST": When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items "PUNCH LIST" to be completed or corrected *along with all special warranties required by the Contract Documents endorsed by the contractor* prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.2.1 The Contractor shall perform a Quality Control / Quality Assurance QC/QA Punchlist of all work prior to requesting Substantial Completion and a punch list from the Owners Team. The Contractor's Project Manager shall take the lead and conduct an onsite review with the Contractor's superintendent and representation from every major sub prime contractor. Notification of this onsite walk thru shall be provided in writing to all members of the Owners Team who may or may not choose to attend. The Contractor's Project Manager shall record and distribute this QC/QA Punchlist in a matrix that provides an additional column for the Contractor to document the completion of the work and the date. After successful completion of the Contractor's QC/QA Punchlist and all work, the Contractor shall request the Owners Team perform a Punchlist. Substantial Completion shall be requested in accordance with paragraph 9.8.1.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents *and the requirements above* 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 *in writing* a request for another inspection by the Architect to determine Substantial Completion.

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

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

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

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or

use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.9.4 *The occupancy of any portion of the Work shall not constitute acceptance of any Work, except as hereinafter stated, nor does it waive the Owner's right to Liquidated Damages. Final Acceptance of the Work shall be for the whole Work only and not part.*

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

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

§ 9.10 Final Completion and Final Payment

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

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

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) ***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) delivery to Architect of Contractor's General Warranty (as described in Paragraph 3.5) and each written warranty and assignment thereof prepared in duplicate, certificates of inspections, and bonds for Architect's review and delivery to Owner, (b) 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, (c) delivery to the Architect of specified Project record documents and (d) 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 if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

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

§ 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.

9.11 LIQUIDATED DAMAGES

§ 9.11.1 *The Contractor understands and agrees that all work must be performed in an orderly and closely coordinated sequence so that the date for substantial completion is met.*

§ 9.11.2 *If the Contractor fails to complete his work or fails to complete a portion of his work, he shall pay the Owner, as liquidated damages and not as a penalty, the sum as specified in the technical portion of the contract documents. Such amount is 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.*

§ 9.11.3 *For projects that have milestone completion dates, liquidated damages shall apply to all phased construction milestone dates as established by the phasing plan, sequencing section and/or the Summary of Work.*

§ 9.11.4 *Substantial completion will be determined by the Architect as defined in paragraph 9.8.1.*

§ 9.11.5 *For damage occurring at the time of delay, the Owner may retain the amount due to him under this clause from any payments due to the Contractor.*

§ 9.11.6 *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 sum of \$1,000.00 stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is substantially complete.*

§ 9.11.7 **ONE THOUSAND (\$1,000) PER DAY CALENDAR DAY FOR PUNCH LIST ITEMS.** *Contractor has thirty (30) days to complete the final punch list. Liquidated damages will be addressed starting on the 31st day after receipt of Notice of Substantial Completion or issuance of the Final Punch List, whichever comes later, to that date of the Architect's acceptance that all punch list(s) have been completed.*

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.

§ 10.1.1

1. *The Contractor must fully comply with the job safety requirements in addition to all Federal, State and Local safety guidelines. All cost associated with complying with all safety requirements shall be included in each contractor's base bid.*
2. *The Contractor will serve as the overall Project Safety Coordinator and shall be responsible for all issues of safety and protection. The Contractor shall designate a safety person at the job site while the contractor is working on the project site. 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 Architect is not responsible for safety on this project but will endeavor to promote safety. Each Contractor must comply with job Safety Requirements in addition to OSHA and local agency requirements. Failure to comply with safety issues will be grounds for withholding of payments.*
3. *Contractor will comply with all reasonable requests of the Owner and Architect with respect to additional security and protections required for work interfacing with Facility Operations. Safety is of utmost importance on this project and all issues relative to safety and protection of the Facility, Staff and Occupants will be treated as emergency needs and will not be subject to the 7-day notice requirements of Article 14.*
 - A. *The Contractor to provide, maintain, relocate and remove in coordination the Architect a 6' high, perimeter security fence. Fence will surround the building and proposed parking areas and will have signage attached at 100' intervals advising "Construction Area – Please Keep Out". The Contractor to be responsible for opening and securing site each day.*
 - B. *Orange safety fencing will be installed around the entire area of any and all earthwork, excavations, etc. and will be maintained until the work is complete.*
 - C. *This is a hard hat job. Identifying hard hats shall be worn at all times.*
 - D. *Hot work permits will be issued by foreman for all activities involving open flames.*
4. *The proper execution of the required safety provisions is directly related to the general condition safety line item on the schedule of values. The failure to provide a competent person on site to properly identify and take immediate corrective action may result in deductions to the general condition safety line item of the schedule of values.*
5. *The Contractor shall be responsible for the immediate investigation and resolution of all safety and environmental complaints / issues generated by contractor employees, owners, owner's representatives or members of the public.*
6. *Contractor shall maintain all egress routes throughout the work area. Contractor shall provide fire extinguishers throughout as deemed necessary by the fire official.*
7. *Contractor's safety representative shall perform a daily safety inspection walk through to ensure that all requirements of the OSHA Standards, Fire Protection Standards and Safe Work Practices are being with and/or corrected. The responsibility of the Contractor is to provide a safe and healthy work environment for construction personnel, Owner's personnel and representative, and the public.*
8. *Upon written receipt of safety concerns and /or issues, the Contractor shall respond in writing addressing how the safety concerns or issues were resolved.*
9. *The Contractor's response and compliance with correction of deficiencies noted in the safety concerns notice issued by the Authority having jurisdiction is mandatory. Failure to comply will be grounds for withholding of progress payments until the conditions are acceptable to O.S.H.A or Authority having local jurisdiction.*
10. *Contractor shall have all required personal protective equipment and materials available for use by each employee as required by Federal, State and Local guidelines.*
11. *Contractor shall supply proper equipment and crew sizes as necessary to safely complete the work.*
12. *Contractor shall provide documented safety training for each of their employees and subcontractor's employees no later than the first day they arrive on site. The training shall be documented and signed by the trainer and employee. A copy of all safety-training documents is to be provided to the Owner and updated as manpower loading increases.*

13. *The Contractor shall be responsible for providing and maintaining all temporary emergency egress routes. The Contractor shall obtain the approval of the Building and Fire Departments for all temporary emergency egress routes.*
14. *Contractor shall provide OSHA approved pedestrian walking bridges as necessary to protect against overhead hazards.*
15. *Contractor shall provide, relocate and /or maintain barricades, signage, provide flagmen etc. as necessary to ensure public safety and safe egress. Contractor to provide, maintain, relocate and remove in coordination with the Owner and/or Architect, the perimeter security fence.*
16. *Contractor shall submit to the Architect, all MSDS sheets and shall cooperate in the posting of all required notifications relative to the use of hazardous substances on the property. Contractor to comply with NJ Law regarding the use or storage of hazardous substances in Schools. MSDS sheets shall be posted prior to product being delivered to site.*
17. *Contractor, subcontractor, venter, etc. should enforce a full time no smoking or alcohol use policy for all employees during the entire course of the project. Any worker found violating these reflections, or being belligerent, will be subject to removal from the site at the sole discretion of Owner.*
18. *Contractor shall be responsible to secure the site at the end of each workday by an effective means and maintain until all parties determine no longer required.*
19. *For the safety of occupants, staff, and the public, all crane operation and lifting must be scheduled and coordinated with the Owner. Swinging of crane boom over occupied space will not be allowed. Contractor shall provide additional barricades and fencing around his crane at all times.*
20. *Contractor must submit an acceptable OSHA compliant site specific written safety plan to the Architect, for review within fourteen (14) days from the notice to proceed or prior to mobilizing on site, whichever comes first. The written safety plan shall include (as applicable to their work) but is not limited to the following:*
 - *Full time no smoking policy or alcohol use is allowed on the project. Any worker found violating these restrictions, or being belligerent, will be subject to removal from the site. (Contractors shall post required signs).*
 - *Full time hard hat policy (identifying hard hats shall be worn at all times).*
 - *Site specific emergency action plan with contractor phone numbers, active 24 hours a day, 7 days a week.*
 - *Competent on-site safety representative, named and active (Provide alternate)*
 - *Full time fall protection plan for exposures over 6'-0".*
 - *Job site signage plan (Perimeter fence warning signs posted 50'-0" o/c.*
 - *First aid and CPR provisions.*
 - *OSHA 200 log and Job Safety and Health Protection poster.*
 - *Daily clean up.*
 - *Hazard Communication Program with MSDS logged and maintained.*
 - *Hazard Communication program.*
 - *Daily diary of work, issues, and incident, etc.*
 - *GFI safety program.*
 - *Required safety clothes; Eye & ear protection, respirators, boots, belts, gloves etc. as appropriate to their work requirement.*
 - *Fire Extinguishers.*
 - *Removal guard rail and protection at material loading areas, 200lb force minimum requirement.*
 - *Daily inspection of tools and equipment; verify safety devises are operational.*
 - *Ladder usage plan.*
 - *Weekly tool box meetings, documented and signed by each employee*
 - *Temporary heat procedures.*
21. *Contractor shall maintain and submit a complete copy of the written safety plan, logs, diaries, plans and programs on site for the Owner.*

The speed limit within the project property is 5MPH. Contractor employees operating vehicles in excess of the speed limit or in any otherwise unsafe manner will be directed to leave the site and not permitted to return.

§ 10.2 Safety of Persons and Property

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction. *as well as any other real or personal property of the Owner.*
- .4 *The Contractor shall provide a third-party Insurance Safety Site Inspection Report monthly and remedy all issues promptly.*

§ 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.

§ 10.2.2.1 Contractor shall comply with all regulations required by the Federal Occupational Safety and Health Act (OSHA).

§ 10.2.2.2 The Contractor shall conform to all applicable New Jersey Department of Environmental Protection regulations.

§ 10.2.2.3 Contractors must comply with Construction and Environmental Standards contained in Federal and State Regulations and other applicable laws.

§ 10.2.2.4 It is the Contractor's responsibility to determine the existence of potentially hazardous materials, including lead, and to protect his workmen and the work area.

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

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall

be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 *The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits under the Contractor's control shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site. Contractor will comply with all reasonable requests of the Owner with respect to additional security and protections required for work interfacing with School Operations. Safety is of utmost importance on this project and all issues relative to safety and protection of the School, Staff and Students will be treated as emergency needs and will not be subject to the 7-day notice requirements of Article 14.*

§ 10.2.10 *The Contractor shall remove snow or ice which may accumulate on the site within areas under his control which might result in damage or delay.*

§ 10.2.11 *The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner and Contractor, whether or not forming part of the Work, located within those areas of the Project to which the Contractor has access. Whenever unattended, including nights and weekends, mobile equipment and operable machinery shall be kept locked and made inoperable and immovable.*

§ 10.2.12 *Neither the Owner nor the Architect shall be responsible for providing a safe working place for the Contractor, the Subcontractors or their employees, or any individual responsible to them for the work.*

§ 10.2.13 *The Contractor shall conform to requirements of OSHA, the Construction Safety Code of the State Department of Labor and those of the AGC Manual. The requirements of the New Jersey and Local Building Construction Codes shall apply where there are equal to or more restrictive than the requirements of the Federal Act.*

§ 10.2.14 *When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work as necessary from injury or any cause.*

§ 10.2.15 *The Contractor shall promptly report in writing to the Owner and Architect 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 and Architect.*

§ 10.2.16 *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 and/or termination of this Contract:*

- .1 No use of alcoholic beverages prior to or during working hours. Anyone found impaired after lunch will be escorted from the 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, or 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 or if it is to remain idle for greater than one hour.*
- .8 All personnel are to be made aware of the availability of Material Safety Data Sheets 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 MSDS forms at the construction site office for all personnel to review.

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up *adjustments shall be accomplished as provided in Article 7.*

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

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

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

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

§ 10.3.7 The Contractor shall submit to the Owner all MSDS sheets and shall cooperate in the posting of all required notifications relative to the use of hazardous materials on school property. Contractor to comply with NJ Law regarding the use or storage of hazardous materials in Schools.

§ 10.4 Emergencies

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

§ 10.4.1 – EMERGENCY/SAFETY PLAN

All parties involved in the construction process should be aware of emergency services that may be required during the construction process.

Contractor shall establish the site-specific Emergency Action Plan and, after approval by the owner, and local authorities, shall display at various locations at the site.

In case of an accident, emergency, or injury on the job site, the Contractor shall immediately follow the Site-Specific Emergency Action Plan. Following the incident, the Contractor shall submit to the Owner a complete written accident report detailing the circumstances which caused the accident, extent of injuries, damage to the building, time of accident, corrective action required, etc.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

All insurance provisions shall be confirmed with Owner's Insurance Agent.

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

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

§ 11.1.1.3 Schedule of Insurance Coverages

.1	Commercial General Liability, Each Occurrence	
a.	Each Occurrence:	\$ 1,000,000.00
b.	Damage to Rented Premises:	\$ 300,000.00
c.	Medical Expense (Any one person):	\$ 15,000.00
d.	Personal & Adv Injury:	\$ 1,000,000.00
e.	General Aggregate:	\$ 2,000,000.00
f.	Products – Comp/Op Agg:	\$ 1,000,000.00
.2	Excess Umbrella Liability:	\$ 5,000,000.00

- .3 **Automobile Liability: (Hired autos, scheduled autos, non-owned autos)**
a. **Combined Single Limit (each accident): \$ 1,000,000.00**
- .4 **Workers Compensation and Employers Liability:**
a. **WC Statutory Limits:**
1. **E.L. Each Accident: \$ 1,000,000.00**
2. **E.L. Disease – Each Employee: \$ 1,000,000.00**
3. **E.L. Disease – Policy Limit: \$ 1,000,000.00**
- .5 **Builder's Risk Insurance: The Contractor shall provide Builder's Risk Insurance for all risk of physical loss or damage to the property described hereunder in an amount equal to the Total Project Value, and furnished under Construction Contracts for the School Facilities Project; excepting excavations, foundations and other structures customarily excluded by such insurance. The Policy shall name the Owner, State of New Jersey, the New Jersey Department of Education, New Jersey Schools Development Authority, and the New Jersey Economic Development Authority as loss payee as their interests may appear on a primary and non-contributory basis. The Builders Risk Policy is to include coverage for the perils of Earthquake, Flood, Full Windstorm, Equipment Breakdown and Theft (excluding employee theft), contain an endorsement allowing permission to occupy and include coverage for both transit and offsite storage. The policy is also to include all contractors, subcontractors and sub-subcontractors as well as the Owner, State of New Jersey, the New Jersey Department of Education, New Jersey Schools Development Authority, and the New Jersey Economic Development Authority, LAN Associates as Additional Named Insureds on a primary and non-contributory basis. The contractor and all subcontractors are responsible for all policy deductibles and uninsured or underinsured losses.**
- .6 **The Policy shall name the following as Additional Insured: The Owner; LAN Associates Engineering, Planning, Architecture, Surveying, Inc.; the State of New Jersey; and the New Jersey Department of Education as additional insureds on a primary and non-contributory basis**
- .7 **Contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18 of the AIA General Conditions.**
- .8 **Workers' Compensation Insurance of not less than statutory limits.**
- .9 **Completed Operations Insurance written to the limits specified for liability insurance specified under subparagraph .1 above. Coverage shall be required from the date of the start of Beneficial Occupancy until one year after the issuance date of Final Certificate for Payment.**
- .10 **Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance. Contractor's ACORD Certificate of Insurance must state "Contractual Liability Included" or it will be rejected.**
- .11 **The Contractor shall either**
.1 **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 in the preceding paragraph; or**
.2 **insure the activities of their subcontractors under their respective policies.**

§ 11.1.2 The Contractor shall provide surety bonds **for the entire contract amount** 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 to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.1.5 **Contractor shall furnish a performance bond and labor and material 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 a responsible surety licensed in the State of New Jersey Best's rating of no less than A-/X and shall remain in effect for a period of not less than two years following the date of final acceptance 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 power of attorney indicating the monetary limit of such power;**
- .5 **Any bond under this Paragraph 11.1.5 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 which singularly or in the aggregate equals or is less than 20% of the Contract Sum. 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 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 30 days after receipt of such notice within which to cure such default of such additional reasonable time as may be required if the nature of such default is such that it cannot be cured within 30 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.

§ 11.1.6 **If any of the foregoing insurance coverages are required to remain in force after final payment, including, but not limited to coverage for completed operations, an additional certificate evidencing continuation of such coverage shall be submitted with the Final Application for Payment.**

§ 11.1.7 **In no event shall any failure of the Owner to receive certificates of policies required under Paragraph 11.1 or to demand receipt of such certificates prior to the Contractor commencing Work be construed as a waiver of the Owner or the Architect of the Contractor's obligations to obtain insurance pursuant to this Article 11. The obligation to procure and maintain any insurance required by this Article 11 is a separate responsibility of the Contractor and independent of the duty to furnish a certificate of such insurance policies.**

§ 11.1.8 **If the Contractor fails to purchase and maintain or require to be purchased and maintained any insurance required under this Article 11, the Owner may, but shall not be obligated to, upon 5 days written notice to the Contractor, purchase such insurance on behalf of the Contractor and shall be entitled to deduct said cost from the Contractor's Contract Sum.**

§ 11.1.9 *When any required insurance due to the attainment of a normal expiration date or renewal date shall expire the Contractor shall supply the Owner with certificates of insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection and scope as was provided by the previous policy. In the event, any renewal or replacement policy for whatever reason obtained or required is written by a carrier other than that with whom the coverage was previously placed or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish replacement policy unless the Owner provides the Contractor with prior written consent to submit only a certificate of insurance for any such policy. All renewal and or replacement policies shall be in form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.*

§ 11.1.10 *The Contractor shall cause each subcontractor to (1) procure insurance in the amounts set for in Article 11 and (2) name the indemnities under Paragraph 3.18 as additional insureds under the subcontractor's comprehensive general liability policy. The additional insured endorsement included on the subcontractor's comprehensive general liability policy shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance which is applicable to the claims, such other insurance shall be on an excess or contingent basis. The amount of the insurance liability under this insurance policy shall not be reduced by the existence of such other insurance.*

§ 11.1.11 *Property insurance provided by the Owner shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring, or other similar items commonly referred to as construction equipment which may be on the site and the capital value of which is not included in the work. The Contractor shall make its own arrangements for any insurance it might require on such construction requirement. Any such policy obtained by the Contractor under this Paragraph 11.4.7 shall include a waiver of subrogation.*

§ 11.1.12 *The Contractor may carry whatever additional insurance he deems necessary to protect himself against hazards not covered for theft, collapse, water damage, materials and equipment stored on the site, and for materials and equipment stored off site, and against loss of owned or rented capital equipment and tools owned by mechanics or any tools, equipment, scaffolding, stagings, towers and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the Work.*

§ 11.1.13 *All insurance coverage procured by the Contractor shall be provided by insurance companies having policy holder ratings no lower than "A-" and financial rating no lower than, "X" in the Best's Insurance guide, latest edition in effect as the date of the Contract and subsequently in effect at the time of the renewal of the policies required by the Contract Documents.*

§ 11.1.14 *If the Owner or the Contractor is damaged by the failure of the other party to purchase or maintain insurance required under Article 11, then the party who failed to purchase or maintain the insurance shall bear all reasonable costs (including attorney's fees and court and settlement costs) properly attributable thereto.*

§ 11.1.15 *The Contractors must remove all "X, C & U" exclusions from their policies.*

§ 11.2 Owner's Insurance

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

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

Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within ~~one year~~ **two (2) years** after the date of ~~Substantial Completion~~ **Final Acceptance** 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.. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

- .1 The obligations under Item 12.2 shall cover any repairs and replacement to any part of the Work or other property caused by the defective Work.**
- .2 Upon completion of any work under or pursuant to Item 12.2., the two-year correction period in connection with the work requiring correction shall be renewed and recommenced.**

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

§ 12.2.2.3 The ~~one-year~~ **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 or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. ***This paragraph relates exclusively to the knowing acceptance of nonconforming work by the Owner. It has no applicability to work accepted by the Owner or Architect without the knowledge that such work fails to conform to the requirements of the Contract Documents.***

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

- .1 This obligation shall survive the termination of any or all other obligation or obligations under the contract Documents and it is agreed by the Contractor and its Surety that in the event the Owner is required to bring suit under this provision against the Contractor or its Surety to enforce this obligation, the contractor and its Surety hereby waive any defense of the status of limitations.***

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

§ 13.4.1 *The Owner shall provide and contract for “structural tests and special inspections” as required by the NJ DCA Bulletin 03-5. The Contractor shall coordinate, schedule, and provide on-site supervision and man-power to facilitate the testing. All other Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor. The Architect, Owner and Contractor shall be afforded a reasonable opportunity to attend, observe, and witness all inspections and tests of the Work. The Architect or Owner may at any time request and receive from the Contractor satisfactory evidence that materials, supplies or equipment are in conformance with the Contract Documents. The Conduct of any inspection of test and the receipt of any approval shall not operate to relieve the Contractor from its obligations under the Contract Documents unless specifically so stated by Owner in writing.*

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

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

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

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

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

§ 13.5.1. *The Contractor shall not be entitled to any payment of interest for any reason, action or inaction by the Architect or the Owner unless required by law.*

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

§ 13.6 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract *in the manner provided in Subparagraph 14.1.2 if repeated suspensions, delays or interruptions by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100% of the total number of days scheduled for completion or 120 days in any 365-day period, whichever is less, or if all the Work is entirely stopped for a continuous period of 30 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:*

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment (*without cause*) within the time stated in the Contract Documents; or

§ 14.1.2 *If one of the above reasons exist, the Contractor may, upon fourteen (14) days written notice to the Owner 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 Architect and Owner.*

§ 14.1.3 *The Owner shall not be responsible for damages for loss of anticipated profits on work not performed on account of any termination described in Subparagraph 14.1.1 and 14.1.2.*

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials *and/or equipment*;
- .2 fails to make *prompt* 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 otherwise is guilty of substantial breach of a provision of the Contract Documents *disregards the instructions of Architect or Owner (when such instructions are based on the requirements of the Contract Documents).*
- .5 *Is adjudged bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or a receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act, or to recognize under bankruptcy or similar laws; or*
- .6 *Breaches any warranty made by the Contractor under or pursuant to the Contract Documents.*
- .7 *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.*
- .8 *Fails after the commencement of the Work to proceed continuously with the construction and completion of the work for more than 10 days except as permitted under the Contract Documents.*
- .9 *Otherwise does not fully comply with the Contract Documents.*

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the

Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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

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

§ 14.2.4.1 *If the costs of finishing the Work, including compensation for the services of any consultants and the Architect's services and expenses made necessary thereby, and the other costs and expenses identified hereinafter, exceed the unpaid balance of the Contract Sum, the contractor and its Surety shall pay the difference to the Owner upon demand. The costs of finishing the Work include, without limitation, all reasonable attorney's fees, additional title costs, insurance, additional interest because of any delay in completing the Work, and all other direct and indirect consequential costs, including, without limitation, Liquidated Damages for untimely completion as specified in the Contract Documents, incurred by the Owner by reason of, or arising from, or relating to the termination of the Contractor as stated herein*

§ 14.3 Suspension by the Owner for Convenience

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

§ 14.4 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.

§ 14.4.3.1 *In case of such termination for the Owner's convenience, the Contractor shall be entitled to Owner payment for Work performed as of the date of termination in accordance with the contract Documents. The Contractor shall, as a condition of receiving the 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. The Contractor warrants that it will enter into no subcontracts or other agreements that would adversely impact the Owner's rights or increase the Owner's obligations under this paragraph. In no event shall the Owner be liable to the Contractor for lost or anticipated profits or consequential damages, or for any amount in excess of the compensation due to the Contractor in accord with the Contract Documents for the Work performed as of the date of termination. The warranty and indemnity obligations of the Contractor and Surety shall survive and continue, notwithstanding any termination pursuant to this paragraph, with respect to the Work performed as of the date of termination.*

§ 14.4.4 *If Owner terminates the Contract for cause pursuant to Paragraph 14.2 and it is subsequently determined that the Owner was not authorized to terminate the Contract as provided in Paragraph 14.2, the Owner's termination shall be treated as a termination for convenience under this Paragraph 14.4 and the rights and obligations of the parties shall be the same as if the Owner has issued a notice of termination to the Contractor as provided in this Paragraph 14.4.*

§ 14.5 Contractor shall promptly pay to Owner all costs and reasonable attorney's fees incurred in connection

with any action or proceeding in which Owner prevails, based on a breach of the Contract or other dispute arising out of or in connection with the Contract.

§ 14.6 *In the event of the appointment of a trustee and/or receiver or any similar occurrence affecting the management of the account of the Contractor pertaining to the Work, it shall be the obligation of the Contractor, its representatives, receivers, sureties, or successors in interest to continue the progress of the Work without delay and specifically to make timely payment to Subcontractors and Suppliers of all amounts that are lawfully due them and to provide the Owner and all Subcontractors and Suppliers whose work may be affected with timely notice of the status of receivership, bankruptcy, etc., and the status of their individual accounts.*

§ 14.7 *Regularly scheduled job meetings shall be held at a location and time convenient to the Owner's representatives, the Architect and the Contractor. The Contractor shall attend such meetings or be represented by a person in authority who can speak for and make decisions for the Contractor.*

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 **law and requirements of the State of New Jersey** ~~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.

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

§ 15.1.2.2 *The Owner's exercise, or failure to exercise, any rights, claims or remedies it may have arising out of or relating to the Contract documents shall not release, prejudice, or discharge the Owner's other rights and remedies, nor shall it give rise to any right, claim, remedy or defense by any other person, including the Contractor, its Surety, any Subcontractor, or any other person or entity.*

§ 15.1.2.3 *Whenever possible, each provision of the Contract Documents shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of the Contract Documents, or portion thereof, is prohibited or found invalid by law, only such invalid provision or portion thereof shall be ineffective, and shall not invalidate or affect the remaining provision of the Contract Documents or valid portions of such provision, which shall be deemed severable. Further, if any provision of this Contract is deemed inconsistent with applicable law, applicable law shall control.*

§ 15.1.2.4 *Contractor shall promptly pay to Owner all costs and reasonable attorney's fees incurred in connection with any action or proceeding in which Owner prevails, based on a breach of the Contract or other dispute arising out of or in connection with the Contract.*

§ 15.1.2.5 *In the event of the appointment of a trustee and/or receiver or any similar occurrence affecting the management of the account of the Contractor pertaining to the Work, it shall be the obligation of the Contractor, its representatives, receivers, sureties, or successors in interest to continue the progress of the Work without delay and specifically to make timely payment to Subcontractors and Suppliers of all amounts that are lawfully due them and to provide the Owner and all Subcontractors and Suppliers whose work may be affected with timely*

notice of the status of receivership, bankruptcy, etc., and the status of their individual accounts.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within ~~24~~ 5 days after occurrence of the event giving rise to such Claim or within ~~24~~ 5 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Injury or Damage to Person or Property. *If either party to the Contract 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, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding five (5) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.*

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.4.3 Claims for Concealed or Unknown Conditions. *Subject to the Contractor's obligations under Articles 1.9.2 and 2.3.4, if conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than five (5) days after first observance of the conditions. The Architect will promptly investigate such conditions and, if 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 an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 5 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Section 15.2.5.1.*

§ 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 ~~herein~~ shall be given to the Owner and Architect before proceeding to execute the portion of the Work that is the subject of the Claim *and within five (5) days after the occurrence of the event giving rise to such Claim for increase in the Construct Sum. 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. 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. The Contractor hereby acknowledges that the Contractor shall not have any right to and the Owner will not consider any requests for an increase in the Contract Sum that is not submitted in*

compliance with the foregoing requirements. . Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. **Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by 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. **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. All required notices for additional costs shall be made by Certified Mail.**

§ 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 **as determined by reference to historical data. The term "historical data" as used in the previous sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five years.**

§ 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 **litigation** of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

§15.2.5.1 All claims and disputes and other matters in question between the Contractor and the Owner arising out of or relating to the Contract Documents or a breach thereof with regard to the Architect's decision, shall be

decided through suit in New Jersey Superior Court venued in the County that the Owner occupies and Contractor consents to the jurisdiction of the New Jersey Superior Court venued in the County that the Owner occupies. The Contractor shall carry on all work and maintain its progress during such suit and the Owner shall continue to make payments not related to the dispute of the Contractor in accordance with Contract Documents.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner *and Architect* 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 *and Architect* 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 *prior to resolution of the claim by the Architect.*

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

4811-8023-3858, v. 1

TO OWNER: PROJECT: _____
 FROM CONTRACTOR: VIA ARCHITECT: _____

APPLICATION NO.: _____ Distribution to:
 PERIOD TO: OWNER
 PROJECT NOS.: ARCHITECT
 CONTRACTOR
 CONTRACT DATE:

CONTRACT FOR:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM \$ _____
2. Net change by Change Orders \$ _____
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$ _____
4. TOTAL COMPLETED & STORED TO DATE \$ _____
 (Column G on G703)
5. RETAINAGE:
 - a. _____ % of Completed Work \$ _____
 (Columns D + E on G703)
 - b. _____ % of Stored Material \$ _____
 (Column F on G703)
 Total Retainage (Line 5a + 5b or
 Total in Column I of G703) \$ _____
6. TOTAL EARNED LESS RETAINAGE \$ _____
 (Line 4 less Line 5 Total)
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT \$ _____
 (Line 6 from prior Certificate)
8. CURRENT PAYMENT DUE \$ _____
9. BALANCE TO FINISH, INCLUDING RETAINAGE \$ _____
 (Line 3 less Line 6)

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
TOTALS		
NET CHANGES by Change Order		

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
 By: _____ Date: _____
 State of: _____
 County of: _____
 Subscribed and sworn to before me this _____ day of _____
 Notary Public:
 My Commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ _____

(Attach explanation if amount certified differs from the amount applied for. Initial all figures on this Application and on the Continuation Sheet that are changed to conform to the amount certified.)

ARCHITECT: _____
 By: _____ Date: _____
 This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

INSTRUCTION SHEET

AIA DOCUMENTS G702 and G703

A. GENERAL INFORMATION

1. Purpose and Related Documents

AIA Document G702, Application and Certificate for Payment, is to be used in conjunction with AIA Document G703, Continuation Sheet. These documents are designed to be used on a project where a Contractor has a direct Agreement with the Owner. Procedures for their use are covered in AIA Document A201, General Conditions of the Contract for Construction, 1987 Edition.

2. Use of Current Documents

Prior to using any AIA document, the user should consult the AIA, an AIA component chapter or a current AIA Documents List to determine the current edition of each document.

3. Limited License for Reproduction

AIA Documents G702 and G703 are copyrighted works and may not be reproduced or excerpted from in substantial part without the express written permission of the AIA. The documents are intended to be used as consumables—that is, the original documents purchased by the user are intended to be consumed in the course of being used. There is no implied permission to reproduce these documents, nor does membership in The American Institute of Architects confer any further rights to reproduce G702 and G703.

A limited license is hereby granted to retail purchasers to reproduce a maximum of ten copies of a completed or executed G702 and G703, but only for use in connection with a particular Project. Further reproductions are prohibited without the express written permission of the AIA.

B. COMPLETING THE G702 FORM:

After the Contractor has completed AIA Document G703, Continuation Sheet, summary information should be transferred to AIA Document G702, Application and Certificate for Payment.

The Contractor should sign G702, have it notarized and submit it, together with G703, to the Architect.

The Architect should review G702 and G703 and, if they are acceptable, complete the Architect's Certificate for Payment on G702. The Architect may certify a different amount than that applied for pursuant to Paragraphs 9.5 and 9.6 of A201. The Architect should then initial all figures on G702 and G703 that have been changed to conform to the amount certified and attach an explanation. The completed G702 and G703 should be forwarded to the Owner.

C. COMPLETING THE G703 FORM:

Heading: This information should be completed to be consistent with similar information on AIA Document G702, Application and Certificate for Payment.

Columns A, B & C: These columns should be completed by identifying the various portions of the Project and their scheduled value consistent with the schedule of values submitted to the Architect at the commencement of the Project or as subsequently adjusted. The breakdown may be by sections of the Work or by Subcontractors and should remain consistent throughout the Project. Multiple pages should be used when required.

Column C should be subtotaled at the bottom when more than one page is used and totaled on the last page. Initially, this total should equal the original Contract Sum. The total of column C may be adjusted by Change Orders during the Project.

Column D: Enter in this column the amount of completed work covered by the previous application (columns D – E) from the previous application). Values from column F (Materials Presently Stored) from the previous application should not be entered in this column.

Column E: Enter here the value of Work completed at the time of this application, including the value of materials incorporated into the project which were listed on the previous application under Materials Presently Stored (column F).

Column F: Enter here the value of Materials Presently Stored for which payment is sought. The total of the column *must* be recalculated at the end of each pay period. This value covers both materials newly stored for which payment is sought and materials previously stored which are not yet incorporated into the Project. Mere payment by the Owner for stored materials does not result in a deduction from this column. Only as materials are incorporated into the Project is their value deducted from this column and incorporated into column E (Work Completed—This Period).

Column G: Enter here the total of columns D, E and F. Calculate the percentage completed by dividing column G by column C.

Column H: Enter here the difference between column C (Scheduled Value) and column G (Total Completed and Stored to Date).

Column I: This column is normally used only for contracts where variable retainage is permitted on a line-item basis. It need not be completed on projects where a constant retainage is withheld from the overall contract amount.

Change Orders: Although Change Orders could be incorporated by changing the schedule of values each time a Change Order is added to the Project, this is not normally done. Usually, Change Orders are listed separately, either on their own G703 form or at the end of the basic schedule. The amount of the original contract adjusted by Change Orders is to be entered in the appropriate location on the G702 form.

Construction Change Directives: Amounts not in dispute that have been included in Construction Change Directives should be incorporated into one or more Change Orders. Amounts remaining in dispute should be dealt with according to Paragraph 7.3 in A201.

D. MAKING PAYMENT

The Owner should make payment directly to the Contractor based on the amount certified by the Architect on AIA Document G702, Application and Certificate for Payment. The completed form contains the name and address of the Contractor. Payment should not be made to any other party unless specifically indicated on G702.

E. EXECUTION OF THE DOCUMENT

Each person executing the Agreement should indicate the capacity in which they are acting (i.e., president, secretary, partner, etc.) and the authority under which they are executing the Agreement. Where appropriate, a copy of the resolution authorizing the individual to act on behalf of the firm or entity should be attached.

CONTINUATION SHEET

AIA DOCUMENT G703 (Instructions on reverse side)

PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing Contractor's signed Certification, is attached.
 In tabulations below, amounts are stated to the nearest dollar.
 Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO.:
 APPLICATION DATE:
 PERIOD TO:
 ARCHITECT'S PROJECT NO.:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		E THIS PERIOD	F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D+E+F)	H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)						

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G703-1992

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INSTRUCTION SHEET

FOR AIA DOCUMENT G703

A. GENERAL INFORMATION

1. Purpose and Related Documents

AIA Document G702, Application and Certificate for Payment, is to be used in conjunction with AIA Document G703, Continuation Sheet. These documents are designed for use on Projects where the Contractor has a direct Agreement with the Owner. Procedures for their use are covered in AIA Document A201, General Conditions of the Contract for Construction, 1987 Edition.

2. Use of Current Documents

The user should consult the AIA, an AIA component chapter or a current AIA Documents List to determine the current edition of each document.

3. Limited License for Reproduction

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B. COMPLETING THE G703 FORM:

Heading: This information should be completed in a manner consistent with similar information on AIA Document G702, Application and Certificate for Payment.

Columns A, B & C: These columns should be completed by identifying the various portions of the Project and their scheduled values consistent with the schedule of values submitted to the Architect at the commencement of the Project or as subsequently adjusted. The breakdown may be by sections of the Work or by Subcontractors and should remain consistent throughout the Project. Multiple pages should be used when required.

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Column E: Enter here the value of Work completed at the time of this application, including the value of materials incorporated in the project that were listed on the previous application under Materials Presently Stored (column F).

Column F: Enter here the value of Materials Presently Stored for which payment is sought. The total of the column must be recalculated at the end of each pay period. This value covers both materials newly stored for which payment is sought and materials previously stored which are not yet incorporated into the Project. Mere payment by the Owner for stored materials does not result in a deduction from this column. Only as materials are incorporated into the Project is their value deducted from this column and incorporated into column E (Work Completed—This Period.)

Column G: Enter here the total of columns D, E and F. Calculate the percentage completed by dividing column G by column C.

Column H: Enter here the difference between column C (Scheduled Value) and column G (Total Completed and Stored to Date).

Column I: This column is normally used only for contracts where variable retainage is permitted on a line item basis. It need not be completed on projects where a constant retainage is withheld from the overall contract amount.

Change Orders: Although Change Orders could be incorporated by changing the schedule of values each time a Change Order is added to the Project, this is not normally done. Usually, Change Orders are listed separately, either on their own G703 form or at the end of the basic schedule. The amount of the original contract adjusted by Change Orders is to be entered in the appropriate location on the G702 form.

Construction Change Directives: Amounts not in dispute that have been included in Construction Change Directives should be incorporated into one or more Change Orders. Amounts remaining in dispute should be dealt with according to Paragraph 7.3 in A201.

The following is an example of a Continuation Sheet for work in progress. Please note that dollar amounts shown below are for illustrative purposes only, and are not intended to reflect actual construction costs.

ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)		BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE) RATE
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD		% (G ÷ C)			
1	MOBILIZATION	5,000	5,000	0	0	5,000	100	0	NOT APPLICABLE TO CONSTANT RATE RETAINAGE
2	STUMP REMOVAL	5,000	5,000	0	0	5,000	100	0	
3	EARTH WORK	15,000	10,000	5,000	0	15,000	100	0	
4	LOWER RETAINING WALL	10,000	0	5,000	0	5,000	50	5,000	
5	CURBS & MISC. CONC.	5,000	0	0	0	0	0	5,000	
6	PAVING, UPPER DRIVE	20,000	0	0	0	0	0	20,000	
7	PAVING, LOWER DRIVE	20,000	0	0	0	0	0	20,000	
8	PAVERS	20,000	0	0	10,000	10,000	50	10,000	
9	BRICK WORK	5,000	0	0	0	0	0	5,000	
		105,000	20,000	10,000	10,000	40,000		65,000	

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

- A. Project Identification: Toilet Room Renovations at Elizabeth Haddon Elementary, J. Fithian Tatem Elementary, and Haddonfield Memorial High School.

- 1. Project Locations:

- a. Elizabeth Haddon Elementary School – 501 W. Redman Avenue, Haddonfield, New Jersey 08033
- b. J. Fithian Tatem Elementary School – 1 Glover Avenue, Haddonfield, New Jersey 08033
- c. Haddonfield Memorial High School - 401 Kings Hwy E, Haddonfield, New Jersey 08033.

- B. Owner: Haddonfield Board of Education.

1. Owner's Representative: Tim McFerren, Director of Facilities.

C. Architect: LAN Associates, E.P.A.S., Inc., 1018 Laurel Oak Road, Suite 11, Voorhees, NJ 08043.

1. Architect's Representative: Ron Schwenke, AIA, Project Executive

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Renovation to restrooms to include:
 - a. Demolition required to accommodate proposed work.
 - b. New acoustical tile ceilings and metal suspension grid.
 - c. New tile floor and wall finishes.
 - d. New high density polyethylene toilet partitions.
 - e. New toilet room accessories.
 - f. New interior doors and frames and associated door hardware.
 - g. New lighting and electrical controls.
 - h. New mechanical ventilation.
 - i. New plumbing fixtures.
 - j. New solid surface windowsills.

B. Type of Contract:

1. Project will be constructed under a single overall (prime) contract.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction

operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Notice to Proceed through August 31, 2023 (summer work): Limit work to between 7:00 a.m. to 11:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction. All work after August 31, 2023, must be 2nd shift, between 3:30 p.m. to 11:00 p.m.
 1. Weekend Hours: As permitted by and at no additional cost to owner.
 2. Early Morning Hours: As permitted by Local Authority having Jurisdiction, and as permitted by and at no additional cost owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances on Project site is not permitted.
- F. Employee Identification: Contractor's employees and subcontractor staff must wear identification at all times.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.10 PROJECT SCHEDULE

- A. Anticipated Notice of Award: Thursday, February 23, 2023.
- B. Execution of Contracts: Early March 2023.
- C. Site mobilization: Friday, June 23, 2023.
- D. Substantial Completion: Friday, September 1, 2023.
- E. Project Close-Out complete: Tuesday, October 31, 2023.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
- C. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

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

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

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

1.7 LUMP-SUM ALLOWANCES

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

- A. All allowances shall include material, equipment, labor, receiving, handling, and installation as well as Contractor overhead and profit.

- B. Contract 14.0: Toilet Room Renovations at Elizabeth Haddon Elementary School, J. Fithian Tatem Elementary School, and Haddonfield Memorial High School.
 - 1. Allowance No. 1: Fifty thousand dollars (\$50,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

- C. Contract 14.01: Toilet Room Renovations at Elizabeth Haddon Elementary School.
 - 1. Allowance No. 1: Twenty thousand dollars (\$20,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

- D. Contract 14.02: Toilet Room Renovations at Haddonfield Memorial High School.
 - 1. Allowance No. 1: Ten thousand dollars (\$10,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

- E. Contract 14.03: Toilet Room Renovations at J. Fithian Tatem Elementary School.
 - 1. Allowance No. 1: Twenty thousand dollars (\$20,000.00) included in the Base Bid amount above for unforeseen conditions encountered during the work.

END OF SECTION 012100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific

features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

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

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 21 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.3 MINOR CHANGES IN THE WORK

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

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.6 CHANGE ORDER PROCEDURES

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

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703 .
 - 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or division.
 - b. Description of the Work.

- c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 7. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
 8. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 9. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling three percent of the Contract Sum and subcontract amount.
 10. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).

4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Sustainable design action plans, including preliminary project materials cost data.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
 15. Certificates of insurance and insurance policies.
 16. Performance and payment bonds.
 17. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706.
 6. AIA Document G706A.
 7. AIA Document G707.
 8. Evidence that claims have been settled.
 9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 10. Final liquidated damages settlement statement.
 11. Proof that taxes, fees, and similar obligations are paid.
 12. Waivers and releases.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Web-based Project management software package.
6. Project meetings.

- B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project

site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
 - 2. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.

1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 - 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name.
 - 2. Owner name.
 - 3. Owner's Project number.
 - 4. Name of Architect.
 - 5. Architect's Project number.
 - 6. Date.
 - 7. Name of Contractor.
 - 8. RFI number, numbered sequentially.
 - 9. RFI subject.
 - 10. Specification Section number and title and related paragraphs, as appropriate.

11. Drawing number and detail references, as appropriate.
 12. Field dimensions and conditions, as appropriate.
 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 14. Contractor's signature.
 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 .
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly .
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number, including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's CAD drawing digital data files for Contractor's use during construction.
- B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
 - 1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 - 1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.

- q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at biweekly intervals.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of Proposal Requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.

- D. Daily Construction Reports: Submit at monthly intervals.

1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.
 - b. Temporary facilities.
 - c. Owner interfaces and furnishing of items.
 - d. Regulatory agency approvals.
 - e. Punch list.
 - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.

2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 - i. Curing.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and the Contract Time.
- F. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Final Completion percentage for each activity.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 14 days of date established for the Notice to Proceed.
 - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.8 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Testing and inspection.
 - 8. Accidents.
 - 9. Meetings and significant decisions.
 - 10. Unusual events.
 - 11. Stoppages, delays, shortages, and losses.
 - 12. Meter readings and similar recordings.
 - 13. Emergency procedures.
 - 14. Orders and requests of authorities having jurisdiction.
 - 15. Change Orders received and implemented.
 - 16. Construction Change Directives received and implemented.
 - 17. Services connected and disconnected.
 - 18. Equipment or system tests and startups.
 - 19. Partial completions and occupancies.
 - 20. Substantial Completions authorized.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three (3) days of taking photographs.
 - 1. Submit photos on CD-ROM or thumb-drive. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Date photograph was taken.

1.4 QUALITY ASSURANCE

1.5 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels. Use flash in low light levels or backlit conditions.

- B. Metadata: Record accurate date and time from camera.
- C. File Names: Name media files with date and sequential numbering suffix.

1.6 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.
 - 1. Take adequate photographs to show existing conditions adjacent to property before starting the Work.
 - 2. Take adequate photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.
 - 3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Periodic Construction Photographs: Take progress photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
5. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

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

1.4 SUBMITTAL SCHEDULE

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

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

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

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

B. Options: Identify options requiring selection by Architect.

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

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

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
 - 2. Paper: Prepare submittals in paper form and deliver to Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 4. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 - a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
 - b. opaque copies of each submittal. Architect
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.

H. Test and Research Reports:

1. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
2. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
3. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three paper copies of certificate, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that

submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

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

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action, as follows:
 - a. No Exceptions Taken; Make Corrections Noted; Amend & Resubmit; Rejected - See Remarks .
- B. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency

qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- E. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- G. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- H. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Testing Agency Qualifications: 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.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.

8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

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

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed , and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 1. Project quality-control manager may also serve as Project superintendent .
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

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

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

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

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

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

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
3. Statement of whether conditions, products, and installation will affect warranty.

1.8 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. 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, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

- C. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, 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. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1.9 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform duties of Contractor.
- C. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspection equipment at Project site.
- D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 012100 "Allowances" for allowance for metered use of temporary utilities.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Location of dust-control partitions at each phase of the work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.
- C. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
 - 1. Methods used to meet the goals and requirements of the Owner.
 - 2. Concrete cutting method(s) to be used.
 - 3. Location of construction devices on the site.

1.4 QUALITY ASSURANCE

- A. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. On-Site Meetings: Owner will provide conditioned interior space for project meetings for duration of Project.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

2.4 PORTABLE RESTROOM FACILITIES

- A. Contractor shall provide and maintain portable restroom facilities on site, with site security fence enclosure. Facility shall be maintained by company which provides the rental and shall comply with all applicable regulations.

2.5 POTABLE WATER SUPPLY

- A. Contractor is permitted to use Owner's existing exterior hose bib water supply for incidental use in concrete work without use charges.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 SUPPORT FACILITIES

- A. Comply with the following:
 - 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 - 2. Utilize designated area within existing building for temporary field offices.

- B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- C. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors. Signs shall include clearly legible signage indicating:
 - 1) Temporary Construction Area.
 - 2) Exit (re-directing staff and public to alternate exit due to construction activities)
 - 3. Maintain and touch up signs, so they are legible at all times.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering the onsite material storage area except by entrance gates.
 - 1. Extent of Fence: As required to accommodate construction operations .

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than

Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 4. Section 01770 "Closeout Procedures" for submitting warranties.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
 - D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
 - E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
 - F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.
- 1.4 QUALITY ASSURANCE
- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- 1.5 COORDINATION
- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.
- 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
 - B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. **Manufacturer's Warranty:** Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
2. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.

- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.

1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
2. **Specified Form:** When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

- C. **Submittal Time:** Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. Product Selection Procedures:
1. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
 2. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
 - 1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Field engineering and surveying.
2. Installation of the Work.
3. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

- B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
2. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting

- and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. 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.
 - a. Primary operational systems and equipment.
 - b. Plumbing piping systems.
 - c. Electrical wiring systems.
 - d. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction 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.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to

confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

- 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. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place 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.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. 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 practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place 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, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- 3.7 STARTING AND ADJUSTING
- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."

- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.

1.3 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.4 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.5 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Procedures Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 - 6. Advise Owner of changeover in utility services.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Complete final cleaning requirements.
 - 9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- C. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 5 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 - 1. 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.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
 - 1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
 - 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit Final Completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On

receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. PDF Electronic File: Architect will return annotated file.
 - b. Three Paper Copies: Architect will return one copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
1. Submit on digital media acceptable to Architect .
- D. Warranties in Paper Form:
1. Bind warranties and bonds in heavy-duty, three-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.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ 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 Final Completion for entire Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - h. Vacuum and mop concrete.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and one set of file prints.
 - 3) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned Record Prints and one set(s) of file prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
 - c. Final Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit Record Digital Data Files and one set(s) of Record Digital Data File plots.
 - 3) Plot each drawing file, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit annotated PDF electronic files and one paper copies of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories and one paper copies of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Locations of concealed internal utilities.
 - h. Changes made by Change Order or Construction Change Directive.
 - i. Changes made following Architect's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - 1. Format: Annotated PDF electronic file.

2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Architect for resolution.
 4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

- C. Format: Submit Record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
 - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Demolition and removal of selected portions of building or structure.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Qualification Data: Provide for demolition firm.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Coordination of Owner's continuing occupancy of portions of existing building.
- D. Inventory: After demolition is complete, submit a list of items that have been removed and salvaged.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.
- F. Work Plan: The contractor shall provide a detailed work plan for each area of demolition, which will indicate the methods used and any special safety procedures to be followed. This plan shall be submitted to the Authority and Design Consultant for review and comment prior to the start of demolition work in any area.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide required signage to re-direct occupants to the nearest building exit while the Vestibules are under construction.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- E. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- F. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
 - 3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- G. Storage or sale of removed items or materials on-site is not permitted.
- H. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- B. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Authority and the Design Consultant.
- C. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during demolition and reinstalled in their original locations after demolition operations are complete.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space

before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain fire watch during and after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Store items in a secure area until delivery to Owner.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

B. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.6 EXPLOSIVE DEMOLITION

A. Explosives: Use of explosives is not permitted.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by building demolition operations.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing. Where necessary, re-point existing, interior CMU construction at locations of demolition to create a uniform appearance on existing masonry walls.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Wood blocking and nailers.
3. Wood furring.

1.02 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Wood-preservative-treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.
5. Metal framing anchors.

1.03 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Dimension lumber framing.
2. Miscellaneous lumber.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.02 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent for 2-inch nominal thickness or less, no limit for more than 2-inch nominal thickness.
- B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.
- C. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2 grade and any of the following species:
 1. Hem-fir (north); NLGA.
 2. Spruce-pine-fir; NLGA.
 3. Douglas fir-larch (north); NLGA.
- D. Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,500,000 psi and an extreme fiber stress in bending of at least [1000 psi] for 2-inch nominal thickness and 12-inch nominal width for single-member use.

2.03 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Furring.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 1. Mixed southern pine, No. 2 grade; SPIB.
 2. Eastern softwoods, No. 2 Common grade; NeLMA.
 3. Northern species, No. 2 Common grade; NLGA.
 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.04 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.

- C. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.05 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

END OF SECTION 061000

SECTION 066116 - SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Provide solid surfacing fabrications including but not limited to following:
1. Windowsills.
- B. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
1. Provision of joint sealants: Section 079200, Joint Sealants.
 2. Provision of tile work: Section 093000, Tiling.
 3. Provision of plumbing and plumbing fixtures: Division 22, Plumbing.

1.02 REFERENCES

- A. Abbreviations and Acronyms:
1. MDF: Medium Density Fiberboard.
 2. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.
 3. VOC: Volatile Organic Compound.
- B. Definitions:
1. Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.
- C. Reference Standards:
1. ANSI/NPA A208.2-09 - Medium Density Fiberboard (MDF) For Interior Applications
 2. ASTM C920-14a - Standard Specification for Elastomeric Joint Sealants
 3. ASTM D638-10 - Standard Test Method for Tensile Properties of Plastics
 4. ASTM D785-08 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
 5. ASTM D790-10 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 6. ASTM D5420-10 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)
 7. ASTM E84-14 - Standard Test Method for Surface Burning Characteristics of Building Materials
 8. ASTM E228-11 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer
 9. ASTM G21-13 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
 10. ASTM G22-76(96) - Standard Practice for Determining Resistance of Plastics to Bacteria
 11. ASTM G155-13 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

- 12. CSA B45.5-11/
IAPMO Z124-2011 - Plastic Plumbing Fixtures
- 13. NFPA 255-06 - Standard Method of Test of Surface Burning Characteristics of Building Materials
- 14. NSF/ANSI 51-07 - Food Equipment Materials
- 15. SCAQMD Rule 1168 - Adhesive and Sealant Applications (amended January 2005)
- 16. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials
- 17. UL Environment/
GREENGUARD - Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1
UL 2818
- 18. UL Environment/
GREENGUARD - Gold Standard for Chemical Emissions for Building Materials,
- Finishes and Furnishings, Section 7.1 and 7.2
UL 2818
- 19. UL 2824 - GREENGUARD Certification Program, Method for Measuring
Microbial Resistance from Various Sources Using Static
Environmental Chambers

1.03 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Samples: Submit samples in accordance with Section 013000. Submit minimum 6" x 6" samples. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.

1.04 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data:
 - 1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.
 - 2. Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installers: Provide work of this Section executed by competent installers with minimum 5 years' experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver no components to Project site until areas are ready for installation.
- B. Storage and Handling Requirements:

1. Store components indoors prior to installation.
2. Handle materials to prevent damage to finished surfaces.

1.07 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
1. Meganite;
 2. Wilsonart Contract;
 3. Corian® by DuPont;
 4. Or Approved Equal
- B. Substitution Limitations: This Specification is based on Wilsonart Products. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.02 MATERIALS

- A. Performance/Design Criteria:

Property	Requirement (min or max)	Test	Procedure
1. Solid Surface Based Products:			
a. Tensile Strength	6000 psi min		ASTM D638
b. Tensile Modulus	1.5 x 10 ⁶ psi min		ASTM D638
c. Tensile Elongation	0.4% min.		ASTM D638
d. Flexural Strength	10000 psi min		ASTM D790
e. Flexural Modulus	1.2 x 10 ⁶ psi min		ASTM D790
f. Hardness	>85-Rockwell "M" scale min.		ASTM D785
g. Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F		ASTM E228
h. Fungi and Bacteria	Does not support microbial growth		ASTM G21 & G22
i. Microbial Resistance	Highly resistant to mold growth		UL 2824
j. Ball Impact	No fracture - 1/2 lb. Ball: 6 mm slab - 36" drop 12 mm slab - 144" drop		NEMA LD 3, Method 3.8
k. Weatherability	ΔE*94<5 in 1,000 hrs		ASTM G155

I.	Flammability			ASTM E84, NFPA 255 & UL 723
		All Colors		
		6 mm	12 mm	
m.	Flame Spread	<25	<25	
n.	Smoke Developed	<25	<25	
o.	Class	A	A	NFPA 101®, Life Safety Code

B. Solid Surface Material:

C. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:

D. Flammability: Class 1 and A when tested to UL 723.

E. Adhesive for Bonding to Other Products: One component silicone to ASTM C920.

F. Sealant: A standard mildew-resistant, FDA/UL recognized silicone color matched sealant or clear silicone sealants.

G. Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.

H. Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.03 COMPONENTS

A. Windowsills: 1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings. Color selected later by Architect from manufacturer's full color range.

B. Fabrication:

1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
2. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
3. Ensure no blistering, whitening and cracking of components during forming.
4. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2")

wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using manufacturer approved adhesive.

5. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
6. Finish: Ensure surfaces have uniform finish:
 - a. Matte, with a 60° gloss rating of 5 - 20.
7. Fabrication Tolerances:
 - a. Variation in Component Size: +/-1/8".
 - b. Location of Openings: +/-1/8" from indicated location.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Verify actual site dimensions and location of adjacent materials prior to commencing work.

3.02 INSTALLATION

- A. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- D. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- E. Seal between wall and components with joint sealant as specified herein and in Section 079200, as applicable.
- F. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.

3.03 REPAIR

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

3.04 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.05 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.06 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION 066116

SECTION 072700 - FIRESTOPPING AND SMOKESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Firestopping of all penetrations through fire barriers, including:
 - a. Voids around:
 1. Pipes.
 2. Ducts.
 3. Conduit.
 4. Cables and wires not in conduit.
 - b. Other openings, as required by authorities having jurisdiction.
 - c. Other openings indicated.
2. Smokestopping of all penetrations through smoke barriers.

B. Extent of fire and smoke barriers is indicated on drawings.

C. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.

D. Products Furnished but Not Installed:

1. Sleeves, which are an integral part of the firestopping assembly, must be set by installer of other construction.

E. Related Sections:

1. Cutting and patching: Division 1.

1.02 REFERENCES

- A. ASTM E 119-88 -- Standard Test Methods for Fire Tests of Building Construction and Materials; 1988.
- B. ASTM E 814-94 -- Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 1994.
- C. Certification Listings; Warnock Hersey International Inc.; 1994.
- D. Fire Resistance Directory; Underwriters Laboratories Inc.; 1994.
- E. FM P7825c -- Approval Guide, Building Materials 1996; Factory Mutual System; 1996.

1.03 DEFINITIONS

- A. Fire Barrier: Any wall, floor, ceiling, or roof, which is indicated as having a fire-resistance rating.
- B. Smoke Barrier: Any wall, floor, ceiling, or roof which is indicated as being designed to prevent passage of smoke and gases; may be indicated as "smoke barrier," "smoke partition," "smoke wall," etc.

1.04 SUBMITTALS

- A. Preinstallation Inspection Report: Identify penetrations, which need to be repaired using the original material of the assembly.
- B. Schedule of Firestopping: Complete list, for approval, of penetrations to be sealed, indicating location, fire rating of penetrated assembly, identification of penetration seal to be used, fire rating of penetration seal, and evidence of acceptable testing.
- C. Schedule of Smokestopping: Complete list, for approval, of penetrations to be sealed, indicating location, construction of penetrated assembly, and identification of penetration seal to be used.
- D. Product Data: Complete product and system description, including tested assembly details, installation instructions, and limitations on use.
- E. Maintenance Data: Include detailed instructions for repair and for modification due to changes in penetrating items.
- F. Final inspection report(s).
- G. Project Record Documents: Drawings showing locations of all fire and smoke barriers, the actual penetrations through them, and the manner in which they have been sealed; cross-referenced to maintenance data.

1.05 QUALITY ASSURANCE

- A. Testing Requirements: Testing shall have been conducted or witnessed by an independent testing agency acceptable to governing authorities.
 - 1. Test methods: ASTM E 814 and ASTM E 119; as indicated for each penetration seal.
 - 2. Conduct tests with a measurably higher pressure inside the chamber than outside.
 - 3. The listing of the assembly to be used in the current edition of one of the following classification guides will be considered evidence of acceptable testing:
 - a. Underwriters Laboratories Inc. "Fire Resistance Directory."
 - b. Factory Mutual System "Approval Guide."
 - c. Warnock Hersey "Certification Listings."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of products to minimize storage time at site.

- B. Deliver products to project site in original unopened containers bearing the name of the manufacturer, product name, type, and testing agency's identification mark.
- C. Store products in accordance with manufacturer's instructions.

1.07 PROJECT CONDITIONS

- A. Coordination Meeting: Prior to the start of work which involves cutting penetrations, conduct a meeting with installers of such work to identify fire and smoke barriers and required configurations of penetrations and to discuss the proper procedures and time schedule for cutting, patching, and sealing penetrations in such assemblies, with emphasis on avoiding unnecessary cutting and patching.

1.08 SEQUENCING AND SCHEDULING

- A. Perform firestopping and smokestopping work after completion of work which penetrates fire and smoke barriers, but prior to covering up or eliminating access to the penetration. Coordinate with installers of such other work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Materials:
 - 1. Manufacturers: Products made by the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Dow Corning Corporation.
 - b. 3M Ceramic Materials Department.
 - c. Or Approved Equal.

2.02 MATERIALS

- A. Firestopping Materials: Provide penetration seal assemblies whose fire-resistance ratings have been determined by testing in the configurations required and which have fire-resistance ratings at least as high as that of the fire-rated assembly in which they are to be installed.
 - 1. Use the materials required for the tested assemblies indicated on the schedule.
 - a. Where no tested assembly is indicated for a particular penetration, use any tested assembly, which complies with the requirements of the specification.
 - 2. T rating: Not less than F rating.
 - 3. Provide products which:
 - a. Allow normal expansion and contraction movement of the penetrating item without failure of the penetration seal.

- b. Emit no hazardous, combustible, or irritating by-products during installation or curing period.
 - c. Do not require special tools for installation.
 - 4. Prohibited products: Do not use any of the following products:
 - a. Safing insulation unless used in an ASTM E 814 tested assembly.
- B. Smokestopping: Use any gunnable or pourable joint sealant suitable for the application; use only fully curing types where accessible in the finished work. Provide products which:
 - 1. Allow normal expansion and contraction movement of the penetrating item without failure of the penetration seal.
 - 2. Emit no hazardous, combustible, or irritating by-products during installation or curing period.
 - 3. Do not require special tools for installation.
- C. Labels: Red, permanent marking using the "Fire-Rated Assembly - Do not disturb - See maintenance instructions" and the testing agency designation, or equivalent as approved by the authority having jurisdiction.
 - 1. For marking firestopping and smokestopping assemblies, use self-adhesive tape or wired-on labels.
 - 2. For marking fire and smoke barriers themselves, use letters at least 2 inches high.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Preinstallation Inspection: Inspect all fire and smoke barriers for penetrations of any type; mark or otherwise identify all penetrations indicating action required: 1) repair; 2) firestopping; or 3) smokestopping.
 - 1. Conduct inspection prior to covering up or enclosing walls or ceilings.
 - 2. Conduct inspection jointly with the architect.
 - 3. Submit a report detailing findings of inspection to the architect.
- B. If the configuration of a particular penetration does not conform to the configuration necessary for the required firestopping assembly, notify the installer of the penetration for modification of the configuration to suit the assembly; do not use the firestopping assembly in other configurations except as specifically stated in the test report or as approved by the authority having jurisdiction.

3.02 PREPARATION

- A. Installation Meeting: Prior to start of work, conduct a meeting to verify that the installation instructions and procedures required are understood by installers.

1. The following shall attend this meeting:
 - a. General contractor.
 - b. Installers of firestopping.
 - c. Installers of smokestopping.
 - d. Firestopping manufacturers' representatives.
- B. Prepare penetrations in accordance with the material manufacturer's instructions.

3.03 INSTALLATION

- A. Install firestopping materials in exact accordance with manufacturer's instructions and the conditions of the testing; provide all accessory materials required.
- B. Remove combustible forming materials, unless they are a required component of the tested assembly.

3.04 PERMANENT IDENTIFICATION OF PENETRATIONS

- A. Near fire and smoke barriers, mark each exposed penetration with label identifying it as a fire-stopped or smoke-stopped assembly.
- B. Mark each fire and smoke barrier above lay-in ceilings with words identifying it as a fire or smoke barrier at intervals required by authorities having jurisdiction, but not less than 20 feet.

3.05 FIELD QUALITY CONTROL

- A. Obtain the services of firestopping material manufacturer's representative to instruct installers and to inspect the completed installations for correctness.
- B. Inspect completed installations for completeness and correct installation.
 1. If installed work is to be covered in completed work, inspect and obtain approval prior to covering.
 2. Obtain the architect's approval; notify the architect that the work is complete and ready for inspection.
 3. Obtain the approval of the material manufacturer.
 4. Obtain the approval of the authority having jurisdiction.
 5. Submit report of inspection to the architect.

3.06 CLEANING

- A. Clean up excess material adjacent to penetrations promptly; use methods and materials approved by the manufacturers of the penetration seals and of surfaces to be cleaned.

3.07 PROTECTION

- A. Protect installed work during curing period.

- B. Protect installed work from damage from construction operations using substantial barriers if necessary.
- C. Repair damaged materials in accordance with manufacturer's instructions.

END OF SECTION 072700

SECTION 079200 – JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Nonstaining silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Joint sealant backing material.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, substrates being adhered to and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- B. Sample Warranties: for Special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five (5) years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools or other outside agents.
 4. Changes in sealant appearances caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of services and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:
 - 1. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
- C. Colors of Exposed Joint Sealants:
 - 1. Match metal color when installed between two metal materials of the same color.
 - 2. Match the darker of two metals when installed between metal materials of dissimilar color.
 - 3. Match skylight aluminum finish when installed at perimeter of skylight system aluminum frame.
 - 4. Match brick masonry when installed in existing brick masonry vertical joints.
 - 5. Match mortar when installed in existing brick masonry horizontal joints.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic-and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Polyurethane, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic-and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

2.4 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-sell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and filed tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installing tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates, that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces or ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with side of joint.
 1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joint as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 250 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealant pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Joints between different materials listed above.
 - c. Control and expansion joints.
 - d. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Elastomeric Polyurethane, S, NS, 100/50, T, NT: or Silicone, nonstaining, S, NS, 50, NT as required by product manufacturer.
 - 3. Joint-Sealant Color: Refer to joint sealant color schedule elsewhere in this section or as selected by Architect from manufacturer's full range of colors.
- B. Joint Sealant Color: Provide actual physical samples of each sealant material for Architect's final approval in accordance with the following:
 - 1. Sealant joint at perimeter of windows: match color of window unit.

END OF SECTION 079200

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door trim for openings.
5. Factory-machining criteria.
6. Factory- finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Dimensions and locations of blocking for hardware attachment.
5. Dimensions and locations of mortises and holes for hardware.
6. Clearances and undercuts.
7. Requirements for veneer matching.
8. Doors to be factory finished and application requirements.

- C. Samples for Initial Selection: For factory-finished doors.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Provide labels and certificates from AWI certification program indicating that doors comply with requirements of grades specified.
 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eggers Industries.
 - b. Masonite Architectural.
 - c. VT Industries Inc.
2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty .
3. Performance Grade:
 - a. ANSI/WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.
4. Architectural Woodwork Standards Grade: Premium .
5. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: Red oak .
 - b. Cut: Plain sliced (flat sliced) .
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Running match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
 - f. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
6. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as follows:
 - 1) 5-inch top-rail blocking.
 - 2) 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - 3) 5-inch midrail blocking, in doors indicated to have armor plates.
 - 4) 5-inch midrail blocking, in doors indicated to have exit devices.
7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LOUVERS

- A. Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.7 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Architectural Woodwork Standards Grade: Premium.
 - 2. Finish: Architectural Woodwork Standards System-9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
 - 3. Staining: As selected by Architect from manufacturer's full range.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083110 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes access doors and frames for walls.

1.2 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material in specified finish.
- D. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 QUALITY ASSURANCE

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. UL 10B for vertical access doors and frames.

1.4 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Manufacturer's standard finish – No. 4 Stainless Steel Satin Finish.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Acceptable Manufacturers:
 - 1. Acudor Products, Inc.
 - 2. Babcock-Davis; A Cierra Products Co.
 - 3. Karp Associates, Inc.
 - 4. Larsen's Manufacturing Company.
 - 5. Or approved equal.
- B. Flush Access Doors and Frames with Exposed Trim: Fabricated from metallic-coated steel sheet.

1. Locations: Wall.
2. Door: Minimum 14 gage thick sheet metal.
3. Frame: Minimum 16 gage thick sheet metal with $\frac{3}{4}$ " wide, surface-mounted trim.
4. Hinges: Continuous piano.
5. Latch: Cam latch with interior release.
6. Lock: Cylinder.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view, provide materials with smooth, flat surfaces without blemishes.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 1. For cylinder lock, furnish two keys per lock and key all locks alike.
 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.
- F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083110

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Field verification of existing conditions.
- C. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
- D. Related Sections:
 - 1. Division 08 Section "Flush Wood Doors".
- E. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 80 - Fire Doors and Windows.
 - 4. NFPA 101 - Life Safety Code.
 - 5. NFPA 105 - Installation of Smoke Door Assemblies.
 - 6. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 7. State Building Codes, Local Amendments.
- F. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. UL 305 - Panic Hardware.
 - 4. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- D. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installation. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Standard Warranty Period: Two years from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Ten years for manual surface door closer bodies.
 - 3. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:

- a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Bommer Industries (BO).
 - b. Hager Companies (HA).
 - c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
 - 1. Manufacturers:
 - a. Yale Locks and Hardware (YA).
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 5. Keyway: Match Facility Standard.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Interchangeable Cores: By Owner.
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Construction Keys (where required): Ten (10).
 - 2. Construction Control Keys (where required): Two (2).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Construction Keying: Provide temporary keyed construction cores.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
 - 1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at paired openings) throw brass or stainless steel latchbolt.
 - 2. Locks are to be non-handed and fully field reversible.
 - 3. Manufacturers:
 - a. Yale Locks and Hardware (YA) 5400LN Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Custom Strike: To fit existing frame cutout.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.7 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully

operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:
 - a. Norton Door Controls (NO) - 7500 Series.
 - b. Yale Locks and Hardware (YA) - 4400 Series.
 - c. Or Approved Equal.

2.8 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.11 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.12 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical hardware and to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch-Out Report): Reference Division 01 Section "Closeout Procedures". Final inspect installed door hardware and state in report whether work complies with or deviates from specification requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. Manufacturer's Abbreviations:

1. PE - Pemko
2. RO - Rockwood
3. YA - Yale
4. HS - HES
5. NO - Norton
6. MK - McKinney
7. SU - Securitron

Hardware Sets

Set: 1.0

Description: Gang Restroom & in toilet room janitors closets

3 Hinge (Heavy Weight)	T4A3786	US26D	MK
1 Classroom Lock	B AU 5408LN	626	YA
1 Core	By Owner	US26D	00
1 Surface Closer	R or PR 7500	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Mop Plate	K1050 4" 4BE CSK	US32D	RO
1 Door Stop	401; 404; 441CU (or per spec)	US26D	RO
1 Head & Jamb Seal (adhesive)	S44BL		PE

Set: 2.0

Description: Private Toilet

3 Hinge (Heavy Weight)	T4A3786	US26D	MK
1 Privacy Lock	AU 5402LN	626	YA
1 Surface Closer	R or PR 7500	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Mop Plate	K1050 4" 4BE CSK	US32D	RO
1 Door Stop	401; 404; 441CU (or per spec)	US26D	RO
1 Head & Jamb Seal (adhesive)	S44BL		PE
1 Coat Hook	806	US26D	RO

END OF SECTION 087100

SECTION 092216 - NON-STRUCTURAL 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. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.
 - 3. Grid suspension systems for gypsum board ceilings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Studs and Runners: Provide documentation that framing members' certification is according to SFIA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members".

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.
- B. Manufacturer's Certification: Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products.

1.5 QUALITY ASSURANCE

- A. Contractor shall provide effective, full time quality control over all fabrication and erection complying with the pertinent codes and regulations of government agencies having jurisdiction. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- B. Manufacturer shall be a current member of the SFIA and be listed on the official website or be a part of a similar organization that provides a verifiable code compliance program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by, and displaying a classification label from an independent testing agency acceptable to the authority having jurisdiction.
 - 1. Construct fire-resistance rated partitions in compliance with tested assembly requirements indicated on drawings.
 - 2. Rated assemblies to be substantiated from applicable testing using proposed products, by Contractor.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft.
- D. Design framing systems in accordance with American Iron and Steel Institute Publication "S220 - North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members", except as otherwise shown or specified.
- E. Design loads: As indicated on the Architectural Drawings or 5 PSF minimum as required by the International Building Code.

2.2 FRAMING SYSTEMS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Framing Members, General: Comply with ASTM C 645 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with ASTM C 645; roll-formed from hot-dipped galvanized steel; complying with ASTM A 653/A 653M G40 (Z120) or having a coating that provides equivalent corrosion resistance. A40 galvanized products are not acceptable.

- a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
- C. Studs and Runners: ASTM C 645.
1. Non-Structural Studs: Cold-formed galvanized steel C-studs as per ASTM C 645 for conditions indicated below:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; ProSTUD products named below, or a comparable product from one of the members of the SFIA:
 - 1) ProSTUD
 - 2) Or approved equal
 - b. Flange Size: 1-1/4 inch.
 - c. Web Depth: 1-5/8 inches.
 - d. Member Description: ProSTUD 25 (25 EQ) 50 ksi.
 - 1) Minimum Base-Steel Thickness: 0.0150 inches.
 - 2) Minimum Design Thickness: 0.0158 inches.
 - e. Member Description: ProSTUD 20 (20 EQ) 65 ksi.
 - 1) Minimum Base-Steel Thickness: 0.0190 inches.
 - 2) Minimum Design Thickness: 0.0200 inches.
 - f. Member Description: ProSTUD 30 mil (20 DW) 33 ksi.
 - 1) Minimum Base-Steel Thickness: 0.0296 inches.
 - 2) Minimum Design Thickness: 0.0312 inches.
 - g. Member Description: ProSTUD 33 mil (20 STR) 33 ksi.
 - 1) Minimum Base-Steel Thickness: 0.0329 inches.
 - 2) Minimum Design Thickness: 0.0346 inches.
 2. Non-Structural Track: Cold-formed galvanized steel runner tracks, drywall track, in conformance with ASTM C 645 for conditions indicated below:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; ProTRAK, or a comparable product from one of the members of the SFIA:
 - 1) ProTRAK
 - a) Provide Contour Track for Curved Soffits
 - 2) Or approved equal
 - b. Flange Size: 1-1/4 inch.
 - c. Web Depth: Track web to match stud web size.
 - d. Minimum Base-Steel Thickness: Track thickness to match wall stud thickness or as per design.
 3. "EQ" (Equivalent Gauge Thickness) Steel Studs and Runners: Members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved May 2012) need not meet the minimum thickness limitation or minimum section properties set forth in ASTM C 645. The submission of an evaluation report is acceptable to show conformance to this requirement.
- D. Backing Plate: Proprietary fire-retardant-treated wood blocking and bracing in width indicated.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Danback Fire-Retardant Treated Wood Backing Plate.
 2. Or approved equal
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Backing Plate.
 2. Or approved equal.
 3. Minimum Base-Steel Thickness: 0.0179 inch.
- F. Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch wide flanges.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Cold-Formed U-Channel and EasyClip U-Series Angle U543.
 2. Or approved equal.
 3. Depth: 1-1/2 inches
 4. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.0538-inch thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Furring Channel.
 2. Or approved equal.
 3. Minimum Base-Steel Thickness: 0.0179 inch.
 4. Depth: As indicated on Drawings.
- H. Z-Shaped Furring: Nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum uncoated-steel thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Z-Furring Channel.
 2. Or approved equal.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 - 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Install fire-resistant partitions using manufacturer's proprietary equivalent gauge studs in compliance with requirements of UL U419.
 - b. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- E. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 16 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092600 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard.
2. Tile backing panels.

1.2 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

C. Samples: For the following products:

1. Trim Accessories: Full-size sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

- C. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Install mockups for the following applications:
 - a. Surfaces with texture finishes.
 - b. Surfaces indicated to receive non-textured paint finishes.
 - c. Surfaces indicated to receive textured paint finishes.
 - 2. Simulate finished lighting conditions for review of mockups.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 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, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Steel Framing and Furring:
 - a. Clark Steel Framing Systems.
 - b. Consolidated Systems, Inc.
 - c. Dale Industries, Inc. - Dale/Incor.
 - d. Dietrich Industries, Inc.
 - e. MarinoWare; Division of Ware Ind.
 - f. National Gypsum Company.
 - g. Scafco Corporation.
 - h. Unimast, Inc.
 - i. Western Metal Lath & Steel Framing Systems.
 - j. Or approved equal.
 - 2. Gypsum Board and Related Products:
 - a. G-P Gypsum Corp.
 - b. Certainteed Corp.
 - c. Or approved equal.

2.2 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Components, General: Comply with ASTM C 754 for conditions indicated.
- B. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40, hot-dip galvanized ASTM A 653, G60, hot-dip galvanized manufacturer's standard corrosion-resistant zinc coating.
 - 1. Cold Rolled Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange, 3/4 inch (19.1 mm) deep.
 - 2. Steel Studs: ASTM C 645.
 - a. Minimum Base Metal Thickness: As indicated 0.0312 inch.
 - b. Depth: As indicated on the drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base Metal Thickness: As indicated 0.0312 inch.
 - 4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
 - a. Configuration: Hat shaped, with face attached to two flanges by slotted or expanded metal legs.
- C. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Acceptable Products:
 - a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
 - b. Chicago Metallic Corporation; Drywall Furring 640 System.
 - c. USG Interiors, Inc.; Drywall Suspension System.
 - d. Or approved equal.

2.3 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Glass-Mat Faced Gypsum Wallboard: ASTM C 1177.
 - 1. Acceptable Products:
 - a. DensArmor Plus Interior Panels by G-P Gypsum Corp.
 - b. GlasRoc Brand Sheathing by Certainteed Corp.
 - c. U.S.G. Fiberrock Brand "Aqua-Tough".
 - d. Or approved equal.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Long Edges: Tapered.
 - 4. Location: As indicated.

2.4 INTERIOR GYPSUM WALLBOARD (WET AREAS)

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead: Use at outside corners, unless otherwise indicated.
 - b. Bullnose Bead: Use at outside corners.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
 - d. L-Bead: L-shaped; exposed long leg receives joint compound; use where indicated.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound; use [at exposed panel edges.
 - f. Expansion (Control) Joint: Use where indicated.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Basis-of-Design: "G-P Gypsum; ToughRock Tape" or 10-by-10 glass mesh or approved equal.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - a. Basis-of-Design: G-P Gypsum; ToughRock Sandable Setting Compound" or approved equal.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Basis-of-Design: G-P Gypsum; ToughRock Sandable Setting Compound" or approved equal.
 - b. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - a. Basis-of-Design: G-P Gypsum; ToughRock Sandable Setting Compound" or approved equal.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - a. Basis-of-Design: G-P Gypsum; ToughRock Sandable Setting Compound or approved equal.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
 - a. Basis-of-Design: G-P Gypsum; ToughRock Sandable Setting Compound or approved equal.
- D. Joint Compound for Tile Backing Panels:
 - 1. Basis-of-Design: G-P Gypsum; "ToughRock Setting Compound" or approved equal.

2. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.
3. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
4. Glass-Mat Gypsum Wallboard: As recommended by wallboard manufacturer.
5. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 ACOUSTICAL SEALANT

A. Acceptable Products:

1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
 - c. Or approved equal.
2. Acoustical Sealant for Concealed Joints:
 - a. Ohio Sealants, Inc.; Pro-Series SC-170 Rubber Base Sound Sealant.
 - b. Pecora Corp.; BA-98.
 - c. Tremco, Inc.; Tremco Acoustical Sealant.
 - d. Or approved equal.

- B. Acoustical Sealant for Exposed and Concealed Joints: Non-sag, paintable, non-staining, 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 E 90.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of gypsum board assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
 - b. Use firestop track where indicated.

- D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.4 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Suspend ceiling hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or approved equal devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure rod flat angle hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. For exterior soffits, install cross bracing and framing to resist wind uplift.
- E. Screw furring to framing.
- F. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.
- G. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.
 - 1. Hangers: 48 inches 1200 mm.
 - 2. Carrying Channels (Main Runners): 48 inches.
 - 3. Furring Channels (Furring Members): 16 inches 24 inches.

- H. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
 - 1. Where studs are installed directly against exterior walls, install asphalt-felt or foam-gasket isolation strip between studs and wall.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 - 1. Cut studs 1/2 inch short of full height to provide perimeter relief.
 - 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 - a. Terminate partition framing at suspended ceilings where indicated.
- D. Install steel studs and furring at the following spacings:
 - 1. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.
 - 2. Multilayer Construction: 16 inches o.c., unless otherwise indicated.
 - 3. Cementitious Backer Units: 16 inches o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1. Install two studs at each jamb, unless otherwise indicated.
 - 2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint.
 - 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

3.6 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Form control and expansion joints with space between edges of adjoining gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- K. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.
- L. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
 - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
- N. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.7 PANEL APPLICATION METHODS

- A. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- C. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 1. Z-Furring Members: Apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- D. Single-Layer Fastening Methods: Apply gypsum panels to supports with corrosion resistant drill screws.
- E. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- F. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

- G. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered and located over supports.
 - 1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.

3.8 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings Install control joints according to ASTM C 840 and in specific locations approved by Design Consultant for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated panels are substrate for acoustical tile indicated.
 - 3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges where indicated.
 - 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
 - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where indicated.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.10 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish manufacturer's written recommendations.

3.11 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Design Consultant will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 - 1. Notify Design Consultant seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
 - 2. Before notifying Design Consultant, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.

END OF SECTION 092600

SECTION 093000 – CERAMIC – PORCELAIN - MOSAIC TILE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic, Porcelain, and mosaic tile.

1.2 REFERENCES

- A. ANSI A108.1A-1993 -- American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar; 1992.
- B. ANSI A108.4-1992 -- Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive; 1992.
- C. ANSI A108.6-1992 -- Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1992.
- D. ANSI A108.10-1992 -- Installation of Grout in Tilework; 1992.
- E. ANSI A118.3-1992 -- American National Standard Specifications for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive; 1992.
- F. ANSI A118.6-1992 -- American National Standard Specifications for Ceramic Tile Grouts; 1992.
- G. ANSI A118.8-1992 -- American National Standard Specifications for Modified Epoxy Emulsion Mortar/Grout; 1992.
- H. ANSI A136.1-1992 -- American National Standard for Organic Adhesives for Installation of Ceramic Tile; 1992.
- I. ANSI A137.1-1988 -- American National Standard Specifications for Ceramic Tile; 1988.
- J. ASTM A 82-94 -- Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 1994.
- K. ASTM A 185-94 -- Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1994.
- L. ASTM C 503-89 -- Standard Specification for Marble Dimension Stone (Exterior); 1989.
- M. ASTM C 920-95 -- Standard Specification for Elastomeric Joint Sealant; 1995.
- N. ASTM E 90-90 -- Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions; 1990.
- O. Handbook for Ceramic Tile Installation; Tile Council of America, Inc. (TCA) 1994.

1.3 DESIGN REQUIREMENTS

- A. Sound-Rated Construction: At locations indicated, provide construction built in accordance with manufacturer's assemblies, laboratory-tested per ASTM E 90 for designated STC ratings.

1.4 SUBMITTALS

- A. Product Data: Written product information, which demonstrates materials to be used on the project comply with contract documents.
- B. Shop Drawings: Showing tile layout and details of expansion joints in tile work and underlying construction.
- C. Samples - Initial Selection: Manufacturer's color selection boards of actual tile materials including a complete selection of available tile colors and finishes for each tile type indicated. Include samples of accessory materials requiring color selection.
- D. Samples for Verification Purposes: Submit the following:
 - 1. Submit each tile type selected mounted on a minimum 12-inch square board with joints filled using selected grout.
 - 2. Trim and accessories: Samples of actual units in selected color.
 - 3. Stone thresholds: 6-inch-long samples.
 - 4. Edge strips: 6-inch long samples.
- E. Certification: Submit Master Grade Certificates for each delivery of each tile type, signed by tile manufacturer and installer.
- F. Test Reports: Submit independent testing agency's certified test reports which demonstrate tile materials and installation products comply with project requirements.
- G. Qualifications Documentation: Written confirmation that companies executing work in this section comply with experience requirements.

1.5 QUALITY ASSURANCE

- A. Material Source: Furnish each type, finish, and color of tile product and accessory materials from a single supplier.
- B. Installer: A company with not less than 20 installations of tile work similar in size and complexity to the work of this project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store tile products and setting materials in manufacturer's sealed packages. Protect material from damage and store in dry location.

1.7 PROJECT CONDITIONS

- A. Provide temperatures in tiled areas during installation and after completion as required by referenced installation standard or manufacturer's instructions, but not less than 50 degrees F.

- B. If necessary, to use temporary heaters, vent units to exterior to protect tile work from carbon dioxide accumulation.

1.8 MAINTENANCE

- A. Extra Materials: Deliver supply of maintenance materials to the Project School District. Furnish maintenance materials from same lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Furnish not less than 2 percent of total product installed maintenance stock for each type, color, pattern, and size of tile product installed.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Ceramic Tile Standard: ANSI A137.1.
 - 1. Tile grade: "Standard Grade," unless noted otherwise.
- B. Tile Installation Materials Standard: ANSI standard referenced for setting and grouting materials.
- C. Colors, Textures, and Patterns, Tile, Grout, and Other Products: As indicated on Finish Legend on sheet A2.08.
 - 1. Tile trim and accessories: Match color and finish of adjoining flat tile.
- D. Color Blending: Factory-blend tile products which have a natural color range so products taken from one box will have the same range as products from a separate box.

2.2 TILE PRODUCTS

- A. Refer to Finish Legend in drawings.

2.3 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: ANSI A108.1A.
 - 1. Setting bed reinforcing: Galvanized welded wire fabric, 2 inches by 2 inches, ASTM A 185; with W0.3 by W0.3, 0.0625 inch diameter, wire, ASTM A 82 except for minimum wire size.
- B. Chemical-Resistant, Water-Cleanable Ceramic Tile Setting and Grouting Epoxy: ANSI A118.3.
 - 1. Service temperature: Product recommended and certified by manufacturer to resist anticipated ambient temperature range, but not less than 140 F degrees on a continuous basis.
 - 2. Acceptable Manufacturers:
 - a. American Olean Tile Company.
 - b. Boiardi Products Corporation.
 - c. C-Cure Corporation.

- d. Mapei Corporation.
- e. Laticrete International, Inc.
- f. Southern Grouts & Mortars, Inc.
- g. Summitville Tiles, Inc.
- h. Tamms Industries.
- i. Approved equal.

2.4 WATERPROOFING MATERIALS

- A. Sheet Membrane: 0.030 inch thick chlorinated polyethylene (CPE) sheet with nonwoven polyester laminated to both sides, 60 inches wide.
 - 1. Acceptable Products:
 - a. "Laticrete International, Inc.
 - b. "NobleSeal TS"; The Noble Company.
 - c. "Dal-Seal TS"; Dal-Tile Corporation.
 - d. Approved equal.

2.5 GROUTING MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10.
- B. Chemical-Resistant Epoxy Grout: ANSI A118.3.
 - 1. Service temperature: Product recommended and certified by manufacturer to resist anticipated ambient temperature range, but not less than 140 F degrees on a continuous basis.
 - 2. Acceptable Manufacturers:
 - a. American Olean Tile Company.
 - b. Atlas Mineral & Chemicals, Inc.
 - c. Boiardi Products Corporation.
 - d. Bostik Inc.
 - e. C-Cure Corporation.
 - f. Mapei Corporation.
 - g. Laticrete International, Inc.
 - h. Southern Grouts & Mortars, Inc.
 - i. Summitville Tiles, Inc.
 - j. Tamms Industries.
 - k. Approved equal.

2.6 ELASTOMERIC SEALANTS

- A. Compatibility: Provide sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates for project performance conditions.
- B. Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and O (for nonporous substrates) with added fungicide.
 - 1. Acceptable Manufacturers:
 - a. Dow Corning Corporation.
 - b. GE Silicones.
 - c. Pecora Corporation.
 - d. Tremco, Inc.
 - e. Approved equal.

- C. Urethane Sealant: ASTM C 920, Grade P; Class 25; Uses T, M, and A.
 - 1. Acceptable Manufacturers:
 - a. Bostik Inc.
 - b. Mameco International, Inc.
 - c. Pecora Corporation.
 - d. Tremco, Inc.
 - e. Approved equal.
- D. Chemical-Resistant Sealants: Sealants recommended by tile setting materials manufacturer to be compatible with and have similar chemical resistant performance as the chemical-resistant mortar and grout.
 - 1. Basis of Design: Atlas Mineral & Chemicals, Inc. or approved equal.

2.7 MISCELLANEOUS MATERIALS

- A. Edge strips; fabricated from the following material with 1/8 inch wide exposed edge, and means for securing strip to substrate:
 - 1. Zinc alloy.
 - 2. Stainless steel.
- B. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.
 - 1. Acceptable Manufacturers:
 - a. Hillyard, Inc.
 - b. Mapei Corporation.
 - c. Approved equal.

2.8 MIXING MORTAR AND GROUT

- A. Mix mortar and grout to comply with referenced standards and manufacturer's mixing procedures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify with the installer that substrate areas where tile is to be installed have been prepared correctly, and that all backing materials have been installed. Correct unacceptable conditions before start of tile work.

3.2 PREPARATION

- A. Factory-Blending: Before start of installation verify that tile with an anticipated range of colors has been correctly blended to achieve a uniform color range from tile package to tile package.

3.3 INSTALLATION - GENERAL

- A. Tile Installation Standard: ANSI A108 series, for setting and grouting materials listed.

- B. Installation Methods: Comply with TCA "Handbook for Ceramic Tile Installation" for type of applications indicated.
- C. Install waterproofing to comply with waterproofing manufacturer's instructions as necessary to result in a watertight installation.
- D. Install tile under or behind equipment and fixtures.
- E. Carefully cut, drill, and grind tile to fit around items projecting through tile surface, so that escutcheons or cover plates conceal cut edges.
- F. Joint Patterns: Lay out tile according to patterns indicated on drawings, or if not shown, in a grid pattern with floor joints aligning with wall and trim joints. Install joints straight and of uniform width.
 - 1. Sheet-mounted tile: Install with joint dimension between sheets the same width as the joint within the sheet for a continuous, uniform installation.

3.4 TILE APPLICATIONS

- A. Interior Wall, Thin-Bed: (See Sheet A7.04 Finish Legend on Drawings)
 - 1. Tile: Refer to Finish Legend.
 - 2. Installation method:
 - a. Dry Set Mortar or Latex Portland Cement Mortar: TCA W202.
 - b. Adhesive: PermaFlex 400, ANSI A108.5.
 - 3. Grout: Sand-Portland cement.
- B. Interior Wall, Thin-Bed: (See Sheet A7.04 Finish Legend on Drawings)
 - 1. Tile: Refer to Finish Legend.
 - 2. Installation method:
 - a. Gypsum board on metal studs: TCA W242.
 - b. Adhesive: Organic adhesive, ANSI A108.4.
 - 3. Grout: Sand-Portland Cement

3.5 CLEANING AND PROTECTION

- A. Clean tile surfaces after installation is complete.
- B. Replace any broken, chipped, marred, or otherwise damaged tile before final acceptance.
- C. Protection: Apply neutral protective cleaner to tile after installation if recommended by tile manufacturer. Overlay completed tile installation with kraft paper for protection from subsequent construction activities.
 - 1. Do not allow any traffic on completed tile floors for minimum 7 days after completion.
 - 2. Remove protection, rinse, and dry tile installations before final review and acceptance.

END OF SECTION 093000

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: 1 Case of each tile used.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Source Limitations:
 - 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
 - 2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
 - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL PANELS

- A. Color: White, unless otherwise indicated on Drawings.
- B. Modular Size: As indicated on Drawings.
- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew,

and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

D. Tile Types

1. Acoustical Panel Type **ACT-1 & ACT-2**

- a. Basis of Design: Rockfon, "Koral".
- b. Classification: Provide ceiling panels complying with ASTM E 1264
- c. Edges: SQ
- d. Size:
 - 1) ACT-1: 24"x48"
 - 2) ACT-2: 24"x24"
- e. Thickness: 5/8"
- f. NRC: 0.85
- g. AC: 170
- h. Fire Class: Class A
- i. Fire Performance:
 - 1) UL 723 (ASTM E84) Flame Spread / Smoke Developed: 0/5
- j. Light Reflectance: 0.86
- k. Recycled Content: Up to 34%
- l. R Value (BTU Units): 2.2

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

- a. Type: Post-installed expansion anchors.
- b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
- c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
- d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire but provide not less than 0.106-inch- diameter wire.
- D. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- F. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.
- G. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches on center on all cross tees.

2.5 METAL SUSPENSION SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Rockfon – bases of design
 2. Armstrong World Industries, Inc.
 3. USG.
- B. Metal Suspension System: Basis of Design – Armstrong Prelude XL 15/16". Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.
 1. Structural Classification: Intermediate-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel cold-rolled sheet.
 5. Cap Finish: Painted white, unless otherwise indicated on Drawings.
 5. Cap Finish: Painted white, unless otherwise indicated on Drawings.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed

- suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches on center along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
 7. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 099000 - PAINTING

PART 1 - GENERAL

1.01 SECTION INCLUDES: (See Paint Schedule and finish designations)

- A. Painting interior
- B. Natural finish of wood

1.02 DEFINITIONS

- A. "Paint or Painting" as used in this specification, are in a general sense and include: Sealers, primers, stains; oil, alkyd, latex, epoxy, and enamel type paints; lacquers; fillers; and the application of these materials.

1.03 PRODUCT SUBMITTALS

- A. Product Data: Listing of proposed products matched to specified products. Cut sheet for each product indicating generic formulation, sheen, ingredients, percentage by volume, and breakdown of pigment versus vehicle.
- B. Samples: Full range of custom mixed color chips for selection.

1.04 CONTRACT CLOSEOUT SUBMITTALS

- A. Maintenance Materials: Turn over to Owner upon completion; one gallon of each type and color of finish. Include color pigmentation formulation.

1.05 PACKING AND DELIVERY

- A. Delivery: Unopened containers with manufacturer's labels indicating type of paint, stock number, color number and instructions.

1.06 STORAGE AND PROTECTION

- A. Storage: Do not store volatiles, thinners, and solvents (including rags and tool cleaning pails) within the building.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Temperature:
 - 1. Interior: Constant 65 degrees F. or above. Prevent wide variations in temperature which might result in condensation.
 - 2. Exterior: Do not paint materials when temperature is below 50 degrees F.
- B. Avoid painting any surfaces while they are exposed to hot sun.
- C. Provide proper conditions of ventilation and light; use artificial light in quantity equivalent to normal occupancy lighting.

PART 2 - PRODUCTS

2.01 PAINT AND FINISHES

- A. Manufacturer:
- | | |
|---|------------------------------|
| Pratt & Lambert, Inc. | PPG Industries |
| ICI Glidden | Benjamin Moore Paint Co. |
| M.A. Bruder & Sons, Inc. | Duron Paints & Wallcoverings |
| Sherwin Williams (Product #s specified) | |
- B. Specific products are indicated in painting schedule included at the end of this Section. These products establish a standard of quality. Others may be required to substantiate properties and qualities.
- C. Ready-mixed; well ground, not settle badly, cake or thicken in the container, readily broken up with a paddle to a smooth consistency; and having easy brushing properties; Lead free.
- D. Colors: Standard colors.
1. Refer to finish schedule on the drawings.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Inspection and Surfaces:
1. Carefully examine executed work of other trades which might affect this Work.
- B. Protect materials and equipment from damage by painting and finishing.
1. Tape, mask, cover and/or coat adjacent materials, areas, surfaces, and equipment not to receive finishes noted in this Section. Specifically protect wood floors and natural unfinished wood.
 2. Before painting, remove hardware, accessories, plates and similar items or provide ample protection of such items.
 3. Remove doors, if necessary, to paint bottom edge.
 4. Use only skilled mechanics for removing and replacing such items. Upon completion of each space, replace above items.
- C. General Preparation of Surfaces:
1. Prepare all surfaces in accordance with manufacturer's recommendations for product being used.
 2. Surfaces: Clean; dry; free of moisture and dampness; smooth, even, true to plane; and free of material which will adversely affect adhesion or appearance of applied coating.

3.02 PREPARATION- WOOD SURFACES TO BE PAINTED OR FINISHED

- A. Dry, clean, and free from oil, grease, wax, loose dirt or other foreign matter.

- B. Sand surfaces smooth and even, and then dust off before applying the first coat.
- C. Coat knots, sap streaks, and pitch spots with recommended sealer.
- D. Fill nail holes, cracks, and imperfections.
 - 1. Paint Finish: Use wood putty
 - 2. Natural or Stain Finish: Use plastic wood filler (match for specie and finish color).
- E. Apply paste wood filler on open grain wood. Wipe across the grain; then with a circular motion to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface until smooth.

3.03 PREPARATION- METAL SURFACES TO BE PAINTED

- A. Thoroughly clean metal surfaces where rust or scale is present, by the use of wire brushing and/or abrasive paper.
- B. Wash surfaces with mineral spirits to remove any grease, oil or dirt.
- C. Touch-up all shop primed or coated surfaces chipped or abraded, using shop coat material specified. Feather edges of damaged shop coat to achieve smooth finish. Comply with metal preparation as indicated by the manufacturer of the coating.

3.04 PREPARATION - MASONRY SURFACES

- A. Masonry Surfaces: Allow to cure at least thirty (30) days before painting. Before apply the first coat of paint, fill all joints and point up all holes, Correct any imperfections. Remove all mortar or plaster droppings and any other foreign matter. Brush surfaces with a stiff bristle or wire brush.
- B. Neutralize free lime with a solution acceptable to the manufacturers of the paint which is to be applied.

3.05 PREPARATION- CONCRETE SURFACES

- A. Patch openings, voids, holes, cracks, and irregularities with Portland Cement mortar and finish flush with adjacent surfaces.
- B. Remove contaminants, oil, scum, grease, and the like.
- C. Remove all loose, powdery or dusting surface laitance mechanically (scarification).
- D. Remove form oil from concrete as recommended by paint manufacturer for proper adhesion.
- E. Allow surfaces to dry completely, usually 60 to 90 days of moderate, weather, before painting.

3.06 PREPARATION- GYPSUM BOARD SURFACES

- A. Fill all minor irregularities with spackling compound and sand to smooth, level surfaces. Exercise care to avoid raising nap of paper.

- B. Allow to cure at least 15 days before painting.
- C. Do not use sandpaper on paper surfaces to be painted.
- D. Do not apply paint or sealer when moisture content exceeds that required by paint manufacturer.

3.07 APPLICATION OF PAINTS

- A. General Requirements: Comply with manufacturer's instructions including environmental conditions, temperatures, pot life, drying and recoating times. Utilize tools and equipment recommended for products.
 - 1. Do not apply coating until moisture content of surface is within limitations recommended by the paint manufacturer. Test with moisture meter.
 - 2. Apply paint, enamel, stains and varnishes with suitable brushes, rollers or spray equipment which have been kept clean, free from contamination and suitable for finish required.
 - 3. Rate of application of coating shall not exceed that as recommended by the paint manufacturer for the purpose of surface involved.
 - 4. Sand and dust between each coat to remove visible defects and blemishes.
- B. Coverage:
 - 1. Apply not less than 2 separate and distinct coats of finish on all exposed Work throughout.
 - 2. Apply to shop or factory primed surfaces not less than 1 finish coat; in addition to the prime coat.
 - 3. Apply additional coats should there be a deficiency in coverage.
 - 4. Apply additional coats over entire surface until paint film is of uniform finish, color appearance and coverage, specifically when previous color, stain, dirt, spackle, patching or undercoats show through final coats.
 - 5. If problems arise in connection with application of paint, stop painting area immediately and contact paint manufacturer for recommendation.
- C. Methods of Application:
 - 1. Brush Application: Brush each coat out uniformly to eliminate laps, skips and excess brush marks. Brush apply field coats on metals, and trim.
 - 2. Roller Application: Use proper skill to avoid signs of lapping and excess paint lines from edge of roller. When cutting in with a brush is required, these areas must be of same texture, color and hiding as adjacent areas, to ensure good appearance.
 - 3. Spray Application: Absolute masking and protective measures shall be taken to avoid damage to other finish materials. Manufacturer's recommendations for dry mil thickness are minimums and square feet per gallon shall not be exceeded. Paints shall not be diluted for purpose of spraying.
- D. Drying:
 - 1. Do not apply any type finish until the preceding coats are thoroughly dry and hard.
 - 2. Interior Paint: Allow to dry at least 24 hours between coats.

- 3. Exterior Paint: Allow to dry at least 48 hours between coats.
- E. Appearance: (As visible from 3 feet)
 - 1. Smooth and even; free from runs, sags, skips, streaks and holidays.
 - 2. No variation in sheen or color within continuous surfaces.
 - 3. No clogging of lines and angles of shapes and details.
 - 4. Edges (adjoining other materials or other colors): Paint sharp and clean without overlapping.
 - 5. Coats: Proper consistency and well spread so as to show no laps and brush marks.

3.08 REPAIR AND CORRECTION

- A. Repair damage (resulting from painting) done to the Work of others and existing Work.
- B. Correct Work damage caused by drafty, dusty conditions or cold, to complete satisfaction, without additional cost.
- C. Refinish entire surface where portion of finish has been damaged or is not acceptable.
- D. No claims will be allowed for correction of defective Work caused by failure to adequately prepare substrates and abide by manufacturers recommendations.

3.09 CLEANING

- A. Touch-up and restore where finish is damaged.
- B. Remove spilled, splashed, or splattered paint from all surfaces.
- C. Do not mar surface finish of item being cleaned.
- D. Leave storage spaces clean and in condition required for equivalent spaces in project. Leave premises clean and free from all rubbish and accumulated material left from this Work.

3.10 SCHEDULE - INTERIOR SURFACES (NORMAL EXPOSURE)

- A. MASONRY - (Walls & Ceilings, Concrete, Cement Board)
 - 1. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1st Coat: S-W ProMar 200 Latex Wall Primer, B28W200
(4 mils wet, 1.2 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss Enamel, B31 W200
 - 3rd Coat: S-W ProMar 200 Latex Semi-Gloss Enamel, B31W200
(4 mils wet, 1.5 mils dry per coat)
- B. MASONRY - (CMU - Concrete or Cinder Block)
 - 1. Latex Systems:

- a. Semi-Gloss Finish:
 - 1st Coat: S-W ProMar Interior/Exterior Block Filler B25W25 (75-125 sq.ft./gal.)
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss B3IW200 Series
 - 3rd Coat: S-W ProMar 200 Latex Semi-Gloss B31 W200 Series (4 mils wet, 1.5 mils dry per coat)
 - b. Flat Finish:
 - 1st Coat: S-W ProMar Interior/Exterior Block Filler B25W25 (75-125 sq.ft./gal.)
 - 2nd Coat: S-W ProMar 200 Latex Flat Wall Paint B3OW200
 - 3rd Coat: S-W ProMar 200 Latex Flat Wall Paint B3OW200 (4 mils wet, 1.4 mils dry per coat)
- C. CONCRETE - (Floors)
 - 1. Alkyd Systems:
 - a. Gloss Finish:
 - 1st Coat: S-W Industrial Enamel, B54Z Series
 - 2nd Coat: S-W Industrial Enamel, B54Z Series (4 mils wet, 2 mils dry per coat)
- D. METAL - (Aluminum)
 - 1. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1st Coat: S-W ProMar 200 Latex Semi-Gloss 631 W200 Series
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss B31 W200 Series (4 mils wet, 1.5 mils dry per coat)
- E. METAL - (Galvanized)
 - 1. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1st Coat: S-W ProMar 200 Latex Semi-Gloss B31 W200 Series
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss B3IW200 Series (4 mils wet, 1.3 mils dry per coat)
 - b. Flat Finish:
 - 1st Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
 - 2nd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200 (4 mils wet, 1.4 mils dry per coat)
- F. METAL - Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Sashes, Doors, Partitions, Cabinets, Lockers, Fixtures, Equipment, Copper, Non-Galvanized Metal
 - 1. Latex Systems:
 - a. Gloss Finish:

1st Coat: DTM Acrylic Primer/Finish, B66W1
(6 mils wet, 3 mils dry)
2nd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
3rd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
(4 mils wet, 2 mils dry per coat)

- b. Semi-Gloss Finish:
 - 1st Coat: DTM Acrylic Primer/Finish, B66W
(6 mils wet, 3 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss B3IW200 Series
 - 3rd Coat: S-W ProMar 200 Latex Semi-Gloss B3IW200 Series
(4 mils wet, 1.3 mils dry per coat)
- c. Egg-Shell Finish:
 - 1st Coat: S-W ProMar 200 Latex Wall Primer, B28W200
(4 mils wet, 1.2 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series
 - 3rd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series
(4 mils wet, 1.6 mils dry per coat)
- d. Flat Finish:
 - 1st Coat: DTM Acrylic Primer/Finish, B66W1
(6 mils wet, 3 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
 - 3rd Coat: S-W ProMar 200 Latex Flat Wall Paint, 83OW200
(4 mils wet, 1.4 mils dry)

G. WOOD - Walls, Ceilings, Doors, Trim, Cabinet Work, Counters, Partitions, Frames Including Sitka Spruce, Southern Pine, Douglas Fir, Cedar, Redwood, Lauan)

- 1. Latex Systems:
 - a. Gloss Finish:
 - 1st Coat: S-W Wall & Wood Primer, B49WZ2
(4 mils wet, 2 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
 - 3rd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
(4 mils wet, 2 mils dry per coat)
 - b. Semi-Gloss Finish:
 - 1st Coat: S-W Wall & Wood Primer, B49WZ2
(4 mils wet, 2 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 W200 Series
 - 3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B3IW200 Series
(4 mils wet, 1.5 mils dry per coat)
 - c. Egg-Shell Finish:
 - 1st Coat: S-W Wall & Wood Primer, B49WZ2
(4 mils wet, 2 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series
 - 3rd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series
(4 mils wet, 1.5 mils dry per coat)
 - d. Flat Finish:

1st Coat: S-W Wall & Wood Primer, B49WZ2
(4 mils wet, 2 mils dry)
2nd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
3rd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
(4 mils wet, 1.4 mils dry per coat)

2. Stained & Varnished (Clear Finish)

a. Open Grained Wood:

1st Coat: S-W Interior Oil Stain, A48 Series
2nd Coat: S-W SHERWOOD Natural Filler, D7OTI
3rd Coat: S-W Oil Base Varnish, Gloss A66V91
4th Coat: S-W Oil Base Varnish, Gloss or Satin A66 Series

b. Closed Grain Wood:

1st Coat: S-W Interior Oil Stain, A48 Series
2nd Coat: S-W Oil Base Varnish, Gloss A66V91
3rd Coat: S-W Oil Base Varnish, Gloss or Satin A66 Series
(4 mils wet, 1.5 mils dry per coat)

H. WOOD - (Floors-Stained, Varnished)

1. Urethane System:

a. Gloss Finish:

1st Coat: S-W Oil Stain
2nd Coat: S-W Polyurethane Varnish, A67VI/A67FI
3rd Coat: S-W Polyurethane Varnish, A67VI/A67FI
(4 mils wet, 1.5 mils dry per coat)

I. DRYWALL - (Walls, Ceilings, Gypsum Board, Etc.)

1. Latex Systems:

a. Gloss Finish:

1st Coat: S-W ProMar 200 Latex Wall Primer, 628W200
(4 mils wet, 1.2 mils dry)
2nd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
3rd Coat: S-W ProMar 200 Latex Gloss, B2IW201 Series
(4 mils wet, 2 mils dry per coat)

b. Semi-Gloss Finish:

1st Coat: S-W ProMar 200 Latex Wall Primer, B28W200
(4 mils wet, 1.2 mils dry)
2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B3IW200 Series
3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B3IW200 Series
(4 mils wet, 1.3 mils dry per coat)

c. Egg-Shell Finish:

1st Coat: S-W ProMar 200 Latex Wall Primer, B28W200
(4 mils wet, 1.2 mils dry)
2nd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series
3rd Coat: S-W ProMar 200 Latex Egg-Shell, B2OW200 Series

(4 mils wet, 1.6 mils dry per coat)

- d. Flat Finish:
 - 1st Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
(4 mils wet, 1.4 mils dry)
 - 2nd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
 - 3rd Coat: S-W ProMar 200 Latex Flat Wall Paint, B3OW200
(4 mils wet, 1.4 mils dry per coat)

END OF SECTION 099000

SECTION 102100 - TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments including the following:
 - 1. Floor mounted toilet compartments.
 - 2. Privacy screens.

1.2 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry.

1.3 REFERENCES

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013300 – Submittal Procedure.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years' experience.
- C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating

surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

D. Performance Requirements:

1. Material Fire Ratings:

a. Shall be NFPA 286 compliant.

2. Material shall be compliant with IBC 2012 or later and must be solid HDPE; foamed material is not allowed. **Material shall be NFPA 286 compliant.**

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. BOBRICK gap free HPL with Wilsonart Nightfall #5023K-19 (bases of design)

B. Scranton Products

C. Substitutions: Approved equal.

2.2 MATERIAL

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

1. Recycled Content; Post Industrial: 100 percent.

B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

C. Stainless Steel Castings: ASTM A167, Type 304.

D. Aluminum: ASTM 6463-T5 alloy.

2.3 TOILET COMPARTMENTS

A. Basis of Design: Solid Plastic (HDPE) Toilet Partitions as manufactured by and supplied by

ASI Global Partitions.

1. Style: floor anchored / overhead braced toilet compartments.
- B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount doors and dividing panels based on height of specified system.
1. Door and Panel Height: 55 inches (Coordinate with Arch. Drawings).
 2. Door Design: Standard.
 3. Panel Edge: Standard.
 4. Refer to drawings for toilet compartment layout and panel sizes.
- C. Panel Color: Wilsonart Nightfall #5023K-19
1. Hammered.
- D. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.
- E. Wall Brackets:
1. Bracket Type: 54 inches (1372 mm) continuous aluminum brackets with theft resistant barrel nuts and shoulder screws.
 2. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
- F. Door Hardware:
1. 8 inch (203mm) aluminum wrap-around hinge.
 - a. Hinges: Hinges shall be 8 inches (203mm) and fabricated from heavy-duty extruded aluminum (6463-T5 alloy) with a bright dip anodized finish with wrap-around flanges, surface mounted and through bolted to doors and pilasters. Hinges operate and are field set with adjustable nylon cams. Cams can be set in 30 degree increments.
 - b. Latch: Anodized extruded aluminum, with housing, slide bolt and button.
 2. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a bright dip anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - a. Style: 6 inches (152 mm) aluminum.
 3. Stainless Steel Paddle Latch and Housing: Heavy-duty stainless-steel type 304. Bright finish.
 4. Doors supplied with one coat hook/bumper and door pull made of chrome plated Zamac.
 5. Equip outswing handicapped doors with second door pull and door stop.

2.4 PRIVACY SCREENS

- A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.
- B. Panels, and pilasters, if required, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 14 inches (356 mm) above the finished floor. Color as selected by Architect from manufacturer's full line of current colors.
 - 1. Aluminum heat sink fastened to bottom edges.
 - 2. Recycled content: Minimum 25 percent.
- C. Screen Type: Wall mounted.
 - 1. Urinal Screens: 18 inches (610 mm) wide by 55 inches (1397 mm) high.
- D. Wall Brackets: Provide aluminum continuous brackets. Fastened to the panel/pilaster with stainless steel tamper resistant torx head screws and fastened to wall with stainless steel tamper resistant torx head sex bolts.
 - 1. Length of Wall Brackets: 54 inches (1327 mm).
 - 2. Bracket Color: Grey.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.
- C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 102100

SECTION 102800 - TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes toilet and bath accessories in accordance with the Contract Documents. The Work of this Section shall include but not be limited to the following:
 - 1. Surface, partition and recessed mounted toilet and bath accessories indicated on the Drawings and Schedules.
- B. Related Sections:
 - 1. Section 102100 - Toilet Compartments.

1.02 SUBMITTALS

- A. Product Data: Provide product data for each toilet accessory item specified, including details of construction relative to materials, dimensions, gauges, profiles, method of mounting, specified options and finishes.
- B. Schedule: Indicating types, quantities, sizes and installation locations (by room) for each toilet and bath accessory item to be provided for the Project.
- C. Setting Drawings: Where cutouts are required in other work, provide substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

1.03 WORK INCLUDED

- A. Toilet Room Accessories.

1.04 REFERENCES (including but not limited to)

- A. ICC/ANSI A117.1 – 2003 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. IBC – Chapter 11, Accessibility
- C. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

1.05 QUALITY ASSURANCE

A. Manufacturers:

1. Model numbers for toilet room accessories manufactured by Bobrick Washroom Equipment, Inc. are listed to establish a standard of quality for design, function, materials, workmanship and appearance. The following manufacturers may be submitted for evaluation by the architect by following the conditions of the substitution clause. Unless approval is obtained, all bids shall be based on the standard of quality. The architect shall be sole judge as to the acceptability of all products submitted for substitution.

- a. Bobrick Washroom Equipment, Inc.
- b. American Specialties, Inc.
- c. Bradley

2. Accessories shall be the products of a single manufacturer. Accessories with tumbler locks shall be keyed alike with the exception of coin boxes in vending equipment.

3. Regulatory Requirements

Operation of accessories shall comply with guidelines set forth by the American Disabilities Act, Title III. Documentation and samples to be provided to architect upon request.

1.06 SUBMITTALS

A. Comply with requirement of Section regarding submittals.

B. Manufacturer's Data

1. Provide required number copies of:

- a. Product data sheets.
- b. Installation instructions.
- c. Service parts manual.

C. Samples

1. Upon request submit one sample of each item specified. If more than one manufacturer is specified, submit one sample of each item for architect's review.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent physical damage or wetting.

C. Handle so as to prevent damage to accessories.

1.08 WARRANTY

- A. Furnish one-year guarantee against defects in material and workmanship on all accessories. In addition, to the above the following shall apply:
 - 1. Welded stainless steel framed mirrors shall have a fifteen-year guarantee against silver spoilage.

PART 2 - PRODUCTS

2.01 TOILET ROOM ACCESSORY SCHEDULE

- A. General: Provide the following toilet and bath accessories in the locations indicated on the Drawings and Schedules.

2.02 MATERIALS

- A. All cabinets shall be constructed on 18-8, type-304 stainless steel.
- B. All waste receptacles shall be constructed of 18-8, type-304 stainless steel or rigid molded leak-proof plastic.
- C. Waste receptacles or cabinets manufactured of type-400 stainless steel are not acceptable.
- D. All lumber locks to be fastened to accessories with lock nuts. Fastening locks units with spring clips is not acceptable.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Check wall open for dimensions, plumbness of blocking or frames that would affect installation of recessed accessories. For surface mounted accessories check condition of wall and confirm installation of backing within wall.
- B. Verify spacing of plumbing fixtures and toilet compartments that affect installation of toilet room accessories.

3.02 INSTALLATION

- A. Install accessories at locations and heights indicated, straight, plumb and level and in accordance with manufacturer's installation instructions.
- B. Install items with non-corrosive anchoring devices.

- C. Installation methods shall conform to manufacturers recommendations for backing and proper support.
- D. Conceal evidence of drilling, cutting and fitting to room finish.
- E. Fit flanges of accessories snugly to wall surfaces.

3.03 ADJUSTMENT AND CLEANING

- A. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.
- B. Adjust accessories for proper operation. Test mechanisms, hinges, locks and latches and where necessary adjust and lubricate.
- C. Clean and polish exposed surfaces prior to final installation.
- D. Deliver accessories schedule, keys and parts manual as part of project closeout documents. For owner's permanent records, provide two (2) sets of the following items of manufacturer's literature:
 - 1. Technical data sheets of each item used for the project.
 - 2. Service and parts manual.
 - 3. Name of local representative to be contacted in the event of need of field service or consultation.

END OF SECTION 102800

SECTION 220000 - PLUMBING SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 22, and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered under Plumbing contract.
 - 2. Work under other contracts.
 - 3. Use of premises.
 - 4. Owner's occupancy requirements.
 - 5. Specification formats and conventions.

- B. Related Sections include the following:

- 1. Division 22 Sections.

1.3 WORK COVERED UNDER PLUMBING CONTRACT

- A. Provide all labor, materials, tools, machinery, equipment, and services necessary to complete the plumbing work under this contract. All systems and equipment shall be complete in every respect and all items of material, equipment, and labor shall be provided for a fully operational system. Coordinate the work with work of other trades so as to resolve conflicts without impeding job progress. The plumbing work includes the following:

- B. The plumbing contractor shall furnish all labor, materials, equipment, rigging, appliances, tools and accessories required for providing, installing, connecting and testing the new plumbing system, associated work, controls etc., in accordance with these specifications and the applicable drawings. The work includes:

- 1. Furnish and install new domestic hot water heater as indicated on plumbing drawings complete with concrete pad, hot and cold-water piping, drain piping, valves, gauges, insulation, electricals, controls, gas piping, circulator pump, supports, identification tags, for a complete operating system.
- 2. Furnish and install hot and cold domestic water piping with domestic hot water return piping.
- 3. Furnish and install new drain, waste, and vent pipes and floor drains. Coordinate all slopes and inverts.
- 4. Furnish and install new storm and emergency overflow storm piping. Coordinate all slopes and inverts.
- 5. Furnish and install new plumbing fixtures, valves, strainers, cleanouts, accessories, etc. as specified on the drawings and in the specifications.

6. Provide new gas lines to all gas fired HV/HVAC equipment, water heaters, kitchen equipment, etc. as called out on the drawings. Coordinate installation with local gas company. Contractor to arrange with local gas company to upgrade existing gas service to the building. Pay for all permits and fees.
7. Provide insulation for all domestic cold water, domestic hot water, domestic hot water return, storm piping, and roof drain pans. Insulation shall be continuous for the entire length of the pipe and provided with high density insulation at hangers and supports with shields at hangers.
8. Provide identification tags for all piping.
9. Provide proper piping supports, hangers, anchors, spring isolation hangers, etc.
10. Provide proper slope to all piping as per National Standard Plumbing Code and other applicable codes.
11. Pressure test all piping for any leakage. Provide pressure test reports (six (6) copies) to the Owner/Architect for review.
12. Paint all non-insulated piping. New exterior gas piping shall be painted yellow (1 primer coat, 2 finish coats).
13. Provide backflow preventers, shut-off valves, pressure reducing valves, relief valves, etc. for cold water piping connections to heating equipment as per local building codes.
14. Provide gas pressure regulators for all appliances and heating equipment connected to gas piping.

1.4 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 USE OF PREMISES

- A. General: Each Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
- B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
 2. Driveways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction.
- B. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- C. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 - 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for

clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.8 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 220000

SECTION 220501 - BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Mechanical demolition.
 - 9. Equipment installation requirements common to equipment sections.
 - 10. Painting and finishing.
 - 11. Concrete bases.
 - 12. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Manufacturers:
 - a. Eclipse, Inc.
 - b. Epco Sales, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Industries, Inc.; Wilkins Div.
 - e. Or Approved Equal
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Epco Sales, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Or Approved Equal
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Manufacturers:
 - a. Calpico, Inc.
 - b. Pipeline Seal and Insulator, Inc.
 - c. Or Approved Equal
 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
 - 1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
 - c. Or Approved Equal
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
 - 1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Or Approved Equal

2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - e. Or Approved Equal
 - 2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel or Stainless steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece/Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- D. One-Piece/Split-Plate, Stamped-Steel Type: With concealed or exposed-rivet hinge, set screw or spring clips, and chrome-plated finish.
- E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

- F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.8 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.

- b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type or One-piece, stamped steel type.
 - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- N. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- O. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- P. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified.
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

7. Use 4000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.9 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout around anchors.
- G. Cure placed grout.

END OF SECTION 220501

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Stack-sleeve fittings.
 - 3. Sleeve-seal systems.
 - 4. Sleeve-seal fittings.
 - 5. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends. PVC sleeves in first paragraph below may be prohibited by fire authorities having jurisdiction.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms. PVC sleeves in paragraph below may be prohibited by fire authorities having jurisdiction.
- G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

- A. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

B. Underdeck Clamp: Clamping ring with setscrews.
2.3 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
- B. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Stainless steel.
- D. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 – EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
- C. Sleeves are not required for core-drilled holes.
- D. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
- E. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
- F. Cut sleeves to length for mounting flush with both surfaces.
- G. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

- H. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- I. Install sleeves for pipes passing through interior partitions.
- J. Cut sleeves to length for mounting flush with both surfaces.
- K. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
- L. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."
- M. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
- B. Install fittings that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
- C. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
- D. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
- E. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
- F. Using grout, seal the space around outside of stack-sleeve fittings.
- G. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
- B. Exterior Concrete Walls above Grade:
 - 1. Piping Smaller Than NPS 6: Cast-iron wall sleeves
 - 2. Piping NPS 6 and Larger: Cast-iron wall sleeves.
- C. Exterior Concrete Walls below Grade:
 - 1. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system
 - 2. Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Piping NPS 6 and Larger: Cast-iron wall sleeves with sleeve-seal system.
 - 4. Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
- D. Concrete Slabs-on-Grade:
 - 1. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
 - 2. Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Piping NPS 6 and Larger: Cast-iron wall sleeves with sleeve-seal system.
 - 4. Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
- E. Concrete Slabs above Grade:
 - 1. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - 2. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
- F. Interior Partitions:
 - 1. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - 2. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 220517

SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.
- E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

C. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
2. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
3. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
4. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
5. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
6. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
7. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
8. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
9. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
10. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
11. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.

D. Install floor plates for piping penetrations of equipment-room floors.

E. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 220518

SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Bimetallic-actuated thermometers.
2. Liquid-in-glass thermometers.
3. Thermowells.
4. Dial-type pressure gages.
5. Gage attachments.
6. Test plugs.

- B. Related Sections:

1. Section 221116 "Domestic Water Piping" for water meters inside the building.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of meter and gage, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 BIMETALLIC-ACTUATED THERMOMETERS

- A. Manufacturers:

1. Palmer Wahl Instruments Inc.
2. H.O. Trerice Co.

3. Weiss Instruments, Inc.
 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 5. Or Approved Equal.
- B. Standard: ASME B40.200.
- C. Case: Liquid-filled and sealed type(s); stainless steel with 5-inch nominal diameter.
- D. Dial: Nonreflective aluminum with permanently etched scale markings and scales in deg. F.
- E. Connector Type(s): Union joint, adjustable angle or rigid, with unified-inch screw threads.
- F. Connector Size: 1/2 inch with ASME B1.1 screw threads.
- G. Stem: 0.25 or 0.375 inch in diameter; stainless steel.
- H. Window: Plain glass.
- I. Ring: Stainless steel.
- J. Element: Bimetal coil.
- K. Pointer: Dark-colored metal.
- L. Accuracy: Plus or minus 1 percent of scale range.

2.2 LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers:
1. Palmer Wahl Instruments Inc.
 2. H.O. Trerice Co.
 3. Weiss Instruments, Inc.
 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 5. Or Approved Equal.
- B. Metal-Case, Compact-Style, Liquid-in-Glass Thermometers:
1. Standard: ASME B40.200.
 2. Case: Cast aluminum, 6-inch nominal size.
 3. Case Form: Back angle or Straight unless otherwise indicated.
 4. Tube: Glass with magnifying lens and blue [or red] organic liquid.
 5. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg. F.
 6. Window: Glass or plastic.
 7. Stem: Aluminum or brass and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
 8. Connector: 3/4 inch, with ASME B1.1 screw threads.
 9. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.
- C. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:

1. Standard: ASME B40.200.
2. Case: Cast aluminum, 9-inch (229-mm) nominal size unless otherwise indicated.
3. Case Form: Adjustable angle, Back angle or Straight unless otherwise indicated.
4. Tube: Glass with magnifying lens and blue or red organic liquid.
5. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg. F.
6. Window: Glass.
7. Stem: Aluminum and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
8. Connector: 1-1/4 inches, with ASME B1.1 screw threads.
9. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.3 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: [CNR] [or] [CUNI] <Insert material>.
4. Material for Use with Steel Piping: [CRES] [CSA] <Insert material>.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, (DN 15, DN 20, or NPS 25,) ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch (13, 19, and 25 mm), with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.4 PRESSURE GAGES

A. Manufacturers:

1. Palmer Wahl Instruments Inc.
2. H.O. Trerice Co.
3. Weiss Instruments, Inc.
4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
5. Or Approved Equal.

B. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Standard: ASME B40.100.
2. Case: [Liquid-filled] [Sealed] [Open-front, pressure relief] [Solid-front, pressure relief] type(s); cast aluminum; 4-1/2-inch nominal diameter.
3. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.

4. Pressure Connection: Brass, with [NPS 1/4 (DN 8)] [NPS 1/4 or NPS 1/2 (DN 8 or DN 15)] [NPS 1/2 (DN 15)], ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
5. Movement: Mechanical, with link to pressure element and connection to pointer.
6. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
7. Pointer: Dark-colored metal.
8. Window: Glass.
9. Ring: Stainless steel.
10. Accuracy: Grade A, plus or minus 1 percent of middle half of.

C. Remote-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Standard: ASME B40.100.
2. Case: Liquid-filled, Sealed type; cast aluminum; 4-1/2-inch nominal diameter with [back] [front] flange and holes for panel mounting.
3. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
4. Pressure Connection: Brass, with [NPS 1/4 (DN 8)] [NPS 1/4 or NPS 1/2 (DN 8 or DN 15)] [NPS 1/2 (DN 15)], ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
5. Movement: Mechanical, with link to pressure element and connection to pointer.
6. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
7. Pointer: Dark-colored metal.
8. Window: Glass.
9. Ring: Stainless steel.
10. Accuracy: Grade A, plus or minus 1 percent of middle half of.

2.5 GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with [NPS 1/4 (DN 8)] [NPS 1/4 or NPS 1/2 (DN 8 or DN 15)] [NPS 1/2 (DN 15)], ASME B1.20.1 pipe threads and [piston] [porous-metal]-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass or stainless-steel needle, with [NPS 1/4 (DN 8)] [NPS 1/4 or NPS 1/2 (DN 8 or DN 15)] [NPS 1/2 (DN 15)], ASME B1.20.1 pipe threads.

2.6 TEST PLUGS

- A. Description: Test-station fitting made for insertion into piping tee fitting.
- B. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- C. Thread Size: [NPS 1/4 (DN 8)] [or] [NPS 1/2 (DN 15)], ASME B1.20.1 pipe thread.
- D. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- E. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermowells with socket extending [a minimum of 2 inches into fluid and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.
- G. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- H. Install remote-mounted pressure gages on panel.
- I. Install valve and snubber in piping for each pressure gage for fluids.
- J. Install test plugs in piping tees.
- K. Install thermometers in the following locations:
 - 1. Inlet and outlet of each water heater.
- L. Install pressure gages in the following locations:
 - 1. Suction and discharge of each domestic water pump.

3.2 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

3.3 ADJUSTING

- A. Adjust faces of meters and gages to proper angle for best visibility.

3.4 THERMOMETER SCHEDULE

- A. Thermometers at inlet and outlet of each domestic water heater shall be one of the following:

1. Liquid-filled or Sealed, bimetallic-actuated type.
2. Industrial]-style, liquid-in-glass type.
3. Test plug with chlorosulfonated polyethylene synthetic or EPDM self-sealing rubber inserts.

B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

A. Scale Range for Domestic Cold-Water Piping: 0 to 100 deg F.

B. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F.

C. Pressure gages at inlet and outlet of each water pressure-reducing valve shall be one of the following:

1. Liquid-filled, Sealed, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic or EPDM self-sealing rubber inserts.

D. Pressure gages at suction and discharge of each domestic water pump shall be one of the following:

1. Liquid-filled, Sealed, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic or EPDM self-sealing rubber inserts.

3.6 PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range for Water Service Piping: 0 to 200 psi.

B. Scale Range for Domestic Water Piping: 0 to 200 psi.

END OF SECTION 220519

SECTION 220523 - PLUMBING VALVES

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 general-duty valves (Lead Free Type):
 - 1. Copper-alloy ball valves.
 - 2. Ferrous-alloy ball valves.
 - 3. Bronze check valves.
 - 4. Ferrous-alloy wafer check valves.
 - 5. Spring-loaded, lift-disc check valves.
 - 6. Bronze globe valves.
- B. Related Sections include the following:
 - 1. Division 22 Section for valve tags and charts.
 - 2. Division 22 piping Sections for specialty valves applicable to those Sections only.
- C. All valves and fittings for potable water system shall be lead-free type in compliance with requirements of NSF/ANSI Standard 61.

1.3 DEFINITIONS

- A. The following are standard abbreviations for valves:
 - 1. CWP: Cold working pressure.
 - 2. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 3. NBR: Acrylonitrile-butadiene rubber.
 - 4. PTFE: Polytetrafluoroethylene plastic.
 - 5. SWP: Steam working pressure.
 - 6. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

- A. ASME Compliance: ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.
 - 1. Exceptions: Domestic hot- and cold-water piping valves unless referenced.
- B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use hand-wheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.

- B. Bronze/Brass Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.
- C. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.
- D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- F. Valve Actuators:
 - 1. Chain wheel: For attachment to valves, of size and mounting height, as indicated in the "Valve Installation" Article in Part 3.
 - 2. Gear Drive: For quarter-turn valves NPS 8 (DN 200) and larger.
 - 3. Hand wheel: For valves other than quarter-turn types.
 - 4. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.
 - 5. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug head.
- G. Extended Valve Stems: On insulated valves.
- H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.
- I. Valve Bypass and Drain Connections: MSS SP-45.

2.3 COPPER-ALLOY BALL VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. One-Piece, Copper-Alloy Ball Valves:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Grinnell Corporation.
 - d. Kitz Corporation of America.
 - e. Legend Valve & Fitting, Inc.
 - f. NIBCO INC.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Or Approved Equal.
- C. Copper-Alloy Ball Valves, General: MSS SP-110, full port type.
- D. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats, full port type.

2.4 FERROUS-ALLOY BALL VALVES

- A. Available Manufacturers:

B. Manufacturers:

1. American Valve, Inc.
2. Conbraco Industries, Inc.; Apollo Div.
3. Cooper Cameron Corp.; Cooper Cameron Valves Div.
4. Flow-Tek, Inc.
5. Hammond Valve.
6. Kitz Corporation of America.
7. KTM Products, Inc.
8. Milwaukee Valve Company.
9. NIBCO INC.
10. Richards Industries; Marwin Ball Valves.
11. Or Approved Equal.

C. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flanged ends, full port.

D. Ferrous-Alloy Ball Valves: Class 150, full port.

2.5 BRONZE CHECK VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 1, Bronze, Horizontal Lift Check Valves with Metal Disc:
 - a. Cincinnati Valve Co.
 - b. Red-White Valve Corp.
 - c. Walworth Co.
 - d. Or Approved Equal.
2. Type 1, Bronze, Vertical Lift Check Valves with Metal Disc:
 - a. Cincinnati Valve Co.
 - b. Red-White Valve Corp.
 - c. NIBCO INC.
 - d. Or Approved Equal.
3. Type 3, Bronze, Swing Check Valves with Metal Disc:
 - a. American Valve, Inc.
 - b. Cincinnati Valve Co.
 - c. Grinnell Corporation.
 - d. Hammond Valve.
 - e. Kitz Corporation of America.
 - f. Legend Valve & Fitting, Inc.
 - g. Milwaukee Valve Company.
 - h. NIBCO INC.
 - i. Powell, Wm. Co.
 - j. Red-White Valve Corp.
 - k. Walworth Co.
 - l. Watts Industries, Inc.; Water Products Div.
 - m. Or Approved Equal.

C. Bronze Check Valves, General: MSS SP-80.

D. Type 1, Class 150, Bronze, Horizontal Lift Check Valves: Bronze body with bronze disc and seat.

- E. Type 1, Class 150, Bronze, Vertical Lift Check Valves: Bronze body with bronze disc and seat.
- F. Type 3, Class 150, Bronze, Swing Check Valves: Bronze body with bronze disc and seat.

2.6 FERROUS-ALLOY WAFER CHECK VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. Dual-Plate, Ferrous-Alloy, Wafer-Lug Check Valves:
 - a. Gulf Valve Co.
 - b. Valve and Primer Corp.
 - c. NIBCO INC.
 - d. Or Approved Equal.
 - 2. Dual-Plate, Ferrous-Alloy, Double-Flanged-Type Check Valves:
 - a. Gulf Valve Co.
 - b. Techno Corp.
 - c. NIBCO INC.
 - d. Or Approved Equal.
- C. Ferrous-Alloy Wafer Check Valves, General: API 594, spring loaded.
- D. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

2.7 SPRING-LOADED, LIFT-DISC CHECK VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. Type I, Wafer Lift-Disc Check Valves:
 - a. Mueller Steam Specialty. NIBCO INC.
 - b. Or Approved Equal.
 - 2. Type II, Compact-Wafer, Lift-Disc Check Valves:
 - a. Durabla Fluid Technology, Inc.
 - b. Flomatic Valves.
 - c. Grinnell Corporation.
 - d. Metraflex Co.
 - e. Milwaukee Valve Company.
 - f. Mueller Steam Specialty.
 - g. NIBCO INC.
 - h. Or Approved Equal.
 - 3. Type III, Globe Lift-Disc Check Valves:
 - a. Durabla Fluid Technology, Inc.
 - b. GA Industries, Inc.
 - c. Grinnell Corporation.
 - d. Metraflex Co.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.

- g. Or Approved Equal.
- 4. Type IV, Threaded Lift-Disc Check Valves:
 - a. Check-All Valve Mfg. Co.
 - b. Durabla Fluid Technology, Inc.
 - c. Grinnell Corporation.
 - d. Legend Valve & Fitting, Inc.
 - e. Metraflex Co.
 - f. Milwaukee Valve Company.
 - g. Mueller Steam Specialty.
 - h. NIBCO INC.
 - i. Watts Industries, Inc.; Water Products Div.
 - j. Or Approved Equal.
- C. Lift-Disc Check Valves, General: FCI 74-1, with spring-loaded bronze or alloy disc and bronze or alloy seat.
- D. Type I, Class 125, Wafer Lift-Disc Check Valves: Wafer style with cast-iron shell with diameter matching companion flanges.
- E. Type II, Class 125, Compact-Wafer, Lift-Disc Check Valves: Compact-wafer style with cast-iron shell with diameter made to fit within bolt circle.
- F. Type III, Class 125, Globe Lift-Disc Check Valves: Globe style with cast-iron shell and flanged ends.
- G. Type IV, Class 125, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

2.8 BRONZE GLOBE VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. Type 1, Bronze Globe Valves with Metal Disc:
 - a. Cincinnati Valve Co.
 - b. Grinnell Corporation.
 - c. Hammond Valve.
 - d. Kitz Corporation of America.
 - e. Legend Valve & Fitting, Inc.
 - f. Milwaukee Valve Company.
 - g. NIBCO INC.
 - h. Powell, Wm. Co.
 - i. Red-White Valve Corp.
 - j. Walworth Co.
 - k. Or Approved Equal.
 - 2. Type 2, Bronze Globe Valves with Nonmetallic Disc:
 - a. Cincinnati Valve Co.
 - b. Grinnell Corporation.
 - c. Hammond Valve.
 - d. Kitz Corporation of America.
 - e. McWane, Inc.; Kennedy Valve Div.
 - f. Milwaukee Valve Company.

- g. NIBCO INC.
 - h. Powell, Wm. Co.
 - i. Red-White Valve Corp.
 - j. Walworth Co.
 - k. Or Approved Equal.
3. Type 3, Bronze Globe Valves with Renewable Seat and Metal Disc:
- a. Cincinnati Valve Co.
 - b. Grinnell Corporation.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Walworth Co.
 - g. Or Approved Equal.
- C. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy hand wheel.
- D. Type 1, Class 150, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.
- E. Type 3, Class 150, Bronze Globe Valves: Bronze body with bronze disc and renewable seat. Include union-ring bonnet.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves.
 2. Throttling Service: Ball or globe valves.
 3. Pump Discharge: Spring-loaded, lift-disc check valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Heating Water Piping: Use the following types of valves:
1. Ball Valves, NPS 2 (DN 50) and Smaller: One or Two-piece, CWP rating, copper alloy.
 2. Ball Valves, NPS 2-1/2 (DN 65) and Larger: Class 150, ferrous alloy.
 3. Lift Check Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, horizontal / vertical, bronze.
 4. Swing Check Valves, NPS 2 (DN 50) and Smaller: Type 4, Class 150, bronze.
 5. Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class 125, gray iron.
 6. Wafer Check Valves, NPS 2-1/2 (DN 65) and Larger: Single / Dual-plate, wafer-lug/ double-flanged, Class 150, ferrous alloy.
 7. Spring-Loaded, Lift-Disc Check Valves, NPS 2 (DN 50) and Smaller: Type IV, Class 150.
 8. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 (DN 65) and Larger: Class 125, cast iron.
 9. Globe Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, bronze.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.
- F. Install check valves for proper direction of flow and as follows:
 1. Swing Check Valves: In horizontal position with hinge pin level.
 2. Dual-Plate Check Valves: In horizontal or vertical position, between flanges.
 3. Lift Check Valves: With stem upright and plumb.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 22 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fiberglass pipe hangers.
4. Metal framing systems.
5. Fiberglass strut systems.
6. Thermal-hanger shield inserts.
7. Fastener systems.
8. Pipe stands.
9. Equipment supports.

- B. Related Sections:

1. Section 220548 "Vibration and Seismic Controls" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 3. Design seismic-restraint hangers and supports for piping and equipment.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Fiberglass pipe hangers.
3. Thermal-hanger shield inserts.
4. Powder-actuated fastener systems.
5. Pipe positioning systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Fiberglass strut systems. Include Product Data for components.
4. Pipe stands. Include Product Data for components.
5. Equipment supports.
6. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
5. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Manufacturers' catalogs indicate that copper pipe hangers are small, typically NPS 4 (DN 100) or smaller, and types available are limited.
2. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or [ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless-] steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Single-Pipe Stand:
 - 1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 2. Base: Stainless steel.
 - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

5. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon steel shapes.

2.7 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Non-staining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
- C. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
- D. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- E. Metal framing system in first paragraph below requires calculating and detailing at each use.
- F. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- G. Fiberglass strut system in first paragraph below requires calculating and detailing at each use.
- H. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- I. Fastener System Installation:
 1. Verify suitability of fasteners in two subparagraphs below for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick.
 2. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use

- operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
3. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- J. Pipe stand in first paragraph below requires calculating and detailing at each use.
- K. Pipe Stand Installation:
1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb.
 3. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- L. Equipment support in first paragraph below requires calculating and detailing at each use.
- M. Equipment Support Installation:
1. Fabricate from welded-structural-steel shapes.
 2. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
 3. Install lateral bracing with pipe hangers and supports to prevent swaying.
 4. Install building attachments within concrete slabs or attach to structural steel.
 5. Install additional attachments at concentrated loads, including valves, flanges, and strainers, [NPS 2-1/2 (DN 65)] <Insert size> and larger and at changes in direction of piping.
 6. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- N. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- P. Insulated Piping:
1. Attach clamps and spacers to piping.
 2. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 3. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 4. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 5. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated.
 6. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 7. High-compressive-strength inserts may permit use of shorter shields or shields with less arc span. Revise first subparagraph below to suit Project.
 8. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

Q. Shield Dimensions for Pipe: Not less than the following:

1. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
2. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
3. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
4. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
5. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

R. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.

S. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

B. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

C. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099123 "Interior Painting".

D. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.5 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F (566 deg C), pipes NPS 4 to NPS 24 (DN 100 to DN 600), requiring up to 4 inches (100 mm) of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated, stationary pipes NPS 3/4 to NPS 8 (DN 20 to DN 200).
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
 8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of non-insulated, stationary pipes NPS 3/8 to NPS 8 (DN 10 to DN 200).
 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated, stationary pipes NPS 3/8 to NPS 3 (DN 10 to DN 80).
 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.

16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 (DN 65 to DN 900) if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 (DN 50 to DN 600) if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 (DN 50 to DN 750) if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.

9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb (340 kg).
 - b. Medium (MSS Type 32): 1500 lb (680 kg).
 - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and, if necessary, to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 220529

SECTION 220548 - VIBRATION AND SEISMIC CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Restrained spring isolators.
 - 2. Housed spring mounts.
 - 3. Spring hangers.
 - 4. Spring hangers with vertical-limit stops.
 - 5. Thrust limits.
 - 6. Pipe riser resilient supports.
 - 7. Restraining cables.

- B. Definitions:
 - 1. A_v : Effective peak velocity related acceleration coefficient.

1.2 SUBMITTALS

- A. Product Data: Include load deflection curves for each vibration isolation device indicated.

- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
 - 3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
 - 4. Seismic-Restraint Details: Detail fabrication and attachment of seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.
 - 5. Details for Interlocking Snubbers: Include load deflection curves up to 1/2-inch deflection in x, y, and z planes.

1.3 QUALITY ASSURANCE

- A. Seismic-restraint devices shall have horizontal and vertical load testing and analysis performed according to agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing

are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a registered professional engineer.

Testing and calculations must include both shear and tensile loads and 1 test or analysis at 45 degrees to the weakest mode.

- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VIBRATION ISOLATORS

- A. Available Manufacturers:
 - 1. Ace Mounting Co., Inc.
 - 2. Amber/Booth Company, Inc.
 - 3. B-Line Systems, Inc.
 - 4. California Dynamics Corp.
 - 5. Isolation Technology, Inc.
 - 6. Kinetics Noise Control, Inc.
 - 7. Mason Industries, Inc.
 - 8. Vibration Eliminator Co., Inc.
 - 9. Vibration Isolation Co., Inc.
 - 10. Vibration Mountings & Controls/Korfund.
 - 11. Or Approved Equal.
- B. Restrained Elastomeric Mounts: All-directional elastomeric mountings with seismic restraint.
 - 1. Materials: Cast-ductile-iron housing containing two separate and opposing, molded, bridge-bearing neoprene elements that prevent central threaded sleeve and attachment bolt from contacting the casting during normal operation.
 - 2. Neoprene: Shock-absorbing materials compounded as defined by AASHTO.
- C. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
 - 1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 2. Minimum Additional Travel: 50 percent of the required deflection at rated load.

3. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 100 psig.
 6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
- D. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
- E. Housed Spring Mounts: Housed spring isolator with integral seismic snubbers.
1. Housing: Ductile-iron or steel housing to provide all-directional seismic restraint.
 2. Base: Factory drilled for bolting to structure.
 3. Snubbers: Vertically adjustable to allow a maximum of 1/4-inch travel before contacting a resilient collar.
- F. Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.
- G. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 deg rees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
- H. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
- I. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression and with a load stop. Include rod and angle-iron brackets for attaching to equipment.
1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.
- J. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of 1/2-inch- thick, 60-durometer neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.
- K. Resilient Pipe Guides: Telescopic arrangement of 2 steel tubes separated by a minimum of 1/2-inch- thick, 60-durometer neoprene. Factory set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction. Shear pin shall be removable and re-insertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.3 SEISMIC-RESTRAINT DEVICES

A. Available Manufacturers:

1. Amber/Booth Company, Inc.
2. B-Line Systems, Inc.
3. California Dynamics Corp.
4. Kinetics Noise Control, Inc.
5. Loos & Co., Inc.; Cableware Technology Division.
6. Mason Industries, Inc.
7. TOLCO Incorporated.
8. Unistrut Diversified Products Co.; Wayne Manufacturing Division.
9. Vibration Eliminator Co., Inc.
10. Vibration Isolation Co., Inc.
11. Vibration Mountings & Controls/Korfund.

12. Or Approved Equal.

- B. Resilient Isolation Washers and Bushings: 1-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer of 40, plus or minus 5, with a flat washer face.
- C. Seismic Snubbers: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
 - 1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
 - 2. Resilient Isolation Washers and Bushings: 1-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer of 40, plus or minus 5.
- D. Restraining Cables: Galvanized steel aircraft cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
- E. Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488/E 488M.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thrust limits at centerline of thrust, symmetrical on either side of equipment.
- B. Install seismic snubbers on isolated equipment. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
- C. Install restraining cables at each trapeze and individual pipe hanger. At trapeze anchor locations, shackle piping to trapeze. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.
- D. Install steel angles or channel, sized to prevent buckling, clamped with ductile-iron clamps to hanger rods for trapeze and individual pipe hangers. At trapeze anchor locations, shackle piping to trapeze. Requirements apply equally to hanging equipment. Do not weld angles to rods.
- E. Install resilient bolt isolation washers on equipment anchor bolts.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Inspect isolator seismic-restraint clearance.
 - 2. Test isolator deflection.
 - 3. Inspect minimum snubber clearances.
- B. Provide certification report to A/E.

3.3 ADJUSTING

- A. Adjust isolators after piping systems have been filled and equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.
- D. Adjust air spring leveling mechanism.
- E. Adjust active height of spring isolators.
- F. Adjust snubbers according to manufacturer's written recommendations.
- G. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- H. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.

END OF SECTION 220548

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:
 - 1. Equipment nameplates
 - 2. Equipment markers
 - 3. Equipment signs
 - 4. Access panel and door markers
 - 5. Valve tags
 - 6. Pipe Markers

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.
- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
 - 1. Terminology: Match schedules as closely as possible.
 - 2. Data:
 - a. Name and plan number
 - b. Equipment service
 - c. Design capacity

- d. Other design parameters such as pressure drop, entering and leaving conditions, and speed
- 3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.
- C. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Data: Instructions for operation of equipment and for safety procedures.
 - 2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
 - 3. Thickness: 1/8 inch, unless otherwise indicated.
 - 4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- D. Access Panel and Door Markers: 1/16-inch thick, engraved laminated plastic, with abbreviated terms and numbers corresponding to identification. Provide 1/8-inch center hole for attachment.
 - 1. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 - 3. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 - 4. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pre-tensioned Pipe Markers: Pre-coiled semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Shaped Pipe Markers: Preformed semi-rigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme. Provide 5/32-inch hole for fastener.
 - 1. Material: 0.032 inch-thick brass/aluminum
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 22 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
 - 1. Fuel-burning units, including boilers, furnaces, heaters
 - 2. Pumps and similar motor-driven units.
 - 3. Fans.
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
 - 1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 - 3. Locate markers where accessible and visible.
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Meters, gages, thermometers, and similar units.
 - c. Fuel-burning units, including boilers, furnaces, heaters.
 - d. Pumps and similar motor-driven units.
 - e. Fans.
- C. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
 - 1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering

- for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.

D. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.

1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pre-tensioned pipe markers. Use size to ensure a tight fit.
2. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 3/4 inch wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
3. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
4. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.

B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non-concealed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and non-accessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:

1. Valve-Tag Size and Shape:
 - a. Domestic Water: 1-1/2 inches, round/square
 - b. Gas: 1-1/2 inches, round/square

3.5 ADJUSTING AND CLEANING

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.
- B. Clean faces of mechanical identification devices.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes mechanical insulation for duct, equipment, and pipe, including the following:
 - 1. Insulation Materials:
 - a. Cellular glass.
 - b. Mineral fiber.
 - c. Polystyrene.
 - 2. Fire-rated insulation systems.
 - 3. Adhesives.
 - 4. Mastics.
 - 5. Lagging adhesives.
 - 6. Sealants.
 - 7. Field-applied jackets.
 - 8. Tapes.
 - 9. Securements.
 - 10. Corner angles.

1.3 DEFINITIONS

- A. ASJ: All-service jacket.
- B. FSK: Foil, scrim, kraft paper.
- C. FSP: Foil, scrim, polyethylene.
- D. PVDC: Polyvinylidene chloride.
- E. SSL: Self-sealing lap.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. Shop Drawings: Show details for the following:

1. Application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 2. Attachment and covering of heat tracing inside insulation.
 3. Insulation application at pipe expansion joints for each type of insulation.
 4. Insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 5. Removable insulation at piping specialties, equipment connections, and access panels.
 6. Application of field-applied jackets.
 7. Application at linkages of control devices.
 8. Field application for each equipment type.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2 (DN 50).
 2. Sheet Form Insulation Materials: 12 inches square.
 3. Jacket Materials for Pipe: 12 inches long by NPS 2 (DN 50).
 4. Sheet Jacket Materials: 12 inches square.
 5. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.
- D. Installer Certificates: Signed by Contractor certifying that installers comply with requirements.
- E. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- F. Field quality-control inspection reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 3. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSULATION MATERIALS

- A. Refer to Part 3 schedule articles for requirements about where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.
1. Products:
 - a. Cell-U-Foam Corporation; Ultra-CUF.
 - b. Pittsburgh Corning Corporation; Foamglas Super K.
 - c. Or Approved Equal.
 2. Block Insulation: ASTM C 552, Type I.
 3. Special-Shaped Insulation: ASTM C 552, Type III.
 4. Board Insulation: ASTM C 552, Type IV.
 5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
 6. Preformed Pipe Insulation with Factory-Applied [ASJ] [ASJ-SSL]: Comply with ASTM C 552, Type II, Class 2.
 7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Mineral-Fiber, Preformed Pipe Insulation:
1. Products:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000° Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - f. Or Approved Equal.
 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.
- H. Mineral-Fiber, Pipe Insulation Wicking System: Preformed pipe insulation complying with ASTM C 547, Type I, Grade A, with absorbent cloth factory applied to the entire inside surface of preformed pipe insulation and extended through the longitudinal joint to outside surface of insulation under insulation jacket. Factory apply a white, polymer, vapor-retarder jacket with self-sealing adhesive tape seam and evaporation holes running continuously along the longitudinal seam, exposing the absorbent cloth.
1. Products:
 - a. Knauf Insulation; Permawick Pipe Insulation.
 - b. Owens Corning; VaporWick Pipe Insulation.
 - c. Or Approved Equal.
- I. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied [ASJ] [FSK jacket] complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F (0.042 W/m x K) or less. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.
1. Products:
 - a. CertainTeed Corp.; CrimpWrap.

- b. Johns Manville; MicroFlex.
- c. Knauf Insulation; Pipe and Tank Insulation.
- d. Manson Insulation Inc.; AK Flex.
- e. Owens Corning; Fiberglas Pipe and Tank Insulation.
- f. Or Approved Equal.

2.3 FIRE-RATED INSULATION SYSTEMS

- A. Fire-Rated Board: Structural-grade, press-molded, xonolite calcium silicate, fireproofing board suitable for operating temperatures up to 1700 deg F. Comply with ASTM C 656, Type II, Grade 6. UL tested and certified to provide a 2-hour fire rating.
 - 1. Products:
 - a. Johns Manville; Super Firetemp M.
 - b. Or Approved Equal.
- B. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is UL tested and certified to provide a 2-hour fire rating.
 - 1. Products:
 - a. CertainTeed Corp.; FlameChek.
 - b. Johns Manville; Firetemp Wrap.
 - c. Nelson Firestop Products; Nelson FSB Flameshield Blanket.
 - d. Thermal Ceramics; FireMaster Duct Wrap.
 - e. 3M; Fire Barrier Wrap Products.
 - f. Unifrax Corporation; FyreWrap.
 - g. Vesuvius; PYROSCAT FP FASTR Duct Wrap.
 - h. Or Approved Equal.

2.4 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-97.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-27/81-93.
 - c. Marathon Industries, Inc.; 290.
 - d. Mon-Eco Industries, Inc.; 22-30.
 - e. Vimasco Corporation; 760.
 - f. Or Approved Equal.
- C. Cellular-Glass, Phenolic-Foam, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-96.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-33.

- c. Or Approved Equal.
- D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
- 1. Products:
 - a. Aeroflex USA Inc.; Aero seal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
 - e. Or Approved Equal.
- E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- 1. Products:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal.
- F. Polystyrene Adhesive: Solvent- or water-based, synthetic resin adhesive with a service temperature range of minus 20 to plus 140 deg F.
- 1. Products:
 - a. Childers Products, Division of ITW; CP-96.
 - b. Foster Products Corporation, H. B. Fuller Company; 97-13.
 - c. Or Approved Equal.
- G. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- 1. Products:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal.
- H. PVC Jacket Adhesive: Compatible with PVC jacket.
- 1. Products:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Red Devil, Inc.; Celulon Ultra Clear.
 - e. Speedline Corporation; Speedline Vinyl Adhesive.
 - f. Or Approved Equal.

2.5 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 - g. Or Approved Equal.
 - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 - 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-30.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-35.
 - c. ITW TACC, Division of Illinois Tool Works; CB-25.
 - d. Marathon Industries, Inc.; 501.
 - e. Mon-Eco Industries, Inc.; 55-10.
 - f. Or Approved Equal.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
 - 3. Service Temperature Range: 0 to 180 deg F
 - 4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
 - 5. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
 - 1. Products:
 - a. Childers Products, Division of ITW; Encacel.
 - b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
 - c. Marathon Industries, Inc.; 570.
 - d. Mon-Eco Industries, Inc.; 55-70.
 - e. Or Approved Equal.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
 - 3. Service Temperature Range: Minus 50 to plus 220 deg F
 - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
 - 5. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-10.
 - b. Foster Products Corporation, H. B. Fuller Company; 35-00.

- c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
 - d. Marathon Industries, Inc.; 550.
 - e. Mon-Eco Industries, Inc.; 55-50.
 - f. Vimasco Corporation; WC-1/WC-5.
 - g. Or Approved Equal.
- 2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 200 deg F.
 - 4. Solids Content: 63 percent by volume and 73 percent by weight.
 - 5. Color: White.

2.6 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
 - 1. Products:
 - a. Childers Products, Division of ITW; CP-52.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-42.
 - c. Marathon Industries, Inc.; 130.
 - d. Mon-Eco Industries, Inc.; 11-30.
 - e. Vimasco Corporation; 136.
 - f. Or Approved Equal.
 - 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
 - 3. Service Temperature Range: Minus 50 to plus 180 deg F.
 - 4. Color: White.

2.7 SEALANTS

- A. Joint Sealants:
 - 1. Joint Sealants for Cellular-Glass, Phenolic-Foam, and Polyisocyanurate Products:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
 - f. Vimasco Corporation; 750.
 - g. Or Approved Equal.
 - 2. Joint Sealants for Polystyrene Products:
 - a. Childers Products, Division of ITW; CP-70.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Or Approved Equal.
 - 3. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 4. Permanently flexible, elastomeric sealant.
 - 5. Service Temperature Range: Minus 100 to plus 300 deg F.
 - 6. Color: White or gray.
- B. FSK and Metal Jacket Flashing Sealants:

1. Products:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - f. Or Approved Equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Or Approved Equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 - e. Or Approved Equal.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
5. Factory-fabricated tank heads and tank side panels.

D. Metal Jacket:

1. Products:
 - a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
 - c. RPR Products, Inc.; Insul-Mate.
 - d. Or Approved Equal.

- E. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.

- 1. Products:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 - e. Or Approved Equal.
- 2. Width: 3 inches
- 3. Thickness: 11.5 mils
- 4. Adhesion: 90 ounces force/inch in width.
- 5. Elongation: 2 percent.
- 6. Tensile Strength: 40 lbf/inch in width.
- 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136 and UL listed.

- 1. Products:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 - e. Or Approved Equal.
- 2. Width: 3 inches.
- 3. Thickness: 6.5 mils.
- 4. Adhesion: 90 ounces force/inch in width.
- 5. Elongation: 2 percent.
- 6. Tensile Strength: 40 lbf/inch in width.
- 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

- 1. Products:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 - e. Or Approved Equal.
- 2. Width: 2 inches.
- 3. Thickness: 6 mils.
- 4. Adhesion: 64 ounces force/inch in width.
- 5. Elongation: 500 percent.
- 6. Tensile Strength: 18 lbf/inch in width.

- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive and UL listed.

1. Products:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
 - e. Or Approved Equal.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Products:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
 - d. Or Approved Equal.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304; 0.015 inch thick, 3/4 inch wide with wing or closed seal.
3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch diameter shank, length to suit depth of insulation indicated.
 - a. Products:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; CD.
 - 3) Midwest Fasteners, Inc.; CD.
 - 4) Nelson Stud Welding; TPA, TPC, and TPS.
 - 5) Or Approved Equal.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 - a. Products:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; Cupped Head Weld Pin.
 - 3) Midwest Fasteners, Inc.; Cupped Head.
 - 4) Nelson Stud Welding; CHP.
 - 5) Or Approved Equal.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products:

- 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
 - 2) GEMCO; Perforated Base.
 - 3) Midwest Fasteners, Inc.; Spindle.
 - 4) Or Approved Equal.
- b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Aluminum, fully annealed, 0.106-inch diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick, aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
 - 5) Or Approved Equal.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch wide, stainless steel or Monel.
 - D. Wire: 0.062-inch soft-annealed, galvanized steel.
 1. Manufacturers:
 - a. ACS Industries, Inc.
 - b. C & F Wire.
 - c. Childers Products.
 - d. PABCO Metals Corporation.
 - e. RPR Products, Inc.
 - f. Or Approved Equal.

2.11 CORNER ANGLES

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 COMMON INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches or 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Below-Grade Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Firestopping and fire-resistive joint sealers are specified in Division 7 Section "Through-Penetration Firestop Systems."

F. Insulation Installation at Floor Penetrations:

1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Pipe: Install insulation continuously through floor penetrations.
3. Seal penetrations through fire-rated assemblies according to Division 7 Section "Through-Penetration Firestop Systems."

3.5 DUCT AND PLENUM INSULATION INSTALLATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.

3.6 EQUIPMENT INSULATION INSTALLATION

- A. Secure insulation with adhesive and anchor pins and speed washers.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of tank and vessel surfaces.
 2. Groove and score insulation materials to fit as closely as possible to equipment, including contours. Bevel insulation edges for cylindrical surfaces for tight joints. Stagger end joints.
 3. Protect exposed corners with secured corner angles.
 4. Install adhesively attached or self-sticking insulation hangers and speed washers on sides of tanks and vessels as follows:
 - a. Do not weld anchor pins to ASME-labeled pressure vessels.
 - b. Select insulation hangers and adhesive that are compatible with service temperature and with substrate.
 - c. On tanks and vessels, maximum anchor-pin spacing is 3 inches from insulation end joints, and 16 inches o.c. in both directions.
 - d. Do not overcompress insulation during installation.
 - e. Cut and miter insulation segments to fit curved sides and domed heads of tanks and vessels.
 - f. Impale insulation over anchor pins and attach speed washers.
 - g. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 5. Secure each layer of insulation with stainless-steel or aluminum bands. Select band material compatible with insulation materials.

6. Where insulation hangers on equipment and vessels are not permitted or practical and where insulation support rings are not provided, install a girdle network for securing insulation. Stretch prestressed aircraft cable around the diameter of vessel and make taut with clamps, turnbuckles, or breather springs. Place one circumferential girdle around equipment approximately 6 inches from each end. Install wire or cable between two circumferential girdles 12 inches o.c. Install a wire ring around each end and around outer periphery of center openings and stretch prestressed aircraft cable radially from the wire ring to nearest circumferential girdle. Install additional circumferential girdles along the body of equipment or tank at a minimum spacing of 48 inches o.c. Use this network for securing insulation with tie wire or bands.
7. Stagger joints between insulation layers at least 3 inches.
8. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection.
9. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
10. For equipment with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.

3.7 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.8 CELLULAR-GLASS INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.9 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.

2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.10 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.11 FIRE-RATED INSULATION SYSTEM INSTALLATION

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous UL-listed fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 7 Section "Through-Penetration Firestop Systems."

3.12 FINISHES

A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.

- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.13 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Fire-suppression piping.
 - 2. Drainage piping located in crawl spaces.
 - 3. Below-grade piping.
 - 4. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.14 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 - 1. NPS 3 (DN 75) and Smaller: Insulation shall be [any of] the following:
 - a. Cellular Glass: 1-1/2 inch thick.
 - b. Mineral-Fiber Pipe Insulation, Type I: 1-1/2 inch thick.
 - 2. NPS 4 (DN 32) and Larger: Insulation shall be any of the following:
 - a. Cellular Glass: 2 inches thick.
 - b. Mineral-Fiber Pipe Insulation, Type I: 2 inches thick.
- B. Domestic Hot and Recirculated Hot Water:
 - 1. NPS 3 (DN 75) and Smaller: Insulation shall be [any of] the following:
 - a. Cellular Glass: 1-1/2 inches thick.
 - b. Mineral-Fiber Pipe Insulation, Type I: 1-1/2 inch thick.
 - 2. NPS 4 (DN 100) and Larger: Insulation shall be any of the following:
 - a. Cellular Glass: 2 inches thick.
 - b. Mineral-Fiber Pipe Insulation, Type I: 2 inch thick.
- C. Condensate Drain & Roof Leader:
 - 1. Refer to Dwg. P0.01 for insulation requirements.

3.15 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. Aluminum, Smooth: 0.016 inch thick.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes domestic water piping inside the building and 5 feet to outside of the building.
- B. Related Sections include the following:
 - 1. Division 22 Section "Domestic Water Piping Specialties" for water distribution piping specialties.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing domestic water piping systems with 80 psig, unless otherwise indicated.

1.4 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Water Samples: Specified in Part 3 "Cleaning" Article.
- C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.3 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Types K and L (ASTM B 88M, Types A and B), water tube, annealed temper.
 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- B. Hard Copper Tube: ASTM B 88, Types L and M (ASTM B 88M, Types B and C), water tube, drawn temper.
 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.4 VALVES

- A. General-duty ball valves are specified in Division 22 Section "Plumbing Valves."
- B. Backflow preventers, strainers, and drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

PART 3 - EXECUTION

3.1 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Fitting Option: brazed joints may be used on aboveground copper tubing.
- D. Under-Building-Slab, Domestic Water Piping on House Side of Water Meter, NPS 4 (DN 100) and Smaller: Soft copper tube, Type K with no fittings.
- E. Aboveground Domestic Water Piping: Use the following piping materials for each size range:
 - 1. NPS 1 (DN 25) and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 2. NPS 2 (DN 50) and larger: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

3.2 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball valves for piping NPS 3 (DN 75) and smaller.
 - 2. Drain Duty: Hose-end drain valves.
- B. Install drain valves at low points in horizontal piping, and where required to drain water piping.
 - 1. Install hose-end drain valves at low points in water mains, risers, and branches.

3.3 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."
- C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- D. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- E. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Mechanical Vibration and Seismic Controls."
- B. Pipe hanger and support devices are specified in Division 22 Section "Hangers and Supports." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 22 Section "Hangers and Supports."
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.
- F. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 (DN 20) and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4 (DN 25 and DN 32): 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2 (DN 65): 108 inches with 1/2-inch rod.
 - 5. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet with 1/2-inch rod.
 - 6. NPS 6 (DN 150): 10 feet with 5/8-inch rod.
- G. Install supports for vertical copper tubing every 10 feet.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

3.7 FIELD QUALITY CONTROL

A. Inspect domestic water piping as follows:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test domestic water piping as follows:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.8 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
4. Remove and clean strainer screens. Close drain valves and replace drain plugs.
5. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

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 domestic water piping specialties:
 - 1. Reduced-Pressure-Principle Backflow Preventers.
 - 2. Balancing valves.
 - 3. Strainers.
 - 4. Hose Bibbs.
 - 5. Wall hydrants.
 - 6. Drain valves.
 - 7. Water hammer arresters.
 - 8. Trap-seal primer valves.
- B. All plumbing fixtures, backflow preventers, valves, strainers and fittings for potable water system shall be lead-free type in compliant with requirements of NSF/ANSI Standard 61.
- C. PERFORMANCE REQUIREMENTS
- D. Minimum Working Pressure for Domestic Water Piping Specialties: 80 psig, unless otherwise indicated.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NSF Compliance:

1. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 REDUCED-PRESSURE-PRINCIPLE BACKFLOW PREVENTERS (Lead Free Type)

A. Backflow Preventers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
 - b. Ames Fire & Waterworks.
 - c. Conbraco Industries, Inc.
 - d. Zurn Industries.
 - e. Or Approved Equal.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Size: Refer to drawings.
5. Accessories:
 - a. Valves NPS 2 (DN 50) and Smaller: Ball type with threaded ends on inlet and outlet.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

2.2 BALANCING VALVES (Lead Free Type)

A. Memory-Stop Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Conbraco Industries, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Red-White Valve Corp.
 - f. Or Approved Equal.
2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
3. Pressure Rating: 400-psig minimum CWP.
4. Size: NPS 2 (DN 50) or smaller.
5. Body: Copper alloy.
6. Port: Standard or full port.
7. Ball: Chrome-plated brass.
8. Seats and Seals: Replaceable.
9. End Connections: Solder joint or threaded.
10. Handle: Vinyl-covered steel with memory-setting device.

2.3 STRAINERS FOR DOMESTIC WATER PIPING (Lead Free Type)

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron[with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and] for NPS 2-1/2 (DN 65) and larger.
3. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 (DN 50) and Smaller: 0.020 inch.
 - b. Strainers NPS 2-1/2 to NPS 4 (DN 65 to DN 100): 0.045 inch.
6. Drain: Pipe plug or Factory-installed, hose-end drain valve.

2.4 DRAIN VALVES (Lead Free Type)

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4 (DN 20).
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

B. Gate-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-80 for gate valves.
2. Pressure Rating: Class 125.
3. Size: NPS 3/4 (DN 20).
4. Body: ASTM B 62 bronze.
5. Inlet: NPS 3/4 (DN 20) threaded or solder joint.
6. Outlet: Garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

C. Stop-and-Waste Drain Valves:

1. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
2. Pressure Rating: 200-psig minimum CWP or Class 125.
3. Size: NPS 3/4 (DN 20).
4. Body: Copper alloy or ASTM B 62 bronze.
5. Drain: NPS 1/8 (DN 6) side outlet with cap.

2.5 HOSE BIBBS

A. Hose Bibbs: Refer to plumbing schedule.

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral, non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.6 WALL HYDRANTS

A. Non-Freeze Wall Hydrants: Refer to plumbing schedule.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company.
 - b. MIFAB, Inc.
 - c. Prier Products, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Woodford Manufacturing Company.
 - h. Zurn Plumbing Products Group; Light Commercial Operation.
 - i. Zurn Plumbing Products Group; Specification Drainage Operation.
 - j. Or Approved Equal.
3. Standard: ASME A112.21.3M for exposed-outlet, self-draining wall hydrants.
4. Pressure Rating: 125 psig.
5. Operation: Loose key.
6. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
7. Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).
8. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
9. Box: Deep, flush mounting with cover.
10. Box and Cover Finish: Chrome plated.
11. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
12. Nozzle and Wall-Plate Finish: Rough bronze.
13. Operating Keys(s): Two (2) with each wall hydrant.

2.7 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. PPP Inc.
 - e. Sioux Chief Manufacturing Company, Inc.
 - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - g. Tyler Pipe; Wade Div.
 - h. Watts Drainage Products Inc.
 - i. Zurn Plumbing Products Group; Specification Drainage Operation.
 - j. Or Approved Equal.
3. Standard: ASSE 1010 or PDI-WH 201.
4. Type: [Metal bellows] [Copper tube with piston].
5. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.8 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MIFAB, Inc.
 - b. PPP Inc.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Watts Industries, Inc.; Water Products Div.
 - f. Or Approved Equal.
3. Standard: ASSE 1018.
4. Pressure Rating: 125 psig minimum.
5. Body: Bronze.
6. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
7. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
8. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.
- B. Install water control valves with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- C. Install balancing valves in locations where they can easily be adjusted.
- D. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet. Refer to plumbing schedule for locations, make & model.
- E. Install water hammer arresters in water piping according to PDI-WH 201.
- F. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- G. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.
- H. Install trap-seal primer systems with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Outlet boxes.
 - 2. Supply-type, trap-seal primer valves.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification For Plumbing Piping And Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
 - 1. Test each system according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION 221119

SECTION 221316 - SANITARY WASTE AND VENT PIPING

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 for soil, waste, and vent piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.
 - 3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures" and International Building Code – New Jersey Edition – Latest Edition

1.4 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings:
 - 1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
 - 2. Sovent Drainage System: Include plans, elevations, sections, and details.
- C. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service and Extra-Heavy class(es).
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, hemp fiber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Solvent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
- C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) ANACO.
 - 2) Fernco, Inc.
 - 3) Ideal Div.; Stant Corp.
 - 4) Mission Rubber Co.
 - 5) Tyler Pipe; Soil Pipe Div.
 - 6) Charlotte Pipe & Foundry Co.
 - 7) Or Approved Equal.
 - 2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.

- a. Manufacturers:
 - 1) ANACO.
 - 2) Clamp-All Corp.
 - 3) Ideal Div.; Stant Corp.
 - 4) Mission Rubber Co.
 - 5) Tyler Pipe; Soil Pipe Div.
 - 6) Charlotte Pipe & Foundry Co.
 - 7) Or Approved Equal.
- 3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) MG Piping Products Co.
 - 2) Or Approved Equal.

2.5 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end, unless grooved or flanged ends are indicated.
 - 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end, unless grooved or flanged ends are indicated.
 - 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Gaskets: AWWA C111, rubber.
- C. Flanges: ASME 16.1, Class 125, cast iron.

2.6 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
 - 1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- B. Hard Copper Tube: ASTM B 88, Types L (ASTM B 88M, Types B and C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
 - 3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- C. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

2.7 SPECIAL PIPE FITTINGS

- A. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Mission Rubber Co.
 - c. Or Approved Equal.
- B. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser, Inc.; DMD Div.
 - c. EBAA Iron Sales, Inc.
 - d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - e. JCM Industries, Inc.
 - f. Romac Industries, Inc.
 - g. Smith-Blair, Inc.
 - h. Viking Johnson.
 - i. Or Approved Equal.
 2. Center-Sleeve Material: Manufacturer's standard.
 3. Gasket Material: Natural or synthetic rubber.
 4. Metal Component Finish: Corrosion-resistant coating or material.
- C. Flexible Ball Joints: Ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include gasketed ball-joint section and ductile-iron gland, rubber gasket, and steel bolts.
 1. Manufacturers:
 - a. EBAA Iron Sales, Inc.
 - b. Or Approved Equal.
- D. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 1. Manufacturers:
 - a. EBAA Iron Sales, Inc.
 - b. Romac Industries, Inc.
 - c. Star Pipe Products; Star Fittings Div.
 - d. Or Approved Equal.
- E. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with

AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

1. Manufacturers:
 - a. SIGMA Corp.
 - b. Or Approved Equal.

2.8 ENCASEMENT FOR UNDERGROUND METAL PIPING

- A. Description: ASTM A 674 or AWWA C105, high-density, crosslaminated PE film of 0.004-inch minimum thickness.
- B. Form: Sheet or tube.
- C. Color: Black.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground, soil and waste piping shall be any of the following:
 1. Hubless cast-iron soil pipe and fittings and couplings; and hubless-coupling joints.
 2. Steel pipe, drainage fittings, and threaded joints.
 3. Stainless-steel pipe and fittings, gaskets, and gasketed joints.
 4. Copper DWV tube, copper drainage fittings, and soldered joints.
 5. Dissimilar Pipe-Material Couplings: Shielded Non-pressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- C. Aboveground, soil and waste piping NPS 5 (DN 125) and larger shall be any of the following:
 1. Hubless cast-iron soil pipe and fittings shielded, stainless-steel couplings; and hubless-coupling joints.
 2. Steel pipe, drainage fittings, and threaded joints.
 3. Dissimilar Pipe-Material Couplings: Shielded Non-pressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- D. Aboveground, vent piping NPS 4 (DN 100) and smaller shall be any of the following:
 1. Hubless cast-iron soil pipe and fittings; couplings; and hubless-coupling joints.
 2. Steel pipe, drainage fittings, and threaded joints.
 3. Stainless-steel pipe and fittings gaskets, and gasketed joints.
 4. Copper DWV tube, copper drainage fittings, and soldered joints.

- a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2 (DN 65 and DN 90): Hard copper tube, Type M (Type C); copper pressure fittings; and soldered joints.
- 5. Dissimilar Pipe-Material Couplings: Shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- E. Aboveground, vent piping NPS 5 (DN 125) and larger shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings; shielded, stainless-steel couplings; and hubless-coupling joints.
 - 2. Steel pipe, drainage fittings, and threaded joints.
 - 3. Dissimilar Pipe-Material Couplings: Shielded Non-pressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- F. Underground, soil, waste, and vent piping NPS 4 (DN 100) and smaller shall be any of the following:
 - 1. Service class, cast-iron bell and spigot type soil pipe with gasketed joints.
 - 2. Stainless-steel pipe and fittings, gaskets, and gasketed joints.
 - 3. Dissimilar Pipe-Material Couplings: Shielded Non-pressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- G. Underground, soil and waste piping NPS 5 (DN 125) and larger shall be any of the following:
 - 1. Service class, cast-iron bell and spigot type soil pipe with gasketed joints.
 - 2. Dissimilar Pipe-Material Couplings: Shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

3.3 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- B. Install seismic restraints on piping. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls."
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- D. Install underground, ductile-iron, special pipe fittings according to AWWA C600.
 - 1. Install encasement on piping according to ASTM A 674 or AWWA C105.
- E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- F. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.
- G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.
- H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- J. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- K. Install engineered soil and waste drainage and vent piping systems as follows:
1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
 2. Solvent Drainage System: Comply with ASSE 1043 and solvent fitting manufacturer's written installation instructions.
 3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.
- L. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Basic Mechanical Materials and Methods."
- B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 22 Section "Valves."

3.6 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Vibration Controls and Seismic Restraints."
- B. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 22 Section "Hangers and Supports."
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches with 3/8-inch rod.
 - 2. NPS 3 (DN 80): 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches with 5/8-inch rod.
 - 4. NPS 6 (DN 150): 60 inches with 3/4-inch rod.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 84 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 (DN 40): 108 inches with 3/8-inch rod.
 - 3. NPS 2 (DN 50): 10 feet with 3/8-inch rod.
 - 4. NPS 2-1/2 (DN 65): 11 feet with 1/2-inch rod.
 - 5. NPS 3 (DN 80): 12 feet with 1/2-inch rod.
 - 6. NPS 4 and NPS 5 (DN 100 and DN 125): 12 feet with 5/8-inch rod.
 - 7. NPS 6 (DN 150): 12 feet with 3/4-inch rod.
- I. Install supports for vertical steel piping every 15 feet.
- J. Install hangers for stainless-steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2 (DN 50): 84 inches with 3/8-inch rod.
2. NPS 3 (DN 80): 96 inches with 1/2-inch rod.
3. NPS 4 (DN 100): 108 inches with 1/2-inch rod.
4. NPS 6 (DN 150): 10 feet with 5/8-inch rod.

K. Install supports for vertical stainless-steel piping every 10 feet.

L. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 (DN 32): 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches with 3/8-inch rod.
3. NPS 2-1/2 (DN 65): 108 inches with 1/2-inch rod.
4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet with 1/2-inch rod.
5. NPS 6 (DN 150): 10 feet with 5/8-inch rod.

M. Install supports for vertical copper tubing every 10 feet.

N. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

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 drainage piping specialties:

1. Cleanouts.
2. Floor drains.
3. Miscellaneous drainage piping specialties.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.
- B. Manufacturer Seismic Qualification Certification: Submit certification that all accessories, and components will withstand seismic forces defined in Division 22 Section "Plumbing Vibration and Seismic Controls." Include the following:
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
- B. Coordinate size and location of roof penetrations.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Cultures: Provide 1-gal. bottles of bacteria culture recommended by manufacturer of FOG disposal systems equal to 200 percent of amount installed, but no fewer than 2 1-gal. bottles.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Metal Floor Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated or a comparable product by one of the following:
 - a. MIFAB, Inc.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Or Approved Equal.

B. Stainless Steel Wall Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated or a comparable product by one of the following:
 - a. MIFAB, Inc.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Or Approved Equal.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated or a comparable product by one of the following:
 - a. MIFAB, Inc.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Or Approved Equal.
4. Standard: ASME A112.6.3 with backwater valve.
5. Pattern: Floor drain.
6. Outlet: Side.
7. Sediment Bucket: Refer to plumbing schedule.
8. Top or Strainer Material: Bronze.
9. Top of Body and Strainer Finish: Nickel bronze.
10. Top Shape: Round.

2.3 MISCELLANEOUS DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping [with increaser fitting of size indicated].

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
 - a. NPS 2 (DN 50): 4-inch minimum water seal.
 - b. NPS 2-1/2 (DN 65) and Larger: 5-inch minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.

D. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.

3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

E. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend [1 inch (25 mm)] [2 inches (51 mm)] <Insert dimension> above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

F. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

G. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

H. Frost-Resistant Vent Terminals:

1. Description: Manufactured or shop-fabricated assembly constructed of copper, lead-coated copper, or galvanized steel.
2. Design: To provide 1-inch (25-mm) enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing.

I. Expansion Joints:

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

J. Downspout Boots:

1. Description: Manufactured, ASTM A 48/A 48M, gray-iron casting, with strap or ears for attaching to building; NPS 4 (DN 100) outlet; and shop-applied bituminous coating.
2. Size: Inlet size to match downspout.
3. Description: ASTM A 74, Service class, hub-and-spigot, cast-iron soil pipe.
4. Size: Same as or larger than connected downspout.

K. Conductor Nozzles:

1. Description: Bronze body with threaded inlet and bronze wall flange with mounting holes.
2. Size: Same as connected conductor.

2.4 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
 - 2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
 - 3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.
- B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Applications: 12 oz./sq. ft.
 - 2. Vent Pipe Flashing: 8 oz./sq. ft.
- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
- E. Fasteners: Metal compatible with material and substrate being fastened.
- F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- G. Solder: ASTM B 32, lead-free alloy.
- H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 224213 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories and sinks.
2. Flushometers.
3. Toilet seats.
4. Fixture supports.
5. Water closets.
6. Lavatories.
7. Urinals.
8. Sinks.
9. Service sinks.

1.2 DEFINITIONS

- A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- B. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- C. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.3 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1 – 1998 or most current edition, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 - 2. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 - 3. Slip-Resistant Bathing Surfaces: ASTM F 462.
 - 4. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
 - 5. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
 - 6. Vitreous-China Fixtures: ASME A112.19.2M.
 - 7. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
 - 8. Water-Closet, Flushometer Tank Trim: ASSE 1037.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
 - 2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
 - 3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
 - 4. Faucets: ASME A112.18.1.
 - 5. Hose-Connection Vacuum Breakers: ASSE 1011.
 - 6. Hose-Coupling Threads: ASME B1.20.7.
 - 7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 - 8. NSF Potable-Water Materials: NSF 61.
 - 9. Pipe Threads: ASME B1.20.1.
 - 10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
 - 11. Supply Fittings: ASME A112.18.1.
 - 12. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
 - 1. Atmospheric Vacuum Breakers: ASSE 1001.
 - 2. Brass and Copper Supplies: ASME A112.18.1.
 - 3. Dishwasher Air-Gap Fittings: ASSE 1021.
 - 4. Manual-Operation Flushometers: ASSE 1037.
 - 5. Brass Waste Fittings: ASME A112.18.2.

6. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

J. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Dishwasher Air-Gap Fittings: ASSE 1021.
2. Flexible Water Connectors: ASME A112.18.6.
3. Floor Drains: ASME A112.6.3.
4. Grab Bars: ASTM F 446.
5. Hose-Coupling Threads: ASME B1.20.7.
6. Off-Floor Fixture Supports: ASME A112.6.1M.
7. Pipe Threads: ASME B1.20.1.
8. Plastic Toilet Seats: ANSI Z124.5.
9. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures of unit shell.
 - b. Faulty operation of controls, blowers, pumps, heaters, and timers.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Period for Commercial Applications: One (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Chicago Faucets.
 - c. Delta Faucet Company.
 - d. Elkay Manufacturing Co.
 - e. Kohler Co.
 - f. Sloan Valve Company.
 - g. Or Approved Equal.

2.2 SINK FAUCETS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Chicago Faucets.
 - c. Delta Faucet Company.
 - d. Elkay Manufacturing Co.
 - e. Kohler Co.
 - f. Sloan Valve Company.

- g. Or Approved Equal.

2.3 FLUSHOMETERS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. Sloan Valve Company
 - b. Delta Faucet Company.
 - c. American Standard Companies, Inc.
 - d. Kohler Co.
 - e. Or Approved Equal
2. Description: Flushometer water closets or urinals. Include brass body with corrosion-resistant internal components, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

2.4 TOILET SEATS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Church Seats.
 - c. Kohler Co.
 - d. Olsonite Corp.
 - e. Or Approved Equal.
2. Description: Toilet seat for water-closet-type fixture.
 - a. Material: Molded, solid plastic with antimicrobial agent.
 - b. Configuration: Open front.
 - c. Size: Elongated.
 - d. Hinge Type: CK, check.
 - e. Class: Commercial heavy duty.
 - f. Color: White.

2.5 FIXTURE SUPPORTS (Refer to plumbing schedule)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. MIFAB Manufacturing Inc.
2. Smith, Jay R. Mfg. Co.
3. Tyler Pipe; Wade Div.
4. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
5. Or Approved Equal.

- B. Water-Closet Supports:

1. Description: Combination carrier designed for accessible mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

C. Lavatory Supports:

1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

2.6 WATER CLOSETS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Crane Plumbing, L.L.C./Fiat Products.
 - c. Kohler Co.
 - d. Or Approved Equal.

2.7 LAVATORIES (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Kohler Co.
 - c. Crane Plumbing, L.L.C./Fiat Products.
 - d. Or Approved Equal.

2.8 URINALS: (Refer to plumbing schedules)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Crane Plumbing, L.L.C./Fiat Products.
 - c. Kohler Co.
 - d. Or Approved Equal.

2.9 SINKS: (Refer to plumbing schedules)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. Kohler Co.
 - b. American Standard Companies, Inc.
 - c. Elkay Manufacturing Co.
 - d. Or Approved Equal.

2.10 SERVICE SINKS (Refer to plumbing schedule)

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on drawings or a comparable product by one of the following:
 - a. Florestone Products Co., Inc.

- b. Kohler Co.
- c. American Standard Companies, Inc.
- d. Or Approved Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install counter-mounting fixtures in and attached to casework.
- H. Install fixtures level and plumb according to roughing-in drawings.
- I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22.
- J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

- K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- L. Install flushometer valves for accessible water closets with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- M. Install toilet seats on water closets.
- N. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- P. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- Q. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- R. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Basic Plumbing Materials and Methods."
- S. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 7 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section.
- D. Connect wiring according to Division 26.

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Operate and adjust controls. Replace damaged and malfunctioning units and controls.
- C. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- D. Replace washers and seals of leaking and dripping faucets and stops.
- E. Install fresh batteries in sensor-operated mechanisms.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucets and strainers, remove sediment and debris, and reinstall strainers and faucets.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224213

SECTION 230000 – MECHANICAL SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 23, and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - a. Work covered under Mechanical Contract.
 - b. Work under other contracts.
 - c. Use of premises.
 - d. Owner's occupancy requirements.
 - e. Specification formats and conventions.

- B. Related Sections include the following:

- a. Division 23 Sections.

1.3 WORK COVERED UNDER MECHANICAL CONTRACT

- A. Provide all labor, materials, tools, machinery, equipment, and services necessary to complete the mechanical work under this contract. All systems and equipment shall be complete in every aspect and all items of material, equipment, and labor shall be provided for a fully operational system. Coordinate the work with work of other trades so as to resolve conflicts without impeding job progress. The mechanical work includes the following:

- B. MECHANICAL

- 1. The mechanical contractor shall furnish all labor, materials, equipment, rigging, appliances, tools and accessories required for providing, installing, connecting and testing the new mechanical/HV system, associated work, controls etc., in accordance with these specifications and the applicable drawings. The work includes, but is not limited to the following:
 - a. Remove all demolished equipment and debris from the site in accordance with all State and Local regulations.
 - b. Coordinate all removals as further scheduled on the drawings so as not to interfere with Owner's use of the building.
 - c. Furnish and install new ceiling exhaust fans complete with exhaust ductwork, electric, flexible connections, wall cap, etc.

- d. Furnish and install new roof exhaust fans complete with necessary duct connections, electric, etc.
- e. Furnish and install new registers and diffusers complete with ductwork and volume dampers above the ceiling to connect back into existing system.
- f. Provide high-efficiency electric motors for all new units.
- g. All cutting, patching and alteration work shall be performed.
- h. Furnish and install all ancillary equipment needed for a complete and proper installation including, but not limited to anchors, hangers, etc.
- i. Contractor to perform testing, adjusting and balancing (TAB) of the entire mechanical/HV system, including all new units, air side distributions, etc. **Submit four (4) sets of air and unit TAB reports for review.**
- j. Provide testing, commissioning and start-up reports for all new mechanical/HV system installed in this project.
- k. Submit four (4) sets of shop drawings of all equipment, duct standards, equipment layout, detailed duct layouts, supports, DDC controls, electrical, wiring diagram, etc.
- l. Contractor to prepare as-built drawings of the entire mechanical/HV system. Submit four (4) sets of Operation and Maintenance Manuals.
- m. Contractor to provide operator training on new mechanical equipment for owner designated personnel consisting of minimum of one (1) four (4)-hour session.
- n. Provide color coded identification tags, identification markers and equipment tags for all equipment including exhaust fans, etc.
- o. Warranty: The entire system shall be warranted for a period of one complete year from the date of acceptance by the owner, including all materials and labor components.

1.4 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 USE OF PREMISES

- A. General: Each Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
- B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

- a. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
- b. Driveways and Entrances: Keep driveways, parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
 - a. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - b. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - a. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - b. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 - c. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.
 - a. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - b. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
- a. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - b. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.8 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 230000

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

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. Grout.
 2. Mechanical demolition.
 3. Equipment installation requirements common to equipment sections.
 4. Painting and finishing.
 5. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for rubber materials:
 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Electrical Characteristics for mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" for general demolition requirements and procedures.

- B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
 - 1. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - 2. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If duct, pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.3 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified in Division 09 Sections "Interior Painting"
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1.

3.5 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.6 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout around anchors.
- G. Cure placed grout.

END OF SECTION 230500

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

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 basic requirements for factory and field-installed motors.

1.3 DEFINITIONS

- A. **Factory-Installed Motor:** A motor installed by motorized-equipment manufacturer as a component of equipment.
- B. **Field-Installed Motor:** A motor installed at Project site and not factory installed as an integral component of motorized equipment.

1.4 SUBMITTALS

- A. **Product Data for Field-Installed Motors:** For each type and size of motor, provide nameplate data and ratings; shipping, installed, and operating weights; enclosure type and mounting arrangements; size, type, and location of winding terminations; conduit entry and ground lug locations; and information on coatings or finishes.
- B. **Shop Drawings for Field-Installed Motors:** Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Include the following:
 - 1. Each installed unit's type and details.
 - 2. Nameplate legends.
 - 3. Diagrams of power, signal, and control wiring. Provide schematic wiring diagram for each type of motor and for each control scheme.
- C. **Coordination Drawings:** Floor plans showing dimensioned layout, required working clearances, and required area above and around field-installed motors. Show motor layout, mechanical power transfer link, driven load, and relationship between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate field measurements.
- D. **Manufacturer Seismic Qualification Certification:** Submit certification that motors, accessories, and components will withstand seismic forces. Include the following:
 - 1. **Basis for Certification:** Indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Qualification Data: For testing agency.
 - F. Source quality-control test reports.
 - G. Field quality-control test reports.
 - H. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain field-installed motors through one source from a single manufacturer.
- C. Product Options for Field-Installed Motors: Drawings indicate size, profiles, and dimensional requirements of motors and are based on the specific system indicated.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in latest NEC, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with latest NEC.

1.6 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices and features that comply with the following:
 - 1. Compatible with the following:
 - a. Magnetic controllers.
 - b. Multispeed controllers.
 - c. Reduced-voltage controllers.

2. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
 3. Matched to torque and horsepower requirements of the load.
 4. Matched to ratings and characteristics of supply circuit and required control sequence.
- B. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.

PART 2 - PRODUCTS

2.1 MOTOR REQUIREMENTS

- A. Motor requirements apply to factory and field installed motors except as follows:
1. Different ratings, performance, or characteristics for motor are specified in another Section.
 2. Motorized-equipment manufacturer requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.2 MOTOR CHARACTERISTICS

- A. Motors 1/2 HP and Larger: Three phase (unless otherwise indicated on drawings). All motors shall be high-efficiency premium motors.
- B. Motors Smaller Than 1/2 HP: Single phase.
- C. Frequency Rating: 60 Hz.
- D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
- E. Service Factor: 1.15 for open drip-proof motors; 1.0 for totally enclosed motors.
- F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
- G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- H. Enclosure: Open drip-proof.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Premium as defined in NEMA MG 1.

- C. Stator: Copper windings, unless otherwise indicated.
 - 1. Multispeed motors shall have separate winding for each speed.
- D. Rotor: Squirrel cage, unless otherwise indicated.
- E. Bearings: Double-shielded, pre-lubricated ball bearings suitable for radial and thrust loading.
- F. Temperature Rise: Match insulation rating, unless otherwise indicated.
- G. Insulation: Class F, unless otherwise indicated.
- H. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
- I. Enclosure: Cast iron for motors 7.5 hp and larger; rolled steel for motors smaller than 7.5 hp.
 - 1. Finish: Gray enamel.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Rugged-Duty Motors: Totally enclosed, with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings insulated with non-hygroscopic material.
 - 1. Finish: Chemical-resistant paint over corrosion-resistant primer.
- C. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
 - 1. Measure winding resistance.
 - 2. Read no-load current and speed at rated voltage and frequency.
 - 3. Measure locked rotor current at rated frequency.
 - 4. Perform high-potential test.

2.5 SINGLE-PHASE MOTORS

- A. Type: One of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split-phase start, capacitor run.
 - 3. Capacitor start, capacitor run.
- B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.

- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.
- D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, pre-lubricated-sleeve type for other single-phase motors.
- E. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
 - 1. Measure winding resistance.
 - 2. Read no-load current and speed at rated voltage and frequency.
 - 3. Measure locked rotor current at rated frequency.
 - 4. Perform high-potential test.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive field-installed motors for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Examine roughing-in for conduit systems to verify actual locations of conduit connections before motor installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FIELD-INSTALLED MOTOR INSTALLATION

- A. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and align with load transfer link.
- B. Comply with mounting and anchoring requirements specified in Division 23 Sections.

3.3 FIELD QUALITY CONTROL FOR FIELD-INSTALLED MOTORS

- A. Prepare for acceptance tests.
 - 1. Align motors, bases, shafts, pulleys, and belts. Tension belts according to manufacturer's written instructions.
 - 2. Verify bearing lubrication.
 - 3. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.
 - 4. Test interlocks and control and safety features for proper operation.
 - 5. Verify that current and voltage for each phase comply with nameplate rating and NEMA MG 1 tolerances.

- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- C. Testing Agency: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- D. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- E. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform electrical tests and visual and mechanical inspections optional tests and inspections stated in NETA ATS on factory and field installed motors. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.4 FIELD-INSTALLED MOTOR DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain field-installed motors. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 230513

SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING

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 general-duty valves:

1. Copper-alloy ball valves.
2. Ferrous-alloy ball valves.
3. Bronze check valves.
4. Ferrous-alloy wafer check valves.
5. Spring-loaded, lift-disc check valves.
6. Bronze gate valves.
7. Cast-iron gate valves.
8. Bronze globe valves.
9. Cast-iron globe valves.

- B. Related Sections include the following:

1. Division 23 Section "Mechanical Identification" for valve tags and charts.
2. Division 23 piping Sections for specialty valves applicable to those Sections only.

1.3 DEFINITIONS

- A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. NBR: Acrylonitrile-butadiene rubber.
4. PTFE: Polytetrafluoroethylene plastic.
5. SWP: Steam working pressure.
6. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

- A. ASME Compliance: ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.
 - 1. Exceptions: Domestic hot- and cold-water piping valves unless referenced.
- B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.
- B. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.

- C. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.
- D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- F. Valve Actuators:
 - 1. Chain wheel: For attachment to valves, of size and mounting height, as indicated in the "Valve Installation" Article in Part 3.
 - 2. Gear Drive: For quarter-turn valves NPS 8 (DN 200) and larger.
 - 3. Hand wheel: For valves other than quarter-turn types.
 - 4. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.
 - 5. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug head.
- G. Extended Valve Stems: On insulated valves.
- H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.

2.3 COPPER-ALLOY BALL VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. One-Piece, Copper-Alloy Ball Valves:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Grinnell Corporation.
 - d. Jamesbury, Inc.
 - e. Kitz Corporation of America.
 - f. Legend Valve & Fitting, Inc.
 - g. NIBCO INC.
 - h. Watts Industries, Inc.; Water Products Div.
 - i. Or Approved Equal.
- C. Copper-Alloy Ball Valves, General: MSS SP-110.
- D. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats.

2.4 FERROUS-ALLOY BALL VALVES

- A. Available Manufacturers:
- B. Manufacturers:

1. American Valve, Inc.
2. Conbraco Industries, Inc.; Apollo Div.
3. Cooper Cameron Corp.; Cooper Cameron Valves Div.
4. Flow-Tek, Inc.
5. Foster Valve Co.
6. Kitz Corporation of America.
7. KTM Products, Inc.
8. Milwaukee Valve Company.
9. NIBCO INC.
10. PBM, Inc.
11. Richards Industries; Marwin Ball Valves.
12. Worcester Controls.
13. Or Approved Equal.

C. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flanged ends.

D. Ferrous-Alloy Ball Valves: Class 150, full or regular port.

2.5 BRONZE CHECK VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 1, Bronze, Horizontal Lift Check Valves with Metal Disc:
 - a. Cincinnati Valve Co.
 - b. Red-White Valve Corp.
 - c. Walworth Co.
 - d. Or Approved Equal.
2. Type 1, Bronze, Vertical Lift Check Valves with Metal Disc:
 - a. Cincinnati Valve Co.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Red-White Valve Corp.
 - d. Or Approved Equal.
3. Type 3, Bronze, Swing Check Valves with Metal Disc:
 - a. American Valve, Inc.
 - b. Cincinnati Valve Co.
 - c. Grinnell Corporation.
 - d. Kitz Corporation of America.
 - e. Legend Valve & Fitting, Inc.
 - f. Milwaukee Valve Company.
 - g. NIBCO INC.
 - h. Powell, Wm. Co.
 - i. Red-White Valve Corp.
 - j. Walworth Co.
 - k. Watts Industries, Inc.; Water Products Div.
 - l. Or Approved Equal.

- C. Bronze Check Valves, General: MSS SP-80.
- D. Type 1, Class 150, Bronze, Horizontal Lift Check Valves: Bronze body with bronze disc and seat.
- E. Type 1, Class 150, Bronze, Vertical Lift Check Valves: Bronze body with bronze disc and seat.
- F. Type 3, Class 150, Bronze, Swing Check Valves: Bronze body with bronze disc and seat.

2.6 FERROUS-ALLOY WAFER CHECK VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. Dual-Plate, Ferrous-Alloy, Wafer-Lug Check Valves:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Gulf Valve Co.
 - c. Valve and Primer Corp.
 - d. Or Approved Equal.
 - 2. Dual-Plate, Ferrous-Alloy, Double-Flanged-Type Check Valves:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Gulf Valve Co.
 - c. Techno Corp.
 - d. Or Approved Equal.
- C. Ferrous-Alloy Wafer Check Valves, General: API 594, spring loaded.
- D. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

2.7 SPRING-LOADED, LIFT-DISC CHECK VALVES

- A. Available Manufacturers:
- B. Manufacturers:
 - 1. Type I, Wafer Lift-Disc Check Valves:
 - a. Mueller Steam Specialty.
 - 2. Type II, Compact-Wafer, Lift-Disc Check Valves:
 - a. Durabla Fluid Technology, Inc.
 - b. Flomatic Valves.
 - c. GA Industries, Inc.
 - d. Grinnell Corporation.
 - e. Metraflex Co.

- f. Milwaukee Valve Company.
- g. Mueller Steam Specialty.
- h. Multiplex Manufacturing Co.
- i. NIBCO INC.
- j. SSI Equipment, Inc.
- k. Val-Matic Valve & Mfg. Corp.
- l. Valve and Primer Corp.
- m. Or Approved Equal.

3. Type III, Globe Lift-Disc Check Valves:

- a. Durabla Fluid Technology, Inc.
- b. Flomatic Valves.
- c. GA Industries, Inc.
- d. Grinnell Corporation.
- e. Metraflex Co.
- f. Milwaukee Valve Company.
- g. Multiplex Manufacturing Co.
- h. NIBCO INC.
- i. SSI Equipment, Inc.
- j. Val-Matic Valve & Mfg. Corp.
- k. Valve and Primer Corp.
- l. Or Approved Equal.

4. Type IV, Threaded Lift-Disc Check Valves:

- a. Check-All Valve Mfg. Co.
- b. Durabla Fluid Technology, Inc.
- c. Grinnell Corporation.
- d. Legend Valve & Fitting, Inc.
- e. Metraflex Co.
- f. Milwaukee Valve Company.
- g. Mueller Steam Specialty.
- h. NIBCO INC.
- i. Watts Industries, Inc.; Water Products Div.
- j. Or Approved Equal.

- C. Lift-Disc Check Valves, General: FCI 74-1, with spring-loaded bronze or alloy disc and bronze or alloy seat.
- D. Type I, Class 125, Wafer Lift-Disc Check Valves: Wafer style with cast-iron shell with diameter matching companion flanges.
- E. Type II, Class 125, Compact-Wafer, Lift-Disc Check Valves: Compact-wafer style with cast-iron shell with diameter made to fit within bolt circle.
- F. Type III, Class 125, Globe Lift-Disc Check Valves: Globe style with cast-iron shell and flanged ends.
- G. Type IV, Class 125, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

2.8 BRONZE GLOBE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 1, Bronze Globe Valves with Metal Disc:

- a. Cincinnati Valve Co.
- b. Grinnell Corporation.
- c. Kitz Corporation of America.
- d. Legend Valve & Fitting, Inc.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell, Wm. Co.
- h. Red-White Valve Corp.
- i. Walworth Co.
- j. Or Approved Equal.

2. Type 2, Bronze Globe Valves with Nonmetallic Disc:

- a. Cincinnati Valve Co.
- b. Grinnell Corporation.
- c. Kitz Corporation of America.
- d. McWane, Inc.; Kennedy Valve Div.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell, Wm. Co.
- h. Red-White Valve Corp.
- i. Walworth Co.
- j. Or Approved Equal.

3. Type 3, Bronze Globe Valves with Renewable Seat and Metal Disc:

- a. Cincinnati Valve Co.
- b. Grinnell Corporation.
- c. Milwaukee Valve Company.
- d. NIBCO INC.
- e. Walworth Co.
- f. Or Approved Equal.

C. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy hand wheel.

D. Type 1, Class 150, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.

E. Type 3, Class 150, Bronze Globe Valves: Bronze body with bronze disc and renewable seat. Include union-ring bonnet.

2.9 CAST-IRON GLOBE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type I, Cast-Iron Globe Valves with Metal Seats:

- a. Cincinnati Valve Co.
- b. Grinnell Corporation.
- c. Kitz Corporation of America.
- d. Milwaukee Valve Company.
- e. NIBCO INC.
- f. Powell, Wm. Co.
- g. Red-White Valve Corp.
- h. Walworth Co.
- i. Or Approved Equal.

C. Cast-Iron Globe Valves, General: MSS SP-85.

D. Type I, Class 125, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 1. Shutoff Service: Ball valves.
 2. Throttling Service: Ball or globe valves.
 3. Pump Discharge: Spring-loaded, lift-disc check valves.

- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Heating Water Piping: Use the following types of valves:
 1. Ball Valves, NPS 2 (DN 50) and Smaller: One or Two-piece, CWP rating, copper alloy.
 2. Ball Valves, NPS 2-1/2 (DN 65) and Larger: Class 150, ferrous alloy.
 3. Lift Check Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, horizontal / vertical, bronze.
 4. Swing Check Valves, NPS 2 (DN 50) and Smaller: Type 4, Class 150, bronze.
 5. Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class 125, gray iron.
 6. Wafer Check Valves, NPS 2-1/2 (DN 65) and Larger: Single / Dual-plate, wafer-lug/ double-flanged, Class 150, ferrous alloy.
 7. Spring-Loaded, Lift-Disc Check Valves, NPS 2 (DN 50) and Smaller: Type IV, Class 150.
 8. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 (DN 65) and Larger: Class 125, cast iron.
 9. Gate Valves, NPS 2 (DN 50) and Smaller: Type 2 / 3, Class 150, bronze.
 10. Gate Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class 125, OS&Y, bronze-mounted cast iron.
 11. Globe Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, bronze.
 12. Globe Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class 125, bronze-mounted cast iron.

3.3 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install chainwheel operators on valves NPS 4 (DN 100) and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor elevation.
- F. Install check valves for proper direction of flow and as follows:
 1. Swing Check Valves: In horizontal position with hinge pin level.
 2. Dual-Plate Check Valves: In horizontal or vertical position, between flanges.
 3. Lift Check Valves: With stem upright and plumb.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 230523

SECTION 230553 - MECHANICAL IDENTIFICATION

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 mechanical identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Equipment markers.
 - 3. Equipment signs.
 - 4. Access panel and door markers.
 - 5. Pipe markers.
 - 6. Duct markers.
 - 7. Stencils.
 - 8. Warning tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Valve numbering scheme.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.
- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
 - 1. Terminology: Match schedules as closely as possible.
 - 2. Data:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
 - 3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.
- C. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Data: Instructions for operation of equipment and for safety procedures.
 - 2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
 - 3. Thickness: 1/8 inch, unless otherwise indicated.
 - 4. Thickness: 1/16 inch for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
 - 5. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- D. Access Panel and Door Markers: 1/16-inch thick, engraved laminated plastic, with abbreviated terms and numbers corresponding to identification. Provide 1/8-inch center hole for attachment.
 - 1. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 - 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pre-tensioned Pipe Markers: Precoiled semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Shaped Pipe Markers: Preformed semi-rigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.3 DUCT IDENTIFICATION DEVICES

- A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.

2.4 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door markers, equipment markers, equipment signs, and similar operational instructions.
 - 1. Stencil Material: Metal or fiberboard, Aluminum, or Brass.
 - 2. Stencil Paint: Exterior, gloss, acrylic enamel black, unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1, unless otherwise indicated.

2.5 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Architect. Provide 5/32-inch hole for fastener.
1. Material: 0.032-inch thick brass or aluminum.
 2. Material: 0.0375-inch thick stainless steel.
 3. Material: 3/32-inch thick laminated plastic with 2 black surfaces and white inner layer.
 4. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.6 VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
 2. Frame: Extruded aluminum.
 3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

2.7 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
1. Size: 3 by 5-1/4 inches minimum.
 2. Fasteners: Brass grommet and wire.
 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 23 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where

not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:

1. Fuel-burning units, including boilers, furnaces, heaters, and stills.
2. Pumps, and similar motor-driven units.
3. Heat exchangers, coils, evaporators, and similar equipment.
4. Fans, blowers, primary balancing dampers, and mixing boxes.
5. Packaged HV/HVAC (central-station and zone-type units), split HV/HVAC, indoor AHU's, etc.

B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.

1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Meters, gages, thermometers, and similar units.
 - c. Pumps and similar motor-driven units.
 - d. Heat exchangers, coils, and similar equipment.
 - e. Fans, blowers, primary balancing dampers, and mixing boxes.
 - f. Strainers, filters, water-treatment systems, and similar equipment.

C. Stenciled Equipment Marker Option: Stenciled markers may be provided instead of laminated-plastic equipment markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

D. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.

1. Identify mechanical equipment with equipment markers in the following color codes:
 - a. Green: For cooling equipment and components.
 - b. Yellow: For heating equipment and components.
 - c. Green and Yellow or Orange: For combination cooling and heating equipment and components.
2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
4. Include signs for the following general categories of equipment:

- a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Pumps and similar motor-driven units.
 - c. Heat exchangers, coils, evaporators, and similar equipment.
 - d. Fans, blowers, primary balancing dampers, and mixing boxes.
 - e. Strainers, filters, water-treatment systems, and similar equipment.
- E. Stenciled Equipment Sign Option: Stenciled signs may be provided instead of laminated-plastic equipment signs, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- F. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
- 1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pre-tensioned pipe markers. Use size to ensure a tight fit.
 - 2. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape at least 3/4 inch wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
- B. Stenciled Pipe Marker Option: Stenciled markers may be provided instead of manufactured pipe markers, at Installer's option. Install stenciled pipe markers with painted, color-coded bands or rectangles complying with ASME A13.1 on each piping system.
- 1. Identification Paint: Use for contrasting background.
 - 2. Stencil Paint: Use for pipe marking.
- C. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non-concealed locations as follows:
- 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and non-accessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 DUCT IDENTIFICATION

- A. Install duct markers with permanent adhesive on air ducts in the following color codes:
- 1. Green: For cold-air supply ducts.

2. Yellow: For hot-air supply ducts.
3. Blue: For exhaust, outside, relief, return, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
5. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

B. Stenciled Duct Marker Option: Stenciled markers, showing service and direction of flow, may be provided instead of laminated-plastic duct markers, at Installer's option, if lettering larger than 1-inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

3.6 ADJUSTING

A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

3.7 CLEANING

A. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION 230553

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - 2. Additional Tests
 - a. Sound testing.
 - b. Vibration testing.
 - c. Duct leakage testing.
 - d. Controls verification.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. T&B: Testing, adjusting, and balancing.
- C. T&B Agency: An independent entity certified by AABC to perform testing and balancing work.
- D. TBE: AABC certified test and balance engineer.
- E. TBT: AABC certified test and balance technician.
- F. HVAC: Heating, ventilating, and air conditioning.
- G. BAS: Building automation systems.
- H. Contract documents: the mechanical drawings and test and balance specification
- I. NC: noise criteria
- J. RC: room criteria

1.4 T&B INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation T&B of AABC certification of T&B agency and personnel, including a sample copy of the AABC "National Performance Guaranty." If not submitted within the timeframe specified, the engineer has the right to choose an AABC agency at the Contractor's expense.
- B. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit T&B strategies and step-by-step procedures as specified in "Preparation" Article.
- C. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article to be used and filled out by systems Installers verifying that systems are ready for T&B.
- D. Examination Report: Within 30 days of Contractor's Notice to Proceed, provide a summary report of the examination review required in Part 3 "Examination", if issues are discovered that may preclude the proper testing and balancing of the systems.
- E. Certified T&B reports: Within 14 days of completion of balancing work, submit AABC-certified T&B report.
 - 1. Submit one copy of the final T&B Report directly to the design professional of record. Provide five additional copies to the contractor.

1.5 QUALITY ASSURANCE

- A. T&B Agency Qualifications: Engage a T&B entity certified by AABC.
 - 1. T&B Field Supervisor: Employee of the T&B Agency who is certified by AABC.
 - 2. T&B Technician: Employee of the T&B Agency and who is certified by AABC as a TBT.
- B. T&B Conference: If requested by the Engineer or Owner after approval of the T&B Agency's submittals, meet to develop a mutual understanding of the details. The T&B agency shall be provided a minimum of 14 days' advance notice of scheduled meeting time and location.
 - 1. Agenda Items:
 - a. The examination report.
 - b. The Strategies and Procedures plan.
 - c. Systems readiness checklists.
 - d. Coordination and cooperation of trades and subcontractors.
 - e. Coordination of documentation and communication flow.
- C. TBT shall perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified T&B reports.
 - 2. Certify that the T&B team complied with the approved T&B plan and the procedures specified and referenced in this Specification.
 - 3. Certify the T&B report.
- D. T&B Report Forms: Use approved forms submitted with the Strategies and Procedures Plan.

- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in the "AABC National Standards for Total System Balance."

1.6 PROJECT CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire T&B period. Cooperate with Owner during T&B operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during T&B operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 T&B AGENCY

- A. Subject to compliance with requirements, engage one of AABC certified T&B Agencies:

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper T&B of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Note the locations of devices that are not accessible for testing and balancing.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- E. Examine equipment performance data including fan curves.
- F. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, clean permanent filters are installed, and equipment with functioning controls is ready for operation.
- G. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected, configured by the controls contractor, and functioning.
- H. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

- I. Examine air vents to verify that mechanical contractor has removed all air from all hydronic systems.

3.3 PREPARATION

- A. Prepare a T&B plan that includes the following:
 1. Equipment and systems to be tested.
 2. Strategies and step-by-step procedures for balancing the systems.
 3. Instrumentation to be used.
 4. Sample forms with specific identification for all equipment.
- B. Prepare system-readiness checklists, as described in the "AABC National Standards for Total System Balance," for use by systems installers in verifying system readiness for T&B. These shall include, at a minimum, the following:
 1. Airside:
 - a. Ductwork is complete with terminals installed.
 - b. Volume, smoke and fire dampers are open and functional.
 - c. Clean filters are installed.
 - d. Fans are operating, free of vibration, and rotating in correct direction.
 - e. Variable-frequency controllers' start-up is complete, and safeties are verified.
 - f. Automatic temperature-control systems are operational.
 - g. Ceilings are installed.
 - h. Windows and doors are installed.
 - i. Suitable access to balancing devices and equipment is provided.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
- B. Cut insulation and ducts for installation of test probes to the minimum extent necessary for T&B procedures.
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain approved submittals and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare single-line schematic diagram of systems for the purpose of identifying HVAC components.

- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check condensate drains for proper connections and functioning.
- H. Check for proper sealing of air-handling-unit components.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside air, return air and relief air dampers for proper position that simulates minimum outdoor air conditions.
 - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report any artificial loading of filters at the time static pressures are measured.
 - 3. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
 - 1. Measure airflow of submain and branch ducts.
 - 2. Adjust sub-main and branch duct volume dampers for specified airflow. Re-measure each sub-main and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
 - 1. Set airflow patterns of adjustable outlets for proper distribution without drafts.

2. Measure airflow at all inlets and outlets.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after all have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm minimum outdoor air, return and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm total airflow is within design.
3. Re-measure all final fan operating data, rpms, volts, amps, static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust, if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.7 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase/Hertz (Hz)
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test the manual bypass of the controller to prove proper operation.

3.8 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record fan and motor operating data.

3.9 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.10 FINAL TEST AND BALANCE REPORT

- A. The report shall be a complete record of the HVAC system performance, including conditions of operation, items outstanding, and any deviations found during the T&B process. The final report also provides a reference of actual operating conditions for the owner and/or operations personnel. All measurements and test results that appear in the reports must be made on site and dated by the AABC technicians or test and balance engineers.
- B. The report must be organized by systems and shall include the following information as a minimum:
 - 1. Title Page:
 - a. AABC certified company name
 - b. Company address
 - c. Company telephone number
 - d. Project identification number
 - e. Location
 - f. Project Architect
 - g. Project Engineer
 - h. Project Contractor
 - i. Project number
 - j. Date of report
 - k. AABC Certification Statement
 - l. Name, signature, and certification number of AABC TBE
 - 2. Table of Contents.
 - 3. AABC National Performance Guaranty.
 - 4. Report Summary:
 - a. The summary shall include a list of items that do not meet design tolerances, with information that may be considered in resolving deficiencies.
 - 5. Instrument List:
 - a. Type.
 - b. Manufacturer.
 - c. Model.
 - d. Serial Number.
 - e. Calibration Date.
 - 6. T&B Data:
 - a. Provide test data for specific systems and equipment as required by the most recent edition of the "AABC National Standards."
- C. One copy of the final test and balance report shall be sent directly to the engineer of record. Provide five additional copies to the contractor.

3.11 VERIFICATION OF T&B REPORT

- A. Final Verification:

1. After testing and balancing is complete and accurately documented in the final report, request that a final verification be made by Engineer.
2. The T&B Agency shall conduct the verification in the presence of Engineer.
3. Engineer shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final verification, the testing and balancing shall be considered incomplete.

3.12 REVERIFICATION

- A. T&B Agency shall recheck all measurements and make adjustments as required to complete the balancing. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second verification.
- B. If the second verification also fails, Owner/Engineer may contact AABC Headquarters regarding the AABC National Performance Guaranty.

3.13 ADDITIONAL TESTS

A. Sound Testing

1. After the systems are balanced and the spaces are architecturally complete, read and record sound levels at 10 locations as designated by the Engineer of record.
2. Instrumentation:
 - a. The sound-testing meter shall be a portable, general-purpose testing meter consisting of a microphone, processing unit, and readout.
 - b. The sound-testing meter shall be capable of showing fluctuations at minimum and maximum levels, and measuring the equivalent continuous sound pressure level (LEQ).
 - c. The sound-testing meter must be capable of using 1/3 octave band filters to measure mid-frequencies from 31.5 HZ to 8000 HZ.
 - d. The accuracy of the sound-testing meter shall be ± 1 decibel.
3. Test Procedures
 - a. Perform test at the quietest background noise period. Note any cause of unpreventable sound that may affect the test outcome.
 - b. Equipment should be operating at design values.
 - c. Calibrate the sound-testing meter prior to taking measurements.
 - d. Use a microphone suitable for the type of noise levels measured that is compatible with the meter. Provide a windshield for outside or in-duct measurements.
 - e. Record a set of background measurements in dB(A), and sound pressure levels in the eight un-weighted octave bands [63 HZ to 8000 HZ (NC)] with the equipment off.

- f. Take sound readings in dB(A), and sound pressure levels in the eight un-weighted octave bands [63 HZ to 8000 HZ (NC)] with the equipment on.
- g. Take readings no closer than 3' from a wall or from the operating equipment, and approximately 5' from the floor, with the meter held or mounted on a tripod.
- h. For outdoor measurements, move the sound-testing meter slowly and scan the area that has the greatest exposure to the noise source being tested. (This type of reading is generally performed using the A-Weighted scale).

4. Reporting

- a. The report must record: the location, the system tested, the dB(A) reading, and the sound pressure level in each octave band with equipment on and off.
- b. Plot all the sound pressure levels on the NC work sheet, with the equipment on and off.

B. Vibration Testing:

- 1. After the systems are balanced and the spaces are architecturally complete, read and record vibration levels on all equipment with motor horsepower equal to or greater than 10 hp.

2. Instrumentation:

- a. The vibration meter should be portable, battery-operated, and microprocessor-controlled, with or without a built-in printer.
- b. The meter shall automatically identify engineering units, filter bandwidth, amplitude and frequency scale values.
- c. The meter shall be able to measure machine vibration displacement in mils of deflection, velocity in inches per second, and acceleration in inches per second squared.

3. Test Procedures:

- a. Verify that the vibration meter calibration date is current before taking readings.
- b. To ensure accurate readings, verify that the accelerometer has a clean, flat surface and is mounted properly.
- c. With the unit running, set up the vibration meter in a safe, secure location. Connect the transducer to the meter with the proper cables. Hold the magnetic tip of the transducer on top of the bearing, and measure the unit in mils of deflection. Record the measurement, then move the transducer to the side of the bearing, and record in mils of deflection. Record an axial reading in mils of deflection by holding the nonmagnetic, pointed transducer tip on the end of the shaft.
- d. Change the vibration meter to velocity (inches per second) measurements. Repeat and record the above measurements.
- e. Record the CPM or the RPM.
- f. Read each bearing on the motor, fan, and/or pump as required. Track and record vibration levels from the rotating component through the casing to the base.

4. Reporting

- a. The report must record the location and the system tested.
- b. Include horizontal-vertical-axial measurements for all tests.
- c. Verify that vibration limits follow specifications, or, if not specified, follow the "General Machinery Vibration Severity Chart" or "Vibration Acceleration General

Severity Chart” from the AABC National Standards. Acceptable levels of vibration are normally “Smooth” to “Good.”

- d. Include in the report the Machinery Vibration Severity Chart, with conditions plotted.

C. Duct Leakage Testing:

1. Witness the duct pressure testing performed by the mechanical/installing contractor.
2. Verify that proper test methods are used and that leakage rates are within specified tolerances.
3. Report any deficiencies observed.

D. Controls Verification

1. In conjunction with system balancing perform the following:
 - a. Work with the temperature control contractor to ensure the system is operating within the design limitations, and gain a mutual understanding of intended control performance.
 - b. Confirm that the sequences of operation are in compliance with the approved drawings.
 - c. Verify that controllers are calibrated and function as intended.
 - d. Verify that controller setpoints are as specified.
 - e. Verify the operation of lockout or interlock systems.
 - f. Verify the operation of all valve and damper actuators.
 - g. Verify that all controlled devices are properly installed and connected to the correct controller.
 - h. Verify that all controlled devices travel freely and are in the position indicated by the controller: open, closed, or modulating.
 - i. Verify the location and installation of all sensors to ensure they will sense only the intended temperatures, humidities, or pressures.
2. Reporting
 - a. The report shall include a summary of verifications performed, remaining deficiencies, and any variations from specified conditions.

END OF SECTION 230593

SECTION 232113 - HYDRONIC PIPING

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 pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
 - 1. Above ground hot-water heating piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:
 - 1. Hot-Water Heating Piping: 125 psig at 200 deg F.

1.4 SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. All types of piping.
 - 2. Pressure-seal fittings.
- B. Shop Drawings: Detail, at 1/4 scale, the piping layout, fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
- C. Welding certificates.
- D. Qualification Data: For Installer.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For air control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.
- G. Grooved joint couplings and fittings shall be shown on drawings and product submittals and shall be specifically identified with the applicable Victaulic style or series number. **(Add/Deduct Alternate)**

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers of Pressure-Sealed Joints: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

E. To assure uniformity and compatibility of piping components in grooved piping systems, all grooved products utilized shall be supplied by a single manufacturer. Grooving tools shall be supplied from the same manufacturer as the grooved components. **(Add/Deduct Alternate)**

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L (ASTM B 88M, Type B).

B. Annealed-Temper Copper Tubing: ASTM B 88, Type K (ASTM B 88M, Type A).

C. DWV Copper Tubing: ASTM B 306, Type DWV.

D. Wrought-Copper Fittings: ASME B16.22.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

E. Wrought-Copper Unions: ASME B16.22.

2.2 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 "Piping Applications" Article.
- B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 250 as indicated in Part 3 "Piping Applications" Article.
- C. Malleable-Iron Threaded Fittings: ASME B16.3, Class 300 as indicated in Part 3 "Piping Applications" Article.
- D. Malleable-Iron Unions: ASME B16.39; Class 250 or 300 as indicated in Part 3 "Piping Applications" Article.
- E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Class 250; raised ground face, and bolt holes spot faced as indicated in Part 3 "Piping Applications" Article.
- F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - 1. Material Group: 1.1.
 - 2. End Connections: Butt welding.
 - 3. Facings: Raised face.

2.3 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless otherwise indicated.
 - a. Full-Face Type: For flat-face, Class 250, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.
- E. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper-alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Hart Industries International, Inc.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. Zurn Plumbing Products Group; AquaSpec Commercial Products Division.
 - 3. Factory-fabricated union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
- D. Dielectric Flanges:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - 3. Factory-fabricated companion-flange assembly, for 300-psig minimum working pressure as required to suit system pressures.
- E. Dielectric-Flange Kits:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.

3. Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
4. Separate companion flanges and steel bolts and nuts shall have 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calpico, Inc.
 - b. Lochinvar Corporation.
3. Galvanized-steel coupling with inert and noncorrosive thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

G. Dielectric Nipples:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Perfection Corporation; a subsidiary of American Meter Company.
 - b. Sioux Chief Manufacturing Company, Inc.
3. Electroplated steel or ductile iron nipple with inert and noncorrosive, thermoplastic lining; plain, or threaded; and 300-psig (2070-kPa) minimum working pressure at 230 deg F (110 deg C). Victaulic Style 47.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Hot-water heating piping, aboveground, NPS 3 (DN 75) and smaller, shall be the following:
 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered or brazed joints.
- B. Hot-water heating piping, aboveground, NPS 4 (DN 100) and larger, shall be the following:
 1. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.

3.2 PIPING INSTALLATIONS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

3.3 HANGERS AND SUPPORTS

- A. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
 - 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.

5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- B. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
1. NPS 3/4 (DN 20): Maximum span, 7 feet (2.1 m); minimum rod size, 1/4 inch (6.4 mm).
 2. NPS 1 (DN 25): Maximum span, 7 feet (2.1 m); minimum rod size, 1/4 inch (6.4 mm).
 3. NPS 1-1/2 (DN 40): Maximum span, 9 feet (2.7 m); minimum rod size, 3/8 inch (10 mm).
 4. NPS 2 (DN 50): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (10 mm).
 5. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (10 mm).
 6. NPS 3 (DN 80): Maximum span, 12 feet (3.7 m); minimum rod size, 3/8 inch (10 mm).
 7. NPS 4 (DN 100): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).
 8. NPS 6 (DN 150): Maximum span, 17 feet (5.2 m); minimum rod size, 1/2 inch (13 mm).
- C. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
1. NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 m); minimum rod size, 1/4 inch (6.4 mm).
 2. NPS 1 (DN 25): Maximum span, 6 feet (1.8 m); minimum rod size, 1/4 inch (6.4 mm).
 3. NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
 4. NPS 2 (DN 50): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
 5. NPS 2-1/2 (DN 65): Maximum span, 9 feet (2.7 m); minimum rod size, 3/8 inch (10 mm).
 6. NPS 3 (DN 80): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (10 mm).
- D. Support vertical runs at roof, at each floor, and at 10-foot (3-m) intervals between floors.
- E. Victaulic Style 107H, 07, and W07 rigid couplings may be used with IPS steel piping systems, which meet the support and hanging requirements of ASME B31.1 and B31.9. An adequate number of Victaulic Style 177, 77 and W77 flexible couplings shall also be used to compensate for thermal expansion/contraction of the pipe. **(Add/Deduct Alternate)**

3.4 PIPE JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.

3.6 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:
1. Leave joints, including welds, uninsulated and exposed for examination during test.
 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
 3. Isolate expansion tanks and determine that hydronic system is full of water.
 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
 6. Prepare written report of testing.
- C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
4. Set temperature controls so all coils are calling for full flow.
5. Inspect and set operating temperatures of hydronic equipment, such as boilers, to specified values.
6. Verify lubrication of motors and bearings.

END OF SECTION 232113

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 2- to plus 10-inch wg (minus 500 to plus 2500 Pa). Metal ducts include the following:
1. Rectangular ducts and fittings.
 2. Single-wall round spiral-seam ducts and formed fittings.
 3. Sheet metal materials.
 4. Duct liner.
 5. Sealants and gaskets.
 6. Hangers and supports.
 7. Seismic-restraint devices.

1.2 DEFINITIONS

- A. NUSIG: National Uniform Seismic Installation Guidelines.

1.3 SYSTEM DESCRIPTION

- A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.4 SUBMITTALS

- A. Shop Drawings: CAD-generated and drawn to 1/4 inch equals 1 foot. Show fabrication and installation details for metal ducts.
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 2. Duct layout indicating sizes and pressure classes.
 3. Elevations of top and bottom of ducts.
 4. Dimensions of main duct runs from building grid lines.
 5. Fittings.
 6. Reinforcement and spacing.
 7. Seam and joint construction.
 8. Penetrations through fire-rated and other partitions.
 9. Equipment installation based on equipment being used on Project.
 10. Duct accessories, including access doors and panels.
 11. Hangers and supports, including methods for duct and building attachment, vibration isolation, and seismic restraints.

- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Other systems installed in same space as ducts.
 - 3. Ceiling- and wall-mounting access doors and panels required to provide access to dampers and other operating devices.
 - 4. Ceiling-mounting items, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
- C. Welding certificates.
- D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- B. NFPA Compliance:
 - 1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
 - 2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 60 Inches (1524 mm) in Diameter: Flanged.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Fabricate round ducts larger than 90 inches (2286 mm) in diameter with butt-welded longitudinal seams.
 - 2. Fabricate flat-oval ducts larger than 72 inches (1830 mm) in width (major dimension) with butt-welded longitudinal seams.
- E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise

indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 (Z275) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.
- D. Aluminum Sheets: ASTM B 209 (ASTM B 209M), alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.5 DUCT LINER

- A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.
 - 1. Manufacturers:
 - a. CertainTeed Corp.; Insulation Group.
 - b. Johns Manville International, Inc.
 - c. Knauf Fiber Glass GmbH.
 - d. Owens Corning.
 - e. Or approved equal.
 - 2. Materials: ASTM C 1071; surfaces exposed to air stream shall be coated to prevent erosion of glass fibers.
 - a. Thickness: 1 inch.
 - b. Thermal Conductivity (k-Value): 0.26 at 75 deg F (0.037 at 24 deg C) mean temperature.
 - c. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
 - d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - e. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.
 - 1) Tensile Strength: Indefinitely sustain a 50-lb- (23-kg-) tensile, dead-load test perpendicular to duct wall.
 - 2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch (3 mm) into air stream.
 - 3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

2.6 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
- B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.
- C. Tape Sealing System: Woven-fiber tape impregnated with gypsum mineral compound and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
- D. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for Class 1 ducts.
- E. Solvent-Based Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.
- F. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.
- G. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.7 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
 - 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
 - 1. Hangers Installed in Corrosive Atmospheres: Electro-galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
 - 2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
 - 3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.
 - 3. Supports for Aluminum Ducts: Aluminum support materials unless materials are electrolytically separated from ducts.

2.8 SEISMIC-RESTRAINT DEVICES

- A. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by [an evaluation service member of the ICC Evaluation Service] [an agency acceptable to authorities having jurisdiction].
 - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- B. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
- C. Restraint Cables: [ASTM A 603, galvanized] [ASTM A 492, stainless]-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- D. Hanger Rod Stiffener: [Steel tube or steel slotted-support-system sleeve with internally bolted connections] [Reinforcing steel angle clamped] to hanger rod.
- E. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.9 RECTANGULAR DUCT FABRICATION

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
 - 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
 - 2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Nexus Inc.
 - c. Ward Industries, Inc.
 - d. McGrill AirFlow LLC.
- C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.

1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Lockformer.
 - c. McGill AirFlow LLC.
 - d. SEMCO LLC
 2. Duct Size: Maximum 30 inches (750 mm) wide and up to 2-inch wg (500-Pa) pressure class.
 3. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.
- D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. ft. (0.93 sq. m) of non-braced panel area unless ducts are lined.

2.10 APPLICATION OF LINER IN RECTANGULAR DUCTS

- A. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
- B. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
- C. Butt transverse joints without gaps and coat joint with adhesive.
- D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
- E. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.
- F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
- G. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
- H. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 1. Fan discharges.
 2. Intervals of lined duct preceding unlined duct.
 3. Upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm (12.7 m/s) or where indicated.
- I. Terminate inner ducts with build outs attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated build outs (metal hat sections) or other build out means are optional; when used, secure build outs to duct walls with bolts, screws, rivets, or welds.

2.11 ROUND DUCT AND FITTING FABRICATION (WHERE INDICATED ON DRAWINGS)

- A. Round, Longitudinal- and Spiral Lock-Seam Ducts: Fabricate exhaust air ducts of aluminum according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
1. Manufacturers:
 - a. McGill AirFlow Corporation.
 - b. SEMCO Incorporated.
 - c. Ductmate Industries, Inc.
 - d. Spiral Manufacturing Co.
- B. Duct Joints:
1. Ducts up to 20 Inches (500 mm) in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.
 2. Ducts 21 to 72 Inches (535 to 1830 mm) in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.
 3. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.
 - a. Manufacturers:
 - 1) Ductmate Industries, Inc.
 - 2) Lindab Inc.
 - 3) SEMCO Incorporated.
 - 4) McGill AirFlow Corporation.
- C. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.
- D. Diverging-Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.
- E. Fabricate elbows using die-formed, gored, pleated, or mitered construction. Bend radius of die-formed, gored, and pleated elbows shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:
1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
 2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg (minus 500 to plus 500 Pa):
 - a. Ducts 3 to 36 Inches (75 to 915 mm) in Diameter: 0.034 inch (0.85 mm).
 - b. Ducts 37 to 50 Inches (940 to 1270 mm) in Diameter: 0.040 inch (1.0 mm).
 3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg (500 to 2500 Pa):
 - a. Ducts 3 to 26 Inches (75 to 660 mm) in Diameter: 0.034 inch (0.85 mm).
 - b. Ducts 27 to 50 Inches (685 to 1270 mm) in Diameter: 0.040 inch (1.0 mm).
 4. Round Elbows 8 Inches (200 mm) and Less in Diameter: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.

5. Round Elbows 9 through 14 Inches (225 through 355 mm) in Diameter: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees unless space restrictions require mitered elbows. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
6. Die-Formed Elbows for Sizes through 8 Inches (200 mm) in Diameter and All Pressures 0.040 inch (1.0 mm) thick with 2-piece welded construction.
7. Round Gored-Elbow Metal Thickness: Same as non-elbow fittings specified above.
8. Pleated Elbows for Sizes through 14 Inches (355 mm) in Diameter and Pressures through 10-Inch wg (2500 Pa): 0.022 inch (0.55 mm).

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

- A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
 1. Return Ducts (Negative Pressure): 2 inch wg.
 2. Exhaust Ducts (Negative Pressure): 2-inch wg.
- B. All ducts shall be galvanized steel except outdoor air intake which shall be aluminum, and kitchen exhaust grease duct. Refer to drawings for grease duct specifications.

3.2 DUCT INSTALLATION

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
- B. Install round ducts in lengths not less than 12 feet (3.7 m) unless interrupted by fittings.
- C. Install ducts with fewest possible joints.
- D. Install fabricated fittings for changes in directions, size, and shape and for connections.
- E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.
- F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

- J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.
- L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).
- N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23." Firestopping materials and installation methods are specified in Division 7.
- O. Install ducts with hangers and braces designed to withstand, without damage to equipment, seismic force required by applicable building codes. Refer to SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
- P. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."
- Q. Paint interiors of metal ducts that do not have duct liner, for 24 inches (600 mm) upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9.

3.3 SEAM AND JOINT SEALING

- A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.
 - 1. For pressure classes lower than 2-inch wg (500 Pa), seal transverse joints.
- B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

- A. Support horizontal ducts within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.
- B. Support vertical ducts at maximum intervals of 16 feet (5 m) and at each floor.
- C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.
- D. Install concrete inserts before placing concrete.

- E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors according to Division 23.
- B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:
 - 1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 - 2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
 - 3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch wg (500 Pa) (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2- to 10-inch wg (500 to 2500 Pa).
 - 4. Remake leaking joints and retest until leakage is equal to or less than maximum allowable.

3.7 CLEANING NEW SYSTEMS

- A. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.
- B. Use service openings, as required, for physical and mechanical entry and for inspection.
 - 1. Create other openings to comply with duct standards.
 - 2. Disconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling sections to gain access during the cleaning process.
- C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.
- D. Clean the following metal duct systems by removing surface contaminants and deposits:
 - 1. Air outlets and inlets (registers, grilles, and diffusers).

2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts or duct accessories.

F. Cleanliness Verification:

1. Visually inspect metal ducts for contaminants.
2. Where contaminants are discovered, re-clean and re-inspect ducts.

END OF SECTION 233113

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Manual volume dampers.
 - 2. Control dampers.
 - 3. Fire dampers.
 - 4. Flange connectors.
 - 5. Turning vanes.
 - 6. Flexible connectors.
 - 7. Flexible ducts.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
 - 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control-damper installations.
 - d. Fire-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
- B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90 (Z275).
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Standard leakage rating, with linkage outside airstream.
 - 2. Suitable for horizontal or vertical applications.
 - 3. Frames:
 - a. Frame: Hat-shaped, 0.094-inch- (2.4-mm-) thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 4. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch (1.62 mm) thick.
 - 5. Blade Axles: Galvanized steel.
 - 6. Bearings:

- a. Oil-impregnated bronze.
 - b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
- 7. Tie Bars and Brackets: Galvanized steel.
- B. Low-Leakage, Steel, Manual Volume Dampers:
 - 1. Comply with AMCA 500-D testing for damper rating.
 - 2. Low-leakage rating with linkage outside airstream and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
 - 3. Suitable for horizontal or vertical applications.
 - 4. Frames:
 - a. Angle shaped.
 - b. 0.094-inch- (2.4-mm-) thick, galvanized sheet steel.
 - c. Mitered and welded corners.
 - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized, roll-formed steel, 0.064 inch (1.62 mm) thick.
 - 6. Blade Axles: Galvanized steel.
 - 7. Bearings:
 - a. Oil-impregnated bronze.
 - b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 - 8. Blade Seals: Neoprene.
 - 9. Jamb Seals: Cambered aluminum.
 - 10. Tie Bars and Brackets: Galvanized steel.
 - 11. Accessories:
 - a. Include locking device to hold single-blade dampers in a fixed position without vibration.

2.4 FIRE DAMPERS

- A. Type: Static; rated and labeled according to UL 555 by an NRTL.
- B. Closing rating in ducts up to 4-inch wg (1-kPa) static pressure class and minimum 2000-fpm (10-m/s) velocity.
- C. Fire Rating: 1-1/2 hours.
- D. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

- E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 - 1. Minimum Thickness: 0.39 inch (9.9 mm) thick, as indicated, and of length to suit application.
 - 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized-steel blade connectors.
- H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- I. Heat-Responsive Device: Replaceable, 165 deg F (74 deg C) rated, fusible links.

2.5 FLANGE CONNECTORS

- A. Description: roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- B. Material: Galvanized steel.
- C. Gage and Shape: Match connecting ductwork.

2.6 FLEXIBLE CONNECTORS

- A. Materials: Flame-retardant or noncombustible fabrics.
- B. Coatings and Adhesives: Comply with UL 181, Class 1.
- C. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
 - 2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install volume dampers at points on supply and return systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install fire dampers according to UL listing.
- G. Install flexible connectors to connect ducts to equipment.
- H. Connect terminal units to supply ducts with maximum 6-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- I. Connect flexible ducts to metal ducts with [adhesive plus sheet metal screws.
- J. Install duct test holes where required for testing and balancing purposes.
- K. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Operate fire dampers to verify full range of movement and verify that proper heat-response device is installed.
 - 4. Inspect turning vanes for proper and secure installation.
 - 5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233416 – HVAC FANS

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. Exhaust Fans.

1.3 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan performance ratings on sea level.
- B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
 - 1. Certified fan performance curves with system operating conditions indicated.
 - 2. Certified fan sound-power ratings.
 - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 4. Material thickness and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For fans to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. AMCA compliance is an optional requirement and not necessarily available from all manufacturers.
- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA 1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.7 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
- C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 7 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 EXHAUST FANS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on the drawings or approved equal:
 - 1. Greenheck
 - 2. Loren Cook
 - 3. Or Approved Equal

D. Exhaust Fans – Model CSP:

1. Duct mounted exhaust air fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy-gauge galvanized steel. The housing interior shall be lined with 0.5 in. acoustical insulation.
2. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge.
3. The access for wiring shall be external.
4. The motor disconnect shall be internal and of the plug-in type.
5. The motor shall be mounted on vibration isolators.
6. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced.
7. All fans shall bear the AMCA Certified Ratings program AMCA Air Performance seal and shall be UL/cUL Listed.
8. Fans shall be Model CSP as manufactured by Greenheck or approved equal.

2.2 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fans level and plumb.
- B. Support suspended units from structure using threaded steel rods and vibration isolators.
- C. Install units with clearances for service and maintenance.
- D. Label fans according to requirements specified in Division 23 Section "Mechanical Identification."

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."

- B. Install ducts adjacent to fans to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 1. Verify that shipping, blocking, and bracing are removed.
 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 3. Verify that cleaning and adjusting are complete.
 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 5. Adjust belt tension.
 6. Adjust damper linkages for proper damper operation.
 7. Verify lubrication for bearings and other moving parts.
 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 9. Refer to Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.
 10. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 233416

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

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 ceiling- and wall-mounted diffusers, registers, and grilles.
- B. Related Sections include the following:
 - 1. Division 23 Section "Duct Accessories" for fire dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

- A. Product Data: For each product indicated, include the following:
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser, Register, and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Coordination Drawings ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Duct access panels.
- C. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.
- D. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 DIFFUSERS AND REGISTERS

- A. Manufacturers:
 - 1. Titus
 - 2. Anemostat; a Mestek Company
 - 3. Carnes
 - 4. Or Approved Equal
- B. **Refer to drawings for types of diffusers, registers and grilles in this project. Model #'s and Mfr's names have been provided on the drawings.**

2.3 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.

- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Electrical equipment coordination and installation.
 - 2. Sleeves for raceways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common electrical installation requirements.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. Connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- E. Coordinate with asbestos abatement plans and specifications and with abatement contractor for all work that potentially will disturb asbestos.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.3 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.

3. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
4. Pressure Plates: Plastic. Include two for each sealing element.
5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.

- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 260519 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

- 2.1 In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 CONDUCTORS AND CABLES

- A. Manufacturers
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Pirelli Cable Corp
 - 5. Senator Wire & Cable Company.
 - 6. Southwire Company.
 - 7. Or Approved Equal.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW, USE and SO.
- D. Multiconductor Cable: Comply with NEMA WC 70 for armored cable, Type AC; metal-clad cable, Type MC; mineral-insulated, metal-sheathed cable, Type MI; Type SO and Type USE with ground wire.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. Illsco Corp
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. Penn Union
 - 6. 3M; Electrical Products Division.
 - 7. Tyco Electronics Corp.
 - 8. Thomas & Betts
 - 9. Or Approved Equal.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.4 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.5 SLEEVE SEALS

- A. Manufacturers:
 1. Advance Products & Systems, Inc.
 2. Calpico, Inc.
 3. Metraflex Co.
 4. Pipeline Seal and Insulator, Inc.
 5. Or Approved Equal.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 2. Pressure Plates: Plastic. Include two for each sealing element.
 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN or Type XHHW, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway; Armored cable, Type AC; Metal-clad cable, Type MC or Mineral-insulated, metal-sheathed cable, Type MI.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway; Armored cable, Type AC; Metal-clad cable, Type MC or Mineral-insulated, metal-sheathed cable, Type MI.

- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway; Armored cable, Type AC; Metal-clad cable, Type MC or Mineral-insulated, metal-sheathed cable, Type MI.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway; Armored cable, Type AC; Metal-clad cable, Type MC or Mineral-insulated, metal-sheathed cable, Type MI.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Type THHN-THWN, in raceway or Power-limited cable, concealed in building finishes.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Grounding for sensitive electronic equipment.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Single-phase motor and appliance branch circuits.
 - 4. Three-phase motor and appliance branch circuits.
 - 5. Flexible raceway runs.
 - 6. Armored and metal-clad cable runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
- C. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
 - 1. Division 26 Section "Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
1. Manufacturers:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Fabco Plastics Wholesale Limited.
 - d. Seasafe, Inc.
 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
 4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 5. Toggle Bolts: All-steel springhead type.

6. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports where permitted by signed and sealed shop drawings.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70 where permitted by signed and sealed shop drawings.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.
 6. To Light Steel: Sheet metal screws.
 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. NBR: Acrylonitrile-butadiene rubber.
- G. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Custom enclosures and cabinets.
- C. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section " Seismic Controls for Electrical Systems." Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term, "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Source quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
1. Comply with NFPA 70.
 2. N. J. Uniform Construction Code
 3. NECA 1

1.6 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

- A. Manufacturers:
1. AFC Cable Systems, Inc.
 2. Alflex Inc.
 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 5. Electri-Flex Co.

6. Manhattan/CDT/Cole-Flex.
 7. Maverick Tube Corporation.
 8. O-Z Gedney; a unit of General Signal.
 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- E. EMT: ANSI C80.3.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Fittings for EMT: Insulated set screws ½” through 2”; compression type 2 ½” through 4”; pie cast fittings are not permitted.
 2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.
- H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.3 NONMETALLIC CONDUIT AND TUBING

- A. Manufacturers:
1. AFC Cable Systems, Inc.
 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 3. Arnco Corporation.
 4. CANTEX Inc.
 5. CertainTeed Corp.; Pipe & Plastics Group.
 6. Condux International, Inc.
 7. ElecSYS, Inc.
 8. Electri-Flex Co.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Manhattan/CDT/Cole-Flex.
 11. RACO; a Hubbell Company.
 12. Thomas & Betts Corporation.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. LFNC: UL 1660.

- D. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: UL 514B.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal, Pull, and Junction Boxes: NEMA FB 1, cast aluminum or galvanized, cast iron with gasketed cover.

F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

G. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.6 SLEEVE SEALS

- A. Manufacturers:
 - 1. Advance Products & Systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: Rigid steel conduit or IMC.
 - 2. Concealed Conduit, Aboveground: Rigid steel conduit, IMC or EMT.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4.
- B. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit or IMC. Includes raceways in the following locations:
 - 3.
 - a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - b. Mechanical rooms.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 6. Damp or Wet Locations: Rigid steel conduit or IMC.

- 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel or nonmetallic in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed. Install a maximum of 150 feet between pull points, and reduce this by 25 feet for each 90 degree bend. Underground conduits for site lighting may be run a maximum of 200 feet between pole lights without an additional pull point. Underground service conduits shall meet the requirements of the utility company.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated. Install exposed at surface cabinets and for motor and equipment connection in electrical and mechanical rooms. Surface mounted installations in occupied areas, where allowed on the drawings, shall be equipped with skirts to cover conduits above and below the panels or boxes. Provide one empty 3/4 inch raceway for each three spare unused poles or spaces of each flush-mounted panelboard. Terminate empty 3/4 inch conduit in junction box, which after completion, is accessible to facilitate future branch circuit extension.
- H. Locate raceways so that strength of structural members is unaffected and they do not conflict with services of other trades. Install 1-inch or larger raceways in or through structural members (beams, slabs, etc.) only when and in manner accepted by Engineer. Draw up couplings and fittings full and tight. Protect exposed threads from corrosion by coating with red lead or zinc chromate after installation.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

- K. Tighten set screws of threadless fittings with appropriately sized screwdriver or nut driver as suits the screw design.
- L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
 - 1. .
- M. Flexible Connections: For equipment subject to vibration, noise transmission, or movement; and for all motors use a maximum of 36 inches of flexible conduit. Use LFMC in damp or wet locations. Install separate ground conductor across or through all flexible connections. Comply with NFPA 70 if more restrictive.
- N. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where otherwise required by NFPA 70.
- O. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
- P. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

3.3 BOXES

- A. Outlet and device boxes shall be located so as to not be blocked by millwork other equipment, or otherwise rendered not accessible or functional. Contractor shall relocate any boxes not meeting these criteria at no cost to the project.
- B. Boxes for switches near doors shall be located on the side opposite the hinge and close to the door trim.
- C. Covers for outlet boxes shall be of a type designed, intended and appropriate for the use and location, and have suitable corrosion protection. Device plates shall not be used as covers for exposed installations. Plates shall be installed plumb.
- D. Junction and pull boxes shall be used where necessary to facilitate the pulling of wire or cable.
- E. Consideration shall be given to the size and number of conductors, number of bends in the raceway, and the need for support of conductors in vertical raceways.
- F. Junction and pull boxes shall be of a type intended or suitable for the use and location.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

3.5 SLEEVE-SEAL INSTALLATION

- A. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260533

SECTION 260544 – SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

- B. Related Requirements:

1. Section 078443 "Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- F. Sleeves for Rectangular Openings:
 1. Material: Galvanized sheet steel.
 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 1. Sealing Elements: [EPDM] [Nitrile (Buna N)] rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 2. Pressure Plates: [Carbon steel] [Plastic] [Stainless steel].
 3. Connecting Bolts and Nuts: [Carbon steel, with corrosion-resistant coating,] [Stainless steel] of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Sealants: 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 that are not fire rated.
 - 2. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed (or unless seismic criteria require different clearance).
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using [steel] [cast-iron] pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260548 - SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Restraint channel bracings.
 2. Restraint cables.
 3. Seismic-restraint accessories.
 4. Mechanical anchor bolts.
 5. Adhesive anchor bolts.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
- B. Delegated-Design Submittal: For each seismic-restraint device.
1. Include design calculations and details for selecting seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Design Calculations: Calculate static and dynamic loading caused by equipment weight, operation, and seismic forces required to select seismic restraints.
 - a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
 3. Seismic -Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events
 - c. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis. They shall bear anchorage preapproval from OSHPD in addition to preapproval, showing maximum seismic-restraint ratings, by ICC-ES or another agency acceptable to authorities having jurisdiction. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) that support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- D. Comply with NFPA 70.
- E. Sustainability and LEED Standards:
 - 1. VOC content limitations defined in Section 018114, "Low-Emitting Materials."
 - 2. California Department of Public Health (CDPH) certification.
 - 3. Low-Emitting Flooring certification.
 - 4. California Air Resources Board (CARB) compliance.
 - 5. ANSI/BIFMA Standard Method M7.1 compliance.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
 - 1. Site Class as Defined in the IBC: C
 - 2. Assigned Seismic Use Group or Building Category as Defined in the IBC: III
 - a. Component Importance Factor: 1.5
 - b. Component Response Modification Factor: 2.5
 - c. Component Amplification Factor: 1.0
 - 3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 0.265
 - 4. Design Spectral Response Acceleration at 1.0-Second Period: .076

2.2 RESTRAINT CHANNEL BRACINGS

- A. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end, with other matching components, and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.3 RESTRAINT CABLES

- A. Restraint Cables: ASTM A 603 galvanize-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.4 SEISMIC-RESTRAINT ACCESSORIES

- A. Hanger-Rod Stiffener: Reinforcing steel angle clamped to hanger rod.
- B. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings.
- C. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchor bolts and studs.
- D. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices used.
- E. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.5 MECHANICAL ANCHOR BOLTS

- A. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.6 ADHESIVE ANCHOR BOLTS

- A. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an evaluation service member of ICC-ES.
- B. Indicate on Drawings, by details, schedules, or a combination of both, the locations where hanger rods for individual raceways, bus duct, cable trays, and hanger rods for trapeze hangers require hanger-rod stiffeners.
- C. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods caused by seismic forces.
- D. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Equipment and Hanger Restraints:
 - 1. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch
 - 2. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES providing required submittals for component.
- B. Install cables so they do not bend across edges of adjacent equipment or building structure.
- C. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- D. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- E. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the Design Consultant if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre-stressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole

and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

5. Set anchors to manufacturer's recommended torque using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Obtain Design Consultant's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 2. Test at least four of each type and size of installed anchors and fasteners selected by Design Consultant.
 3. Test to 90 percent of rated proof load of device.
- B. Seismic controls will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 260548

SECTION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Identification for raceway and metal-clad cable.
 - 2. Identification for conductors and communication and control cable.
 - 3. Warning labels and signs.
 - 4. Instruction signs.
 - 5. Equipment identification labels.
 - 6. Miscellaneous identification products.

1.3 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.2 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
- C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.
- D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches.
- E. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.3 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and ultraviolet-resistant seal for label.
- B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- C. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- D. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength: 50 lb, minimum.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.
- B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- B. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape and write-on tags.
- C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- D. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
1. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- E. Instruction Signs:
1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect.
- F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with the equipment. Apply labels to disconnect switches unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
 2. Equipment to Be Labeled:
 - a. Panelboards
 - b. Disconnect switches.
 - c. Enclosed circuit breakers.
 - d. Motor starters.
 - e. Contactors.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

- F. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 18 inches overall.
- I. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Time switches.
2. Photoelectric switches.
3. Indoor occupancy switchbox-mounted occupancy and motion sensors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data

1.5 QUALITY ASSURANCE

A. Sustainability and LEED Standards:

1. VOC content limitations defined in Section 018114, "Low-Emitting Materials."
2. California Department of Public Health (CDPH) certification.
3. Low-Emitting Flooring certification.
4. California Air Resources Board (CARB) compliance.
5. ANSI/BIFMA Standard Method M7.1 compliance.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

A. Basis of Design: Watt Stopper, Leviton or approved equal.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Contact Configuration: SPST
3. Contact Rating: 20-A ballast load, 120-/240-V ac.
4. Programs: Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.

5. Programs: Two on-off set points on a 24-hour schedule, allowing different set points for each day of the week.
6. Astronomic Time: All channels.
7. Automatic daylight savings time changeover.
8. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

A. Acceptable Manufacturers:

1. Watt Stopper
2. Leviton
3. Or approved equal

B. Description: Solid state with SPST or approved equal dry contacts rated for 1800 VA to operate connected load complying with UL 773.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
3. Time Delay: Thirty-second minimum, to prevent false operation.
4. Lightning Arrester: Air-gap type.
5. Mounting: Twist lock complying with NEMA C136.10, with base.

2.3 INDOOR OCCUPANCY SENSORS

A. Acceptable Manufacturers:

1. Watt Stopper
2. Leviton
3. Or approved equal

B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
5. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
7. Bypass Switch: Override the "on" function in case of sensor failure.

8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.

C. PIR Type: Ceiling mounted; detect occupants in coverage area by their heat and movement.

1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in.
2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot- high ceiling.

2.4 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Acceptable Manufacturers:

1. Watt Stopper
2. Leviton
3. Or approved equal

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.

C. Wall-Switch Sensor Tag Doc:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft.
2. Sensing Technology: [PIR] [Dual technology - PIR and ultrasonic].
3. Switch Type: SP.
4. Voltage: [Match the circuit voltage] [120 V] [Dual voltage, 120 and 277 V]; type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.5 OUTDOOR MOTION SENSORS

A. As per drawings.

2.6 LIGHTING CONTACTORS

A. Acceptable Manufacturers:

1. Watt Stopper
2. Leviton

3. Or approved equal
- B. Description: Electrically operated and held combination-type lighting contactors with fusible switch complying with NEMA ICS 2 and UL 508.
1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
 2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
 3. Enclosure: Comply with NEMA 250.
 4. Provide with control and pilot devices as indicated on Drawings matching the NEMA type specified for the enclosure.

2.7 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 23.
- B. Classes 2 and 3 Control Cable: Multi-conductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 23.
- C. Class 1 Control Cable: Multi-conductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 23.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.
- B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit District's operations.
- C. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.
- D. Wiring Method: Comply with S Division 23. Minimum conduit size is 1/2 inch.
- E. Identify components and power and control wiring according to Division 23.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.

- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 260923

SECTION 262726 – WIRING DEVICES

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. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Snap switches and wall-box dimmers.
 - 3. Wall-switch and exterior occupancy sensors.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- C. Comply with NFPA 70.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper; 5351 (single), 5352 (duplex).
 - b. Hubbell; HBL5351 (single), CR5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper; XGF20.
 - b. Hubbell; GF5352.
 - c. Leviton; 6898.
 - d. Pass & Seymour; 2084.

2.4 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
 - b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
- C. Pilot Light Switches, 20 A:
 - 1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper; 2221PL for 120 V and 277 V.
 - b. Hubbell; HPL1221PL for 120 V and 277 V.
 - c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.
 - d. Pass & Seymour; PS20AC1-PLR for 120 V.
 - 2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

2.5 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - 1. Wiring Devices connected for general duty shall be grey; connected for computers shall be white, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.
5. Alternatively, if installed before wall repair or painting; provide protective covers for the devices. Replace any devices that have mortar, wallboard compound or are painted on visible or operative surfaces.
6. Openings or cuts around boxes, in wallboard or block walls, shall not exceed 1/8 inch. Coordinate repair of wall surface to match surrounding to comply with this requirement.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin GFCI receptacles so that wording is oriented for normal reading. Install ground pin of vertically mounted standard receptacles to match the orientation of GFCI receptacles.

- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. No opening in the wall shall be visible around the plate.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
 - 1. Receptacles: Identify panelboard and circuit number from which served. Write on inside of device plate with indelible marker and use durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Test straight blade convenience outlets in patient-care areas for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz.

END OF SECTION 262726

SECTION 262813 – FUSES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Cartridge fuses rated 600 V and less.

1.2 SUBMITTALS

- A. Product Data: For each fuse type indicated.
- B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA FU 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussman, Inc.
 - 2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Tracor, Inc.; Littelfuse, Inc. Subsidiary.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

PART 3 - EXECUTION

3.1 FUSE APPLICATIONS

- A. Service Entrance: Class L, time delay 6r J, time delay.
- B. Feeders: Class L, time delay 6r J, time delay.
- C. Motor Branch Circuits: Class RK5, time delay.
- D. Other Branch Circuits: Class RK5, time delay 6r J, time delay.

3.2 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

- A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 262813

SECTION 262816 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Non-Fusible switches.
 - 3. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Include evidence of NRTL listing for series rating of installed devices.
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Qualification Data: For qualified testing agency.
- D. Field quality-control reports.
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

- E. Manufacturer's field service report.
- F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 - 2. Fuse Pullers: Two for each size and type.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Specific fuse types noted on the drawings shall override general requirements of Division 26 section "FUSES."
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240 and 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Lugs: Mechanical type, suitable for number, size, and conductor material.
- D. General Requirements: Comply with ASME A17.1, UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.

- E. Switches: Three-pole, horsepower rated, with integral shunt trip mechanism and Class J fuse block; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- F. Control Circuit: 120-V ac; obtained from integral control power transformer, with primary and secondary fuses, with a control power transformer of enough capacity to operate shunt trip, connected pilot, and indicating and control devices.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration Controls for Electrical Systems."

- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 265100 – LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Interior luminaires.
- 2. Emergency lighting units.
- 3. Luminaires supports.

- B. Related Sections:

- 1. Division 26 Section "Lighting Control Devices" has been depicted on the floor plans and wiring diagram drawings The controls must be submitted for review and approval with the lighting as a package.

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CCT: Correlated color temperature
- C. CRI: Color-rendering index.
- D. CU: Coefficient of utilization
- E. LER: Luminaire efficacy rating.
- F. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Driver and diodes factor.
 - 4. Energy-efficiency data.
 - 5. Life, output, CCT, CRI, lumens and energy-efficiency data for luminaires.

6. Photometric data, in IESNA format, based on laboratory tests of each luminaire type, outfitted with accessories identical to those indicated for the luminaires as applied in this Project. Provide conversion factors for all luminaire data if not the same as supplied for this project.
- B. Shop Drawings: For the specified luminaires and the mandated energy code required specified controls/
- C. Product Certificates: For each type of ballast for dimmer-controlled fixtures, from manufacturer.
- D. Qualification Data: For qualified agencies providing photometric data for lighting fixtures.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
- G. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Comply with NFPA 70.
- C. Provide specified manufacturer as listed in the Luminaire Schedule or an equal substitute manufacturer. Substitute must be equal in quality & performance.

1.6 COORDINATION

- A. Coordinate layout and installation of lighting fixtures.
 1. Structural members to which suspension systems for lighting fixtures will be attached.

1.7 WARRANTY

- A. Special Warranty for Emergency Luminaires Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 1. Warranty Period for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.

2. Completion.
- B. Special Warranty for LED: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Warranty Period: Ten year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In the Luminaire Schedule where titles below are column or row headings that introduce lists or are added in notes for particular luminaire types, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 2. Basis-of-Design Product: The design for each luminaire is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by another manufacturer equal to the specified. Provide manufacturers data sheets and point-to point calculations for the substituted luminaires.

2.2 EMERGENCY LED BATTERY UNITS

- A. Description: Self-contained units complying with UL 924.
1. Battery: Sealed, maintenance-free, lead-acid type.
 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 6. Integral Time-Delay Relay: Holds unit on for fixed interval of 10 minutes when power is restored after an outage.

7. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.

PART 3 - PRODUCTS

3.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. CRI of minimum 80; CCT of 3500 K
- C. Rated lamp life of minimum 50,000 hours.
- D. LED dimmable from 100 percent to 0 percent of maximum light output.
- E. Internal driver.
- F. Nominal Operating Voltage – see Luminaire Schedule on plans.

PART 4 - EXECUTION

4.1 INSTALLATION

- A. Luminaires: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
 1. Provide support chains or rods connected to building structure.
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

4.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100