



# **KITCHEN & CAFETERIA RENOVATION**

**AT**

**NORTH PROVIDENCE**

**HIGH SCHOOL**

**1828 MINERAL SPRING AVE,  
NORTH PROVIDENCE, RI 02904**

**JANUARY 6, 2025**

Prepared By

**StudioJAED**

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**END OF SECTION 00 01 10**

**SECTION 00 11 13**

**ADVERTISEMENT FOR BIDS**

North Providence Public Schools hereinafter called "NPS" will receive sealed bids for the following:

**Kitchen & Cafeteria Renovation - North Providence High School**

Sealed Bids shall be received at the office of the School Administration Building, 1820 Mineral Spring Ave, North Providence, RI 02904 addressed to Lori Lazzarschi, Comptroller, no later than: **2:00 PM on February 6, 2025** for the **"Kitchen & Cafeteria Renovation - North Providence High School"**. Bids will be publicly opened and read aloud following submission.

Bids received after the stipulated time shall not be accepted and will be returned unopened.

All Bids must be submitted in a sealed envelope addressed to Lori Lazzarschi, Comptroller, North Providence School Administration Building, 1820 Mineral Spring Ave, North Providence, RI 02904, and must be plainly marked in the lower left-hand corner, **"Kitchen & Cafeteria Renovation - North Providence High School"**. Please provide two (2) hard copies and one (1) electronic copy on USB with your submittal.

A **Non-Mandatory Pre-Bid** on site meeting is scheduled for **3:30 p.m. on January 21, 2025 at North Providence High School, 1828 Mineral Spring Ave, North Providence, RI 02904.**

Copies of the bid documents may be downloaded from the following .ftp site starting at **4:00 PM on January 17, 2025.**

[https://drive.google.com/drive/folders/1qpV7cahrtTqAvt85bWU\\_fBIGLqVij7vu?usp=drive\\_link](https://drive.google.com/drive/folders/1qpV7cahrtTqAvt85bWU_fBIGLqVij7vu?usp=drive_link)

No Bids may be withdrawn for a period of 60 calendar days subsequent to the date of the bid opening. North Providence public Schools reserves the right to waive any informality and to reject any and all bids or to accept any bids deemed to be in the best interest of the School Department.

This project is a prevailing wage project and requires a 5% Bid Bond. The project requires 15% MBE/WBE Participation. The successful bidder will be required to furnish 100% Payment and Performance Bonds at the time of award.

**END OF SECTION 00 11 13**

**SECTION 00 20 00**

**GENERAL TERMS & CONDITIONS/BID FORM/NON-COLLUSION AFFIDAVIT**

1. North Providence Public Schools (NPS) reserves the right to reject any and all bids/proposals and to waive any informality that is in the best interest of NPS.
2. The Bidder shall guarantee the total price of the bid/proposal for a period of not less than 60 days from the deadline for submission of bids/proposals.
3. The Proposer shall provide all necessary personnel, materials and equipment to perform and complete all work under this bid/proposal within the following Contract Time requirements:
  - A. Immediately upon receipt of Award – Vendor to begin submittal process.**
  - B. Substantial Completion - on or about August 15, 2025**
  - C. Project Completion – August 30, 2025**
4. All original documents and drawings shall become the property of NPS after completion of the Bidder's/Proposer's work.
5. NPS intends to recommend award of a contract to the School Committee within 60 days of the bid opening. The Bidder/Proposer shall be prepared to commence work immediately upon execution of a contract with NPS.
6. Awards will not be made to any person, firm or company in default of a contract with NPS, the Town of North Providence, the State of Rhode Island or the Federal Government.
7. The Proposer hereby agrees that it will assign to NPS all cause of action that it may acquire under the anti-trust laws of Rhode Island and the United States as the result of conspiracies, combination of contracts in restraint of trade which affect the price of goods or services obtained by NPS under this contract if so requested by NPS.
8. NPS is exempt from all sales and Federal excise taxes. Please bill less these taxes.
9. Unless otherwise specified all costs listed are firm for the term of the contract.
10. Neither party shall be liable for any inability to perform its' obligations under any subsequent agreement due to war, riot, insurrection, civil commotion, fire, flood, earthquake, storm or other act of God.
11. Notification of the parties shall be considered to have been constructively received via email, as stated in the contract to: Jim Fuoroli [jim.fuoroli@npsd.k12.ri.us](mailto:jim.fuoroli@npsd.k12.ri.us)
12. Non-Collusion Affidavit: Bidders/Proposers shall submit a Non-Collusion Affidavit with their Proposals. See Attachment B. If there is reason to believe that collusion exists among the Proposers, NPS may refuse to consider bids/proposals from participants in such collusion.
13. Formation of Contract. Bidder's/Proposer's signed Bid/Proposal and NPS's written acceptance shall constitute a binding contract. The Agreement for the Work will be written on AIA Document A101,

Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is a Stipulated Sum.

14. The successful Bidder/Proposer shall provide proof of the following insurance specifications:

- a. Workers' Compensation:
  1. State-Statutory
  2. Employer's Liability-\$500,000
- b. Comprehensive General Liability  
(Note-including Premises-Operations; Independent Contractors; Protective; Broad Form Property Damage, All Risk).Professional Services Liability Insurance for errors and omissions (\$1,000,000.00 minimum)
  1. Bodily Injury:
    - a. \$1,000,000-Each Occurrence
    - b. \$1,000,000-Annual Aggregate
  2. Property Damage:
    - a. \$500,000-Each Occurrence
    - b. \$500,000-Annual Aggregate
- c. Contractual Liability:
  1. Bodily Injury-\$1,000,000 Each Person
  2. Property Damage liability-\$500,000 Each Occurrence, 500,000 Annual aggregate.
- d. Personal Injury, with Employment Exclusion Deleted:
  1. \$500,000-Annual Aggregate
- e. Comprehensive Automobile Liability:
  1. Bodily Injury-\$500,000 Each Person; \$1,000,000 Each Occurrence
  2. Property Damage-\$500,000-Each Occurrence
- f. All Risk:
  1. As required, no deductible
- g. Additional Insured: North Providence Public Schools and the Town of North Providence shall be named as additional insured on this policy.

15. Prevailing Wages: Any construction over \$ 1,000.00 is required by state law to pay state prevailing wage. A current copy of the most recent Prevailing Wage scale is obtained from the State of Rhode Island, Department of Labor and Training, Division of Professional Regulation or at the Davis-Bacon Wage Determination link. It is also by request for each construction bid document. All vendors supplying construction services must submit certified payrolls from any contractor and sub-contractor who work on the project. No payments are made until all payrolls are up to date, and correct. Click here for Prevailing Wage Tables. <http://www.dlt.ri.gov/pw>.

16. The Technical Point of Contact (POC) for this package is Jim Fuoroli [jim.fuoroli@npsd.k12.ri.us](mailto:jim.fuoroli@npsd.k12.ri.us)

17. The safety of the pupils and teachers requires that nothing shall be done, in any way, to block the passageways in or about the exits themselves. Neither shall there be any unauthorized interference with the free and unobstructed use of hallways, stairways, toilets and rooms. When necessary for mechanics to work in any portion of the premises normally occupied by the school, application must be made, before entering, to the Facilities Director, who will perfect a working agreement with the principal of the school so that work may be carried out.
18. Indemnification: The Contractor will indemnify and hold harmless NPS and its agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of fees or resulting from the negligent acts, errors or omissions in the performance of the Agreement by the Contractor, its officials, employees, agents and subcontractors.
19. Authorized Signatures: Every bid must be signed by the person or persons legally authorized to bind the Proposer to a contract for the execution of the work. Upon request of NPS, any agent submitting a bid on behalf of a Proposer shall provide a current power of attorney certifying the agent's authority to bind the Proposer. If an individual makes the bid, his or her name, signature, and post office address must be shown. If a firm or partnership makes the bid, the name and post office address of the firm or partnership and the signature of at least one of the general partners must be shown. If a corporation makes the bid, the bid shall show the name of the state under the laws of which the corporation is chartered, the name and post office address of the corporation and the title of the person signing on behalf of the corporation. Upon request of NPS, the corporation shall provide a certified copy of the bylaws or resolution of the board of directors showing the authority of the officer signing the bid to execute contracts on behalf of the corporation.
20. Award of Bid: Award will be made to the Bidder/Proposer offering the most advantageous bid to NPS.
21. Cancellation of Solicitation: NPS may cancel this bid/solicitation at any time.
22. Shop Drawings: When stated in the specifications, the successful bidder shall prepare all shop drawings of all items called for, and submit prints, cuts, brochures and the like in duplicate or more, as requested by the Owner, for approval before fabrication and/or installation. Format shall be AutoCAD, two full size copies and one copy in electronic format
23. Operating and Maintenance Brochures: The successful bidder shall furnish the Owner with all applicable operating and maintenance brochures for all equipment and accessories purchased by North Providence Public Schools.
23. References and prior work performed for North Providence Public Schools will be used in the bid evaluation. See Attachment C.
24. List the Officers of your Corporation or Principals of your LLC. Award cannot be done without the attachment. See Attachment D.
25. A background check must be completed with the Bureau of Criminal Identification and Investigation prior to construction start.

**ATTACHMENT A**

**Bid Form: Kitchen & Cafeteria Renovation - North Providence High School**

WHEREAS, North Providence Public Schools has duly asked for bids for the supply of goods and/or services in accordance with the aforementioned specifications;

The person or entity below does irrevocably offer to perform the services and/or furnish the goods in accordance with the specifications/proposal which are hereby incorporated by reference in exchange for the bid price below;

The offer shall remain open and irrevocable until North Providence Public Schools shall transform the bid into a contract.

(To be completed, notarized and submitted with Proposal)

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Bidder's Signature: \_\_\_\_\_

Bidder's Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number \_\_\_\_\_

Email: \_\_\_\_\_

**Base Bid**

Total Cost: \$ \_\_\_\_\_

Base Bid

Total Cost in Words: \_\_\_\_\_



**ATTACHMENT B**

**Non Collusion Affidavit**

To be completed, notarized and submitted with Bid/Proposal.

State of Rhode Island County of Providence

" \_\_\_\_\_," Bidder/Proposer, being first duly sworn, deposes and says that he or she is Owner of the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid."

Date (Signed at): \_\_\_\_\_

Proposer name Authorized Representative (Person, Firm, Corp.) \_\_\_\_\_

Address: \_\_\_\_\_ Representative's Name: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_ Representative's Title: \_\_\_\_\_





**SECTION 00 68 00**

**NONRESIDENT CONTRACTORS**

**ATTENTION OF ALL CONTRACTORS IS HEREBY DIRECTED TO THE FOLLOWING EXCERPTS FROM THE GENERAL LAWS OF RHODE ISLAND, RELATIVE TO THE CONDITIONS TO NONRESIDENT CONTRACTORS DOING BUSINESS WITHIN THE STATE OF RHODE ISLAND.**

**NOTICE – “TO ALL PERSONS ENGAGING NONRESIDENT CONTRACTORS”**

**RELATIONS RE: CONTRACTORS AND SUBCONTRACTORS – “REGULATION C”**

**ARTICLE III. NONRESIDENT CONTRACTORS**

Any individual, partnership, joint venture, corporation, state municipal government or exempt organization awarding a construction contract in Rhode Island to a nonresident contractor (as hereinafter defined) is required, pursuant to Section 44-1-6 of the General Laws, as last amended, to withhold 3% of the contract price to secure payment of any sales and use tax or income tax withheld, or both, that may be due to the State of Rhode Island in carrying out the contract.

Upon completion of the contract, the nonresident contractor is required to notify the Tax Administrator in writing by certified or registered mail to audit his records for the particular project. At such time he is required to have available on the job site or within this state, sales and use tax records and employee's personal income tax withheld records.

Receipted copies of this request are to be furnished by the Tax Administrator to the nonresident contractor and the person holding the funds.

The Tax Administrator shall, within 30 days after receipt of the request, audit the records and provide by certified mail to the person holding the funds and to the nonresident contractor, either a certificate of no tax due or a notice of taxes due.

The persons holding the funds is required to pay to the Tax Administrator the amount set forth in the notice of taxes due, including interest and penalties but not in excess of 3% of the contract price. Moneys withheld in excess of taxes due the Tax Administrator may be paid over to the nonresident contractor.

If the Tax Administrator does not furnish a certificate of no tax due or notice of taxes due within 30 days after receipt of the request for the making of the audit, the person holding the funds may remit the full amount due to the nonresident contractor. The Tax Administrator shall not have any claim against such funds in the hand of the person holding funds.

**“DEFINITION OF NONRESIDENT CONTRACTOR”**

A nonresident contract is one who does not maintain a regular place of business in this state. A regular place of business shall be deemed to mean and include any bona fide office (other than a statutory office), factory, warehouse or other space in this state at which the taxpayer is doing business in its own name in a regular and systematic manner, and which is continuously maintained, occupied and used by the taxpayer in carrying on its business through employees regularly in attendance. A temporary office at the site of construction shall not constitute a regular place of business.

In order to effectively implement this legislative change which became effective on passage, nonresident contractors shall forward such notice of completion be certified or registered mail (in duplicate) to the Division of Taxation.

Tax Administrator

44.1.6 Additional collection powers – Nonresident contractors

(a) Any person doing business with a nonresident contractor shall withhold payment an amount of three percent (3%) of the contract price until thirty (30) days after said contractor has completed his contract and has requested the tax administrator, in writing, to the audit his records for the particular project, a receipted copy of such request to be furnished to the person holding the funds. The tax administrator shall within thirty (30) days after receipt of the request to furnish to said nonresident contractor and to the person holding the funds either a certificate of no tax due or a certificate of sales and use tax or income tax withheld, or both, due from the nonresident contractor.

Upon receipt of a certificate of no tax due, the person holding such payment may pay the nonresident contractor the same. Upon receipt of a certificate of taxes due, he may pay the nonresident contractor the same. Upon receipt of a certificate of taxes due, he may pay to said contractor out of such amount withheld the excess over the amount of taxes set forth in the certificate together with the interest and penalties then assessed. If the tax administrator furnished neither certificate to both parties within thirty (30) days after receipt of a written request for making of the audit, the person holding such payment may forthwith pay the payment withheld to the nonresident contractor under the terms of the contract free from any claims of the tax administrator against either the person holding such payment or the nonresident contractor for payment of sales or use taxes or income taxes withheld or both.

In the event the tax administrator shall serve upon said contractor and the person holding such payment a certificate showing the taxes due within such thirty (30) day period, the person holding such payment shall deposit with the tax administrator the amount set forth in the certificate which is not in excess of three percent (3%) of such contract price, taking a receipt for the same, and shall thereupon be free from any such claim of the nonresident contractor for such amount or of the tax administrator for sales and use taxes or income taxes withheld, or both, arising out of the materials, equipment and services used in performance of the contract of the nonresident contractor on that project.

(b) As used in this section, a nonresident contractor is one who does not maintain a regular place of business in this state. A regular place of business shall be deemed to mean and include any bonafide office (other than a statutory office), factory, warehouse or other space in this state at which the taxpayer is doing business in its own name in a regular and systematic manner and which is continuously maintained, occupied and used by the taxpayer in carrying on its business through its regular employees regularly in attendance. A temporary office at the site of construction shall not constitute a regular place of business.

**END OF SECTION 00 68 00**

**SECTION 00 73 00**

**MINORITY BUSINESS ENTERPRISE REQUIREMENTS AND WOMEN  
BUSINESS ENTERPRISE PARTICIPATION REQUIREMENTS**

Under Rhode Island General Laws §37-14.1, Minority business enterprises shall be included in all procurements and construction projects under this chapter and shall be awarded a minimum of fifteen percent (15%) of the dollar value of the entire procurement or project. Of that fifteen percent (15%), minority business enterprises owned and controlled by a minority owner, shall be awarded a minimum of seven and one-half percent (7.5%), and minority business enterprises owned and controlled by a woman shall be awarded a minimum of seven and one-half percent (7.5%).

The successful bidder shall substantiate this participation within ten (10) days after receipt of Notice of Award.

**END OF SECTION 00 73 00**

## SECTION 01 10 00

### SUMMARY

#### PART 1 GENERAL

##### 1.01 PROJECT

- A. Project Name: North Providence High School Cafeteria Renovation.
- B. Owner's Name: North Providence Public Schools.
- C. The Project consists of renovations to the existing kitchen, cafeteria, and restrooms in North Providence High School.

##### 1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

##### 1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of work is as indicated on the drawings.

##### 1.04 ADDITIONAL PROJECT REQUIREMENTS

- A. The Contractor is responsible for all required applications, reviews, permits, and associated fees. All fees shall be included in the Contractor's bid proposal.
- B. The Contractor shall include an Owner's Contingency Allowance as specified in Section 01 21 00. The Allowance shall be included in the Contractor's bid proposal.

##### 1.05 WORK BY OWNER

- A. Owner reserves the right to complete work or award separate contracts for work in and around the work area during this contract.

##### 1.06 CONCURRENT WORK

- A. The following work will be completed concurrently with this contract.
  - 1. None

##### 1.07 OWNER OCCUPANCY

- A. North Providence Public Schools intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Cooperate with North Providence Public Schools to minimize conflict and to facilitate North Providence Public Schools's operations.
- C. Schedule the Work to accommodate North Providence Public Schools occupancy.

##### 1.08 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
  - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
  - 1. North Providence Public Schools occupancy.
  - 2. Work by Others.
  - 3. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by North Providence Public Schools:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Contractor shall be required to provide temporary sanitary facilities.
- E. Existing building spaces may not be used for storage.

F. Time Restrictions:

1. Days/Hours of construction shall be limited to Monday thru Friday, 7:00 am to 5:00 pm. Work outside of these hours must be coordinated in advance with the School and the School Department.

G. Utility Outages and Shutdown:

1. Limit disruption of utility services to hours the building is unoccupied.
2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to North Providence Public Schools and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

**1.09 WORK SEQUENCE**

- A. Coordinate construction schedule and operations with North Providence Public Schools.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 01 10 00**



**SECTION 01 20 00**  
**PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Price and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

**1.02 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- E. Revise schedule to list approved Change Orders, with each Application For Payment.

**1.03 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to StudioJAED for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Percentage of Completion.
  - 9. Balance to Finish.
  - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit one copy of each Application for Payment electronically.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 01 30 00.
  - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
  - 3. Current construction photographs specified in Section 01 30 00.
  - 4. Partial release of liens from major subcontractors and vendors.

5. Affidavits attesting to off-site stored products.
- K. When StudioJAED requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

#### **1.04 MODIFICATION PROCEDURES**

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Price or Contract Time, StudioJAED will issue instructions directly to Contractor.
- C. For other required changes, StudioJAED will issue a document signed by North Providence Public Schools instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  1. The document will describe the required changes and will designate method of determining any change in Contract Price or Contract Time.
  2. Promptly execute the change.
- D. For changes for which advance pricing is desired, StudioJAED will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 5 days.
- E. Contractor may propose a change by submitting a request for change to StudioJAED, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 60 00.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  1. For change requested by StudioJAED for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by StudioJAED.
  3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  4. For change ordered by StudioJAED without a quotation from Contractor, the amount will be determined by StudioJAED based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
  1. On request, provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: StudioJAED will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

#### **1.05 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Price, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01 70 00.

#### **1.06 INITIAL PROGRESS PAYMENT PROCEDURES**

- A. The following items must be complete and submitted to the owner prior to acceptance and/or payment of the initial application for payment:
  1. Approved Schedule of Values
  2. Complete listing of Subcontractors
  3. Contractors Safety Plan
  4. Emergency Action Plan and Emergency Contacts
  5. Contractors Certificate of Insurance
  6. Contractors Submittal Schedule
  7. Approved Contractor's Construction Schedule (Preliminary if not final)

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION 01 20 00**

**SECTION 01 25 00**  
**SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 RELATED REQUIREMENTS**

- A. Requests for substitution must be made ten days prior to bid. Requests for substitution made after the bid may be considered by the Owner/Architect at their discretion and only under extra-ordinary conditions that could not be determined during the bidding period.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.03 SUMMARY**

- A. This Section includes administrative and procedural requirements for handling requests for substitutions.
- B. Related Sections: The following Divisions contain requirements that relate to this Section:
  - 1. Division 01 specifies that applicability of industry standards to products specified.
  - 2. Division 01 specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
  - 3. Division 01 specifies requirements governing the Contractor's selection of products and product options.

**1.04 DEFINITIONS**

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor. The following are not considered to be requests for substitutions:
  - 1. Revisions to the Contract Documents requested by the Owner or Architect.
  - 2. Specified options of products and construction methods included in the Contract Documents.
  - 3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

**1.05 SUBMITTALS**

- A. Substitution Request Submittal: Substitution requests will only be considered during the bidding period. Substitutions will not be considered after the bids are accepted.
  - 1. Submit three copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change order proposals and utilizing the CSI Substitution Request Form 13.1A. The contractor is solely responsible for obtaining the required forms to submit before the stated time period expires.
  - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
  - 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
    - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.

- c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
  - d. Samples, where applicable or requested.
  - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
  - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
  - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
  - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within two weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later.
- a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

## **PART 2 PRODUCTS**

### **2.01 SUBSTITUTIONS**

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
1. Revisions to the Contract Documents are not required.
  2. Proposed changes are in keeping with the general intent of the Contract Documents.
  3. The request is timely, fully documented, and properly submitted.
  4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
  5. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
  6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
  7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
  8. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

## **PART 3 EXECUTION**

### **3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  2. Agrees to provide the same warranty for the substitution as for the specified product.
  3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to North Providence Public Schools.
  5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Contractor's Substitution Request documentation must include the following:
    - a. Project Information:
      - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
      - 2) North Providence Public Schools's, StudioJAED's, and Contractor's names.
    - b. Substitution Request Information:
      - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
      - 2) Indication of whether the substitution is for cause or convenience.
      - 3) Issue date.
      - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
      - 5) Description of Substitution.
      - 6) Reason why the specified item cannot be provided.
      - 7) Differences between proposed substitution and specified item.
      - 8) Description of how proposed substitution affects other parts of work.
    - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
      - 1) Physical characteristics.
      - 2) In-service performance.
      - 3) Expected durability.
      - 4) Visual effect.
      - 5) Sustainable design features.
      - 6) Warranties.
      - 7) Other salient features and requirements.
      - 8) Include, as appropriate or requested, the following types of documentation for proposed substitution and for specified product in order to expedite review:
        - (a) Product Data:
        - (b) Samples.
        - (c) Certificates, test, reports or similar qualification data.
        - (d) Drawings, when required to show impact on adjacent construction elements.
    - d. Impact of Substitution:
      - 1) Savings to North Providence Public Schools for accepting substitution.
      - 2) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.

### **3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. North Providence Public Schools will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.

### **3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Under extra-ordinary conditions, submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by StudioJAED, in order to stay on approved project schedule.
- B. Substitutions will not be considered under one or more of the following circumstances:
  - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  - 2. Without a separate written request.
  - 3. When acceptance will require revisions to Contract Documents.

### **3.04 RESOLUTION**

- A. StudioJAED may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

**END OF SECTION 01 25 00**



**SECTION 01 30 00**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Requests for Interpretation (RFI) procedures.
- J. Submittal procedures.

**1.02 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to StudioJAED:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 10. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. North Providence Public Schools will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. North Providence Public Schools.
  - 2. StudioJAED.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of North Providence Public Schools-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
  - 5. Submission of initial Submittal schedule.
  - 6. Designation of personnel representing the parties to Contract, OMB and StudioJAED.



7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to StudioJAED, North Providence Public Schools, participants, and those affected by decisions made.

### **3.02 SITE MOBILIZATION MEETING**

- A. North Providence Public Schools will schedule a meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
1. Contractor.
  2. North Providence Public Schools.
  3. StudioJAED.
  4. Contractor's Superintendent.
  5. Contractor's Project Manager.
  6. Major Subcontractors.
- C. Agenda:
1. Use of premises by North Providence Public Schools and Contractor.
  2. North Providence Public Schools's requirements and occupancy prior to completion.
  3. Construction facilities and controls provided by Contractor and Owner.
  4. Temporary utilities provided by North Providence Public Schools.
  5. Security and housekeeping procedures.
  6. Schedules.
  7. Application for payment procedures.
  8. Procedures for maintaining record documents.
  9. Requirements for start-up of equipment.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to StudioJAED, North Providence Public Schools, participants, and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. Attendance Required: North Providence Public Schools, StudioJAED, and Contractor.
- C. Agenda:
1. Review minutes of previous meetings.
  2. Review of Work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Review of RFIs log and status of responses.
  7. Review of off-site fabrication and delivery schedules.
  8. Maintenance of progress schedule.
  9. Corrective measures to regain projected schedules.
  10. Planned progress during succeeding work period.
  11. Coordination of projected progress.
  12. Maintenance of quality and work standards.
  13. Effect of proposed changes on progress schedule and coordination.
  14. Other business relating to Work.
  15. Provide three week look ahead.

### 3.04 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 5 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 5 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

### 3.05 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to StudioJAED.
- D. Views:
  - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  - 2. Consult with StudioJAED for instructions on views required.
  - 3. Provide factual presentation.
  - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- E. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
  - 1. Delivery Medium: Via email.
  - 2. File Naming: Include project identification, date and time of view, and view identification.
  - 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

### 3.06 REQUESTS FOR INTERPRETATION (RFI)

- A. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.
  - 2. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
  - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  - 2. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.

- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  2. North Providence Public Schools's, StudioJAED's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date, and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.
  3. Highlight items requiring priority or expedited response.
- G. Review Time: StudioJAED will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to North Providence Public Schools.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
  2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
  3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
  4. Notify StudioJAED within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

### **3.07 SUBMITTAL SCHEDULE**

- A. Submit to StudioJAED for review a schedule for submittals in tabular format.
1. Coordinate with Contractor's construction schedule and schedule of values.
  2. Format schedule to allow tracking of status of submittals throughout duration of construction.
  3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
  4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

- a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

### **3.08 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to StudioJAED for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

### **3.09 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  1. Design data.
  2. Certificates.
  3. Test reports.
  4. Inspection reports.
  5. Manufacturer's instructions.
  6. Manufacturer's field reports.
  7. Other types indicated.
- B. Submit for StudioJAED's knowledge as contract administrator or for North Providence Public Schools. No action will be taken.

### **3.10 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. When the following are specified in individual sections, submit them at project closeout:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- B. Submit for North Providence Public Schools's benefit during and after project completion.

### **3.11 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Extra Copies at Project Closeout: See Section 01 78 00.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by StudioJAED.
  1. After review, produce duplicates.
  2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.12 SUBMITTAL PROCEDURES**

- A. General Requirements:
  1. Use a single transmittal for related items.
  2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.

3. Preface each submittal with the appropriate specification section number and follow with a sequential identifying number. For revised submittals use original number and append a sequential numerical revision number.
  4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will be returned without review.
  6. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving StudioJAED's consultants, North Providence Public Schools, or another affected party, allow an additional 7 days.
  7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  8. Provide space for Contractor and StudioJAED review stamps.
  9. When revised for resubmission, identify all changes made since previous submission.
  10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
  11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  12. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
  2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

**END OF SECTION 01 30 00**

## **SECTION 01 31 00**

### **PROJECT MANAGEMENT AND COORDINATION**

#### **PART 1 - GENERAL**

##### **1.01 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.

##### **1.02 SUMMARY**

- A. This Section includes administrative provisions for coordinating construction operations on the project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Coordination Drawings.
  - 3. Administrative and supervisory personnel.
  - 4. Project meetings.
- B. Related Sections
  - 1. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.
- C. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

##### **1.03 DEFINITIONS**

- A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

##### **1.04 COORDINATION**

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for the Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of the Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Pre-installation conferences.
  - 7. Project closeout activities.



- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

#### **1.05 REQUESTS FOR INFORMATION (RFIS)**

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as 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. Project number
  3. Date
  4. Name of Contractor
  5. Name of Architect
  6. RFI number, numbered sequentially
  7. RFI subject
  8. Specification Section number and title and related paragraphs, as appropriate
  9. Drawing number and detail references, as appropriate
  10. Field dimensions and conditions, as appropriate
  11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI
  12. Contractor's signature
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within [10] ten days of receipt of the RFI response
- C. 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.
- D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly.

#### **1.06 SUBMITTALS**

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Indicate relationship of components shown on separate Shop Drawings.
  2. Indicate required installation sequences.
  3. Refer to Division 15 Section "Basic Mechanical Materials and Methods" and Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at the Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to the Project.

2. Post copies of list in the Project meeting room, in temporary field office, and by each temporary telephone.

### 1.07 PROJECT MEETINGS

- A. General: Meetings shall be schedule by the Owner and shall be conducted at the Project site, unless otherwise indicated.
  1. Attendees: Architect shall inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
  2. Agenda: Contractor shall prepare the meeting agenda and distribute the agenda to all invited attendees.
  3. Minutes: Contractor shall record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned within 5 days of the meeting.
- B. Preconstruction Conference: Owner shall schedule a preconstruction conference before starting Construction. Conference shall be held at the conference at the Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
  1. Attendees: Authorized representatives of the Owner, the Architect and their consultants, the Contractor and its superintendent, and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule
    - b. Phasing
    - c. Critical work sequencing
    - d. Designation of responsible personnel
    - e. Procedures for processing field decisions and Change Orders
    - f. Procedures for processing Applications for Payment
    - g. Distribution of the Contract Documents
    - h. Submittal procedures
    - i. Preparation of Record Documents
    - j. Use of the premises
    - k. Responsibility for temporary facilities and controls
    - l. Parking availability
    - m. Office, work, and storage areas
    - n. Equipment deliveries and priorities
    - o. First aid
    - p. Security
    - q. Progress cleaning
    - r. Working hours
- C. Progress Meetings: Owner shall schedule the Progress Meetings at bi-weekly intervals.
  1. Agenda:
    - a. 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 the Project.
    - b. 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 the 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) Contractor shall issue a three-week look ahead schedule in advance of each Progress Meeting.
      - 2) Contractor shall revised the Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. At a minimum,



the updated Construction Schedule shall be issued with each Application for Payment.

- c. 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 utilization
  - 8) Temporary facilities and controls
  - 9) Work hours
  - 10) Hazards and risks
  - 11) Progress cleaning
  - 12) Quality and work standard
  - 13) Change Orders
  - 14) Documentation of information for payment requests
2. Reporting: Contractor to record minutes and distribute copies within five days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION 01 31 00**

**SECTION 01 32 00**  
**CONSTRUCTION PROGRESS**

**PART 1 - GENERAL**

**1.01 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.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Preliminary Construction Schedule.
  2. Contractor's Construction Schedule.
  3. Submittals Schedule.
  4. Daily construction reports.
  5. Material location reports.
  6. Field condition reports.
  7. Preconstruction Photographs
  8. Construction photographs.
- B. Related Sections include the following:
1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
  2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
  3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
  4. Division 01 Section "Closeout Procedures" for submitting construction photographs as Project Record Documents at Project closeout.

**1.03 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 activities are activities on the critical path. They must start and finish on the planned early start and finish times.
  2. Predecessor activity is an activity that must be completed before a given activity can be started.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
  3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.

- G. Milestone: A key or critical point in time for reference or measurement.
- H. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- I. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.04 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tubular format:
  - 1. Scheduled date for first submittal.
  - 2. Specification Section number and title.
  - 3. Submittal category (action or informational).
  - 4. Name of subcontractor.
  - 5. Description of the Work covered.
- C. Contractor's Construction Schedule: Submit three printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- D. CPM Reports: Concurrent with CPM schedule, submit three printed copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.
  - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Photographic Documentation:
  - 1. Preconstruction Photographs: Before commencement of demolition, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 2. Periodic Construction Photographs: Take 12,color, digital photographs monthly with timing each month adjust to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
    - a. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.
    - b. Format: 4-by-6-inch (101-by-152-mm) smooth-surface matte prints on single weight commercial grade stock.
    - c. Identification: On back of each print, provide an applied label or rubber stamped impression with the following information:
      - 1) Name of project
      - 2) Name and address of photographer
      - 3) Name of Architect
      - 4) Name of Contractor
      - 5) Date photograph was taken
      - 6) Description of vantage point, indicating location, direction (by compass point) and elevation or story of construction.

- d. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints on CD-ROM. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.
- e. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.
- f. Daily Construction Reports: Submit two copies at weekly intervals.
- g. Material Location Reports: Submit two copies at weekly intervals.
- h. Field Condition Reports: Submit two copies at weekly intervals.

#### **1.05 QUALITY ASSURANCE**

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting.

#### **1.06 COORDINATION**

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from parties involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### **PART 2 - PRODUCTS**

#### **2.01 SUBMITTALS SCHEDULE**

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  - 2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

#### **2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)**

- A. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 15 days after date established for the Notice to Proceed..
  - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 3. Use "one workday" as the unit of time.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals
    - b. Mobilization and demobilization
    - c. Purchase of materials
    - d. Delivery
    - e. Fabrication

- f. Utility interruptions
    - g. Installation
    - h. Work by Owner that may affect or be affected by Contractor's activities
    - i. Testing
  2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical
    - b. path.
- C. Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting. Include the following:
  1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time
    - a. 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.

## 2.03 REPORTS

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

Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 01 32 00**

**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.01 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.

**1.02 SUMMARY**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
  - 1. Process designated submittals for the Project electronically through designated email system.

**1.03 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 and responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- D. Email System: A method to transmit certain electronic submittals between the Contractor, Architect, and Owner, via email.
  - 1. For consistency, the standard file format will be PDF. Convert paper originals and other file formats to PDF prior to submission.
  - 2. In the event of system malfunction, submittals shall be processed in accordance with the Architect's instructions, until the system malfunction has been corrected.
  - 3. For this Project, process the following submittal types through the designated email system:
    - a. Product Data.
    - b. Shop Drawings.
    - c. Product Schedules.
    - d. Qualification Data.
    - e. Certificates (Welding, Installer, Manufacturer, Product, and Material, as applicable).
    - f. Test Reports (Material, Product, Preconstruction, Compatibility, and Field, as applicable).
    - g. Research Reports.
    - h. Warranty (sample).
    - i. Design Data, including calculations.
    - j. Coordination Drawings.
    - k. Delegated-Design Services Certifications.
  - 4. For Samples, provide electronic submittal of Sample cover sheet, identifying location and actual delivery date of Samples. Deliver Samples to location (Architect's office, Project site, etc.) as directed by the Architect.
    - a. Architect will identify delivery location(s) after receipt and review of Contractor's Submittal Schedule.

#### 1.04 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit a schedule of submittals indicating scheduled date for each submission. Factor time required for review, ordering, manufacturing, fabrication, and delivery when establishing submission 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. Submit concurrently with the first complete submittal of Contractor's construction schedule.
  2. Format: Arrange the following information in a tabular format:
    - a. Specification Section number and title.
    - b. A/E Number.
      - 1) Architect will furnish Contractor with unique "A/E Number" designation for each required submittal.
    - c. Submittal category: Action; informal.
    - d. Submittal type: Product Data, Shop Drawings, Samples, etc.
    - e. Description of the Work covered.
    - f. Scheduled date for first submittal.

#### 1.05 COLOR SCHEDULE

- A. Color Schedule: Within 30 days after date of Notice of Award, submit a complete list of proposed manufacturers and complete product designations (i.e. model, grade, series, product line, etc.) for each item requiring color selection by Architect.

#### 1.06 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. 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. Where indicated, submit all submittal items required for each Specification Section concurrently.
  3. Coordinate transmittal of different types of submittals for related parts of the Work 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.
- B. Processing Time: Allow sufficient time for submittal review, including time for resubmittals. 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.
- C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Include a cover sheet on each submittal item for identification. Do not combine different submittals under same cover sheet; only one submittal is to be provided per email.
    - a. Cover Sheet: Use PDF version of sample form included in Project Manual. Complete each item on form, sign and date. Architect will furnish PDF version of sample form.
  2. Name submittal file as directed by Architect.
  3. Transmit each submittal via email using subject line as directed by Architect.
  4. Send submittal to designated Project-specific email address:
    - a. Use the following email address: zigmondb@studiojaed.com.
- D. Resubmittals: Make resubmittals in same form and, for non-electronic submittals, in the same number of copies as initial submittal.
1. Note date and content of revision in label or title block and clearly indicate extent of revision.
  2. Resubmit submittals until they are marked with approval notation from Architect.



3. Refer to Supplementary Conditions for provisions allowing Owner to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of certain resubmittals.
- 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.
- 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.

## **PART 2 - PRODUCTS**

### **2.01 SUBMITTAL PROCEDURES, GENERAL**

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

### **2.02 ELECTRONIC SUBMITTAL PROCEDURES**

- A. Use the designated email system for submittals in this Article.
  1. Submit electronic submittals via email as PDF electronic files.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  1. Mark submittal to show which products and options are applicable.
  2. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Statement of compliance with specified referenced standards.
    - c. Testing by recognized testing agency.
  3. For equipment, include the following in addition to the above, as applicable:
    - a. Printed performance curves.
    - b. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- C. 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, unless submittal based on Architect's digital data drawing files is otherwise permitted.
  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 dimensions established by field measurement.
    - e. Relationship and attachment to adjoining construction clearly indicated.
    - f. Seal and signature of professional engineer if specified.
- D. 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.
- E. Certificates:
  1. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
  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. **Product Certificates:** Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  5. **Material Certificates:** Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- F. **Test Reports:**
1. **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.
  2. **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.
  3. **Preconstruction Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
  4. **Compatibility Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
  5. **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.
- G. **Research Reports:** Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- H. **Warranty:** Submit sample warranties as required in individual Specification Sections.
- I. **Design Data:** Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- J. **Coordination Drawing Submittals:** Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- K. **Delegated-Design Services Certification:** Submit 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.
  2. In addition, for a project in New Jersey, provide three paper copies of certificate, signed and sealed (with raised seal) by the responsible design professional.

### **2.03 NON-ELECTRONIC SUBMITTAL PROCEDURES**

- A. **Samples:** Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. **Identification:** Attach label on unexposed side of Samples that includes the following:

- a. Generic description of Sample.
  - b. Product name and name of manufacturer.
  - c. Sample source.
  - d. Number and title of applicable Specification Section.
3. 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.
  4. 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. Number of Samples: Submit three full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return one submittal with options selected.
  5. 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 return one set.
      - 1) 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.
- B. 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, and telephone number of entity performing subcontract or supplying products
  2. Number and title of related Specification Section(s) covered by subcontract.
  3. Submit subcontract list in the following format:
    - a. Number of Copies: Four paper copies of subcontractor list, unless otherwise indicated. Architect will return one copy.
- C. Key Personnel Names: No later than 15 days after date of Notice of Award, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.
1. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including emergency, office, and cellular telephone numbers and email addresses.
    - a. Number of Copies: Four paper copies of key personnel list, unless otherwise indicated.
- D. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
- E. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

#### **2.04 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.
- B. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

## **PART 3 - EXECUTION**

### **3.01 CONTRACTOR'S REVIEW**

- A. Action 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. Identify any deviations from Contract Document requirements. Mark cover sheet with approval before submitting to Architect.
  - 1. Sign and date statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### **3.02 ARCHITECT'S ACTION**

- A. General: Architect will not review submittals that do not bear Contractor's approval and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will mark submittal appropriately to indicate action, as follows:
  - 1. Final Unrestricted Release: Where the submittal is marked "Approved," the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
  - 2. Final-but-Restricted Release: Where the submittal is marked "Approved as Noted," the Work covered by the submittal may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
  - 3. Resubmit: Where the submittal is marked "Approved, Revise and Return Corrected Copies," the Work covered by the submittal may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Revise submittal according to Architect's notations and corrections and return corrected copies. Final acceptance will depend on that compliance.
  - 4. Rejected: Where the submittal is marked "Rejected," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.
  - 5. Incomplete - Resubmit: Where the submittal is marked "Incomplete, Submit Additional Information," do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents, that indicates compliance with requirements, and resubmit.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Limit information submitted to specific products indicated. Do not submit extraneous matter. Submittals containing excessive extraneous matter will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents may be returned by the Architect without action.

**END OF SECTION 01 33 00**

**SECTION 01 35 53**  
**SECURITY PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security measures including formal security program, entry control, personnel identification, and miscellaneous restrictions.
- B. Background check must be completed with the Bureau of Criminal Identification and Investigation prior to construction start.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Use of Premises and occupancy.
- B. Section 01 50 00 - Temporary Facilities and Controls: Temporary lighting and barriers and enclosures.

**1.03 SECURITY PROGRAM**

- A. Protect Work, existing premises and North Providence Public Schools's operations from theft, vandalism, and unauthorized entry.
- B. A background check must be completed with the Bureau of Criminal Identification and Investigation prior to construction start.
- C. Initiate program at project mobilization.
- D. Initiate program in coordination with North Providence Public Schools's existing security system at project mobilization.
- E. Maintain program throughout construction period until North Providence Public Schools acceptance precludes the need for Contractor security.
- F. Maintain program throughout construction period until directed by Owner.

**1.04 ENTRY CONTROL**

- A. Restrict entrance of persons and vehicles into Project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. North Providence Public Schools will control entrance of persons and vehicles related to North Providence Public Schools's operations.

**1.05 PERSONNEL IDENTIFICATION**

- A. Provide identification badge to each person authorized to enter premises.
- B. Badge to Include: Personal photograph, name, expiration date and employer.
- C. Maintain a list of accredited persons, submit copy to North Providence Public Schools on request.
- D. Require return of badges at expiration of their employment on the Work.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 01 35 53**

**SECTION 01 40 00**  
**QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Control of installation.
- B. Tolerances.
- C. Testing and inspection services.
- D. Manufacturers' field services.

**PART 3 EXECUTION**

**2.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from StudioJAED before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

**2.02 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from StudioJAED before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

**2.03 MANUFACTURERS' FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**2.04 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of StudioJAED, it is not practical to remove and replace the Work, StudioJAED will direct an appropriate remedy or adjust payment.

**END OF SECTION 01 40 00**

**SECTION 01 42 16**  
**DEFINITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Other definitions are included in individual specification sections.

**1.02 DEFINITIONS**

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Specifications: Same as Project Manual.
- F. Provide: To furnish and install.
- G. Supply: Same as Furnish.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 01 42 16**



**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 TEMPORARY UTILITIES**

- A. North Providence Public Schools will provide the following:
  - 1. Electrical power and metering, consisting of connection to existing facilities.
  - 2. Water supply, consisting of connection to existing facilities.
  - 3. Contractor shall be responsible to tie to existing utility services and make distribution to the construction site.

**1.03 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required portable toilets and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

**1.04 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades required by Owner and governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- E. Traffic Controls: Coordinate with the Owner.

**1.05 FENCING**

- A. Provide 6 foot high fence around on-grade storage areas; equip with vehicular and pedestrian gates with locks.

**1.06 EXTERIOR ENCLOSURES**

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

**1.07 INTERIOR ENCLOSURES**

- A. Provide temporary partitions as indicated and as otherwise required to separate work areas from North Providence Public Schools-occupied areas, to prevent penetration of dust and moisture into North Providence Public Schools-occupied areas, and to prevent damage to existing materials and equipment.



- B. Construction: Framing and and reinforced polyethylene with plywood overlay sheet materials with closed joints and sealed edges at intersections with existing surfaces:

**1.08 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and North Providence Public Schools's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with North Providence Public Schools's security program.
- C. Provide background check for any/all employees who enter building.

**1.09 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and North Providence Public Schools.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Existing parking areas may be used for construction parking. Owner shall designate parking areas to be used by contractor.

**1.10 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site daily.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 01 50 00**

**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Transportation, handling, storage and protection.
- B. Product option requirements.
- C. Substitution limitations and procedures.
- D. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS**

**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.

**2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

**2.03 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

**PART 3 EXECUTION**

**3.01 SUBSTITUTION PROCEDURES**

- A. See Section 01 25 00 - Substitution Procedures.
- B. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to North Providence Public Schools.
  4. Waives claims for additional costs or time extension that may subsequently become apparent.
- E. Substitution Submittal Procedure:
1. Submit one electronic copy of request for substitution for consideration, including all required supporting materials. Limit each request to one proposed substitution.
  2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  3. Where color selections or physical comparison must be made, submit physical samples.
  4. The StudioJAED will notify Contractor in writing of decision to accept or reject request.

### **3.02 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.03 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION 01 60 00**

**SECTION 01 61 16**

**VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

**1.02 DEFINITIONS**

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Exterior and interior paints and coatings applied on site.
  - 2. Exterior and interior adhesives and sealants applied on site.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
  - 1. Concrete.
  - 2. Clay brick.
  - 3. Metals that are plated, anodized, or powder-coated.
  - 4. Glass.
  - 5. Ceramics.
  - 6. Solid wood flooring that is unfinished and untreated.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

**1.04 QUALITY ASSURANCE**

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
  - 1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
  - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
  - 2. Joint Sealants: SCAQMD 1168 Rule.
  - 3. Paints and Coatings: Each color; most stringent of the following:

- a. 40 CFR 59, Subpart D.
- b. SCAQMD 1113 Rule.
- c. CARB (SCM).

### **PART 3 EXECUTION**

#### **3.01 FIELD QUALITY CONTROL**

- A. North Providence Public Schools reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to North Providence Public Schools.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION 01 61 16**

**SECTION 01 70 00**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of North Providence Public Schools personnel.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures.
- C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 50 00 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01 51 00 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.
- F. Section 01 74 19 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
- G. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- H. Section 01 81 13 - Sustainable Design Requirements

**1.03 REFERENCE STANDARDS**

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of North Providence Public Schools or separate Contractor.

**1.05 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
  - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by North Providence Public Schools.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

## **1.06 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After North Providence Public Schools occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of North Providence Public Schools's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.



- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify StudioJAED four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to StudioJAED, North Providence Public Schools, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify StudioJAED of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to StudioJAED the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to StudioJAED.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
  - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

### 3.05 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

### 3.06 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to StudioJAED before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
- C. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
  - 2. Relocate items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.
  - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- E. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
  - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to StudioJAED.

2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
  3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for StudioJAED review and request instructions.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- I. Clean existing systems and equipment.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.
- L. Comply with all other applicable requirements of this section.

### **3.07 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
1. Complete the work.
  2. Fit products together to integrate with other work.
  3. Provide openings for penetration of mechanical, electrical, and other services.
  4. Match work that has been cut to adjacent work.
  5. Repair areas adjacent to cuts to required condition.
  6. Repair new work damaged by subsequent work.
  7. Remove samples of installed work for testing when requested.
  8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- H. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.08 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- E. NE CHPS - For phased, occupied renovations HEPA vacuum the carpet daily in the occupied areas.

### **3.09 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.10 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.11 DEMONSTRATION AND INSTRUCTION**

- A. See Section 01 79 00 - Demonstration and Training.

### **3.12 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.13 FINAL CLEANING**

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.14 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
- B. Notify StudioJAED when work is considered ready for Substantial Completion.
- C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for StudioJAED's review.
- D. North Providence Public Schools will occupy all of the building as specified in Section 01 10 00.
- E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to North Providence Public Schools-occupied areas.
- F. Notify StudioJAED when work is considered finally complete.
- G. Complete items of work determined by StudioJAED's final inspection.

**END OF SECTION 01 70 00**

## SECTION 01 74 19

### CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

#### PART 1 GENERAL

##### 1.01 WASTE MANAGEMENT REQUIREMENTS

- A. North Providence Public Schools requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Methods of trash/waste disposal that are not acceptable are:
  - 1. Burning on the project site.
  - 2. Burying on the project site.
  - 3. Dumping or burying on other property, public or private.
  - 4. Other illegal dumping or burying.
- E. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

##### 1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- C. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

##### 1.03 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.

- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

#### **3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, North Providence Public Schools, and StudioJAED.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  - 1. Pre-bid meeting.
  - 2. Pre-construction meeting.
  - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  - 1. Provide containers as required.
  - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified



materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**END OF SECTION 01 74 19**



**SECTION 01 76 10**  
**TEMPORARY PROTECTIVE COVERINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary protective coverings for installed floors, walls, and other surfaces.

**PART 2 PRODUCTS**

**2.01 GENERAL**

- A. Provide materials that are easily removed without damage to the surfaces covered and with the following characteristics:
  - 1. Water resistant.
  - 2. Impact resistant.
  - 3. Slip resistant.

**2.02 MATERIALS**

- A. Sheet Materials:
  - 1. Wood Hardboard: ANSI A135.4, tempered, 1/4 inch thick nominal.
- B. Rolled Materials:
  - 1. Self-adhering polyethylene film.
  - 2. Recycled cellulose fiberboard paper.
- C. Opening Protection Materials:
  - 1. Acrylic Plastic Sheet
- D. Tape: Type recommended by protective covering material manufacturer.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Remove dirt and debris from surfaces to be protected.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Trim or overlap sheet materials to fit area to be covered.
- C. Roll out and cut rolled materials to fit area to be covered.
- D. Tape seams. Avoid taping directly to finished surfaces.
- E. Stretch self-adhering film materials to completely cover surface.
- F. Install door jamb protection to full height of opening.

**3.03 REMOVAL**

- A. Remove protective coverings prior to Date of Substantial Completion. Reuse or recycle materials if possible.

**END OF SECTION 01 76 10**

**SECTION 01 78 00**  
**CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 65 01 - Closeout Document Checklist: List of required submittals for closeout.
- B. Section 00 72 13 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- C. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- D. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- E. Individual Product Sections: Specific requirements for operation and maintenance data.
- F. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to StudioJAED with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. StudioJAED will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by North Providence Public Schools, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with StudioJAED comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with North Providence Public Schools's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.

4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by North Providence Public Schools.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  1. Changes made by Addenda and modifications.
- F. Record Drawings : Legibly mark each item to record actual construction including:
  1. Field changes of dimension and detail.
  2. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  1. Description of unit or system, and component parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance.
- D. Include manufacturer's printed operation and maintenance instructions.
- E. Additional Requirements: As specified in individual product specification sections.

### **3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for North Providence Public Schools's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of StudioJAED, Consultants, Contractor and subcontractors, with names of responsible parties.

- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

### **3.05 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with North Providence Public Schools's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION 01 78 00**

**SECTION 02 41 00**  
**DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building demolition .
- B. Selective demolition of building elements for alteration purposes.
- C. Legal disposal of demolished items.

**1.02 RELATED REQUIREMENTS**

- A. Division 01 - General Requirements
- B. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

**1.03 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
  - 1. Minimum of ten years of documented experience.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove selective portions of existing building to be restored as indicated on the drawings and as required to complete the work of the project.
- B. Remove other items indicated, for salvage, relocation, and recycling.

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 3. Provide, erect, and maintain temporary barriers and security devices.
  - 4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 6. Do not close or obstruct roadways or sidewalks without approval of the Owner.
- B. Do not begin removal until receipt of notification to proceed from North Providence Public Schools.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
- E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- F. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

### **3.03 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction are based on casual field observation and existing record documents only.
  1. Verify that construction and utility arrangements are as shown.
    - a. Opening for new door is anticipated to be in a bearing wall.
    - b. Opening for expansion of existing restroom is anticipated to be in a non-bearing wall. This must be confirmed prior to demolition.
  2. Report discrepancies to StudioJAED before disturbing existing installation.
  3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 .
- C. Remove existing work as indicated and as required to accomplish new work.
  1. Remove rotted wood and corroded metals; replace with new construction specified.
  2. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  1. Verify that abandoned services serve only abandoned facilities before removal.
  2. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

### **3.04 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION 02 41 00**

**SECTION 06 10 00**  
**ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rough opening framing for doors.
- B. Sheathing.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Concealed wood blocking, nailers, and supports.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- C. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.
- D. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. AWPA U1 - Use Category System: User Specification for Treated Wood.
- G. NELMA (SGR) - Standard Grading Rules for Northeastern Lumber.
- H. PS 1 - Structural Plywood.
- I. PS 20 - American Softwood Lumber Standard.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. North East Collaborative for High Performance Schools (NECHPS) Submittals: Items necessary to document use of sustainable construction materials, products, and practices.
- C. Product Data: Provide technical data on wood preservative materials and application instructions.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
  - 1. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.



- C. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Douglas Fir, unless otherwise indicated.
  - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.
- C. Provide sustainably harvested wood.

#### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Northeastern Lumber Manufacturers Association; NELMA (SGR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.
- E. Miscellaneous Blocking, Furring, Nailers, and Curbs:
  - 1. Lumber: S4S, No. 1 or Construction Grade.
  - 2. Boards: Standard.

#### **2.03 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M; or Stainless Steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
  - 3. Anchors: Toggle bolt type for anchorage to hollow masonry.

#### **2.04 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.



- B. Fire Retardant Treatment:
1. Manufacturers:
    - a. Arch Wood Protection, Inc: [www.wolmanizedwood.com/#sle](http://www.wolmanizedwood.com/#sle).
    - b. Hoover Treated Wood Products, Inc: [www.frtw.com/#sle](http://www.frtw.com/#sle).
    - c. Osmose, Inc: [www.osmose.com/#sle](http://www.osmose.com/#sle).
    - d. Substitutions: Not permitted.
  2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Do not use treated wood in direct contact with the ground.
  3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as scheduled; or as indicated.
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
1. Manufacturers:
    - a. Arch Wood Protection, Inc.: [www.wolmanizedwood.com](http://www.wolmanizedwood.com).
    - b. Viance, LLC: [www.treatedwood.com](http://www.treatedwood.com).
    - c. Osmose, Inc: [www.osmose.com](http://www.osmose.com).
    - d. Substitutions: Not permitted.
- D. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - a. Treat lumber exposed to weather.
  2. Treat lumber in contact with roofing, flashing, or waterproofing.
  3. Treat lumber in contact with masonry or concrete.
  4. Treat lumber less than 18 inches above grade.
    - a. Treat lumber in other locations as indicated.
  5. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
    - a. Kiln dry plywood after treatment to maximum moisture content of 15 percent.
    - b. Treat plywood in contact with masonry or concrete.
    - c. Treat plywood in other locations as indicated.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.

- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Specifically, provide the following non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Visual display and marker boards.
  - 8. Wall paneling and trim.
  - 9. Joints of rigid wall coverings that occur between studs.

### **3.04 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

### **3.05 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD**

- A. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- B. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retardant, and parapet construction.

### **3.06 INSTALLATION OF CONSTRUCTION PANELS**

- A. Miscellaneous Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.

### **3.07 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

### **3.08 CLEANING**

- A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.

3. Do not burn scraps that have been pressure treated.
  4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION 06 10 00**

**SECTION 06 20 00**  
**FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Plastic Laminate Wall Finish
- C. Hardware and attachment accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 08 14 16 - Flush Wood Doors.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications.
- C. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. AWI (QCP) - Quality Certification Program.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.
- G. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
- H. AWPA U1 - Use Category System: User Specification for Treated Wood.
- I. BHMA A156.9 - Cabinet Hardware.
- J. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
- K. NEMA LD 3 - High-Pressure Decorative Laminates.
- L. PS 1 - Structural Plywood.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
  - 2. Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
  - 3. Include certification program label.

### 1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide labels or certificates indicating that work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.
  - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Protect from moisture damage.
- D. Handle materials and products to prevent damage to edges, ends, or surfaces.

## PART 2 PRODUCTS

### 2.01 FINISH CARPENTRY ITEMS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

### 2.02 SHEET MATERIALS

- A. Softwood Plywood, Not Exposed to View: Any face species, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- B. Softwood Plywood, Exposed to View: Face species as indicated, plain sawn, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- C. Hardwood Plywood: Face species as indicated, plain sawn, book matched, medium density fiberboard core; HPVA HP-1, Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.
- D. Pegboard: Pressed wood fiber with resin binder, standard grade; 1/8 inch thick, with holes spaced at 1 inch on center in both directions.

### 2.03 PANEL CORE MATERIALS

- A. Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.
  - 1. Grade: 115; moisture resistance: MR10.
  - 2. Panel Thickness: 1 inch.

### 2.04 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3; color as selected by Architect; textured, low gloss finish.
- B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

- C. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

## 2.05 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.
- C. Concealed Joint Fasteners: Threaded steel.

## 2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming and Blocking: Softwood lumber of indicated species.
- C. Plastic Edge Trim: Extruded convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness; color as selected.
- D. Safety Glass: Laminated glass complying with 16 CFR 1201 and ANSI Z97.1; clear; nominally 6 mm thick.
- E. Primer: Alkyd primer sealer.
- F. Wood Filler: Solvent base, tinted to match surface finish color.

## 2.07 HARDWARE

- A. Hardware: Comply with BHMA A156.9.
- B. Countertop Support Brackets: Fixed, L-shaped, corner reinforced, face-of-stud mounting.
  - 1. Material: Steel.
    - a. Finish: Manufacturer's standard, factory-applied, textured powder coat.
    - b. Color: Black.
    - c. Height: 5 inches.
    - d. Support Length: 8 inches.
  - 2. Products:
    - a. A&M Hardware, Inc; Standard Brackets: [www.aandmhardware.com/#sle](http://www.aandmhardware.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.08 WOOD TREATMENT

- A. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- C. Wood Preservative by Pressure Treatment (PT Type): Provide AWPA U1 treatment using waterborne preservative with 0.25 percent retainage.
- D. Shop pressure treat wood materials requiring fire rating to concealed wood blocking.
- E. Provide identification on fire retardant treated material.
- F. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- G. Redry wood after pressure treatment to maximum \_\_\_\_ percent moisture content.

## 2.09 SITE FINISHING MATERIALS

- A. Field Finishing: See Section 09 91 23.

## 2.10 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.

- B. Cap exposed plastic laminate finish edges with plastic trim.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- E. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

#### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

#### **3.03 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

**END OF SECTION 06 20 00**

**SECTION 07 84 00**  
**FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Cutting and patching.
- B. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**1.03 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies.
- E. ITS (DIR) - Directory of Listed Products.
- F. FM 4991 - Approval Standard of Firestop Contractors.
- G. FM P7825 - Approval Guide; Factory Mutual Research Corporation.
- H. SCAQMD 1168 - Adhesive and Sealant Applications.
- I. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems.
- J. UL (FRD) - Fire Resistance Directory.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Certificate from authority having jurisdiction indicating approval of materials used.
- G. Qualification statements for installing mechanics.

**1.05 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
  - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.



- C. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors, or meeting any two of the following requirements:.
  - 2. With minimum 5 years documented experience installing work of this type.
  - 3. Able to show at least 3 satisfactorily completed projects of comparable size and type.
  - 4. Licensed by authority having jurisdiction.
  - 5. Approved by firestopping manufacturer.
- D. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

#### **1.06 MOCK-UP**

- A. Install one firestopping assembly representative of each fire rating design required on project.
  - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
  - 2. Where firestopping is intended to fill a linear opening, install minimum of 2 linear ft.
- B. Obtain approval of authority having jurisdiction before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.
- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

#### **1.07 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

### **PART 2 PRODUCTS**

#### **2.01 FIRESTOPPING - GENERAL REQUIREMENTS**

- A. Manufacturers:
  - 1. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
  - 2. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
  - 3. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
  - 4. Nelson FireStop Products: [www.nelsonfirestop.com](http://www.nelsonfirestop.com).
- B. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

#### **2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
  - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- B. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
  - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.

2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
  3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
  4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.
- C. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
  2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
  3. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

## **2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS**

- A. Concrete and Concrete Masonry Walls and Floors:
1. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
    - a. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  2. Concrete/Concrete Masonry Wall to Wall Joints:
    - a. 2 Hour Construction: UL System WW-D-0017; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System WW-D-0032; Hilti CP 606 Flexible Firestop Sealant.
- B. Gypsum Board Walls:
1. Wall to Wall Joints:
    - a. 2 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
    - b. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.

## **2.04 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION**

- A. Blank Openings:
1. In Walls:
    - a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE Intumescent Firestop Sealant.
- B. Penetrations Through Walls By:
1. Multiple Penetrations in Large Openings:
    - a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE Intumescent Firestop Sealant.
  2. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System C-AJ-1421; Hilti FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-1498; Hilti CP 680-P/M Cast-In Device.
  3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
    - b. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.
  4. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System C-AJ-3216; Hilti CP 658 Firestop Plug.
    - b. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.

- c. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
  - 5. Cable Trays with Electrical Cables:
    - a. 3 Hour Construction: UL System C-AJ-4035; Hilti FS-ONE Intumescent Firestop Sealant.
  - 6. Insulated Pipes:
    - a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
  - 7. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-7084; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
- C. Penetrations Through Walls By:
- 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE Intumescent Firestop Sealant.
  - 2. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System W-J-3060; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
    - b. 2 Hour Construction: UL System W-J-3143; Hilti CP 658T Firestop Plug.
  - 3. Insulated Pipes:
    - a. 2 Hour Construction: UL System W-J-5041; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System W-J-5042; Hilti FS-ONE Intumescent Firestop Sealant.
    - c. 2 Hour Construction: UL System W-J-5028; Hilti FS-ONE Intumescent Firestop Sealant.
  - 4. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
  - 5. HVAC Ducts, Insulated:
    - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE Intumescent Firestop Sealant.

## **2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS**

- A. Blank Openings:
  - 1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
  - 1. Multiple Penetrations in Large Openings:
    - a. 2 Hour Construction: UL System W-L-1389; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE Intumescent Firestop Sealant.
    - c. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE Intumescent Firestop Sealant.
    - d. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE Intumescent Firestop Sealant.
    - e. 2 Hour Construction: UL System W-L-8087; Hilti FS 657 Fire Block.
  - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:

- a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE Intumescent Firestop Sealant.
- b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE Intumescent Firestop Sealant.
- c. 2 Hour Construction: UL System W-L-1206; Hilti FS-ONE Intumescent Firestop Sealant.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
  - b. 2 Hour Construction: UL System W-L-2411; Hilti CP 648-E Firestop Wrap Strip.
  - c. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE Intumescent Firestop Sealant.
4. Electrical Cables Not In Conduit:
  - a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
  - b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
  - c. 2 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
  - d. 2 Hour Construction: UL System W-L-3394; Hilti CFS-SL SK Firestop Sleeve Kit.
  - e. 2 Hour Construction: UL System W-L-3395; Hilti CP653 Speed Sleeve.
5. Cable Trays with Electrical Cables:
  - a. 2 Hour Construction: UL System W-L-4011; Hilti FS 657 Fire Block.
  - b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE Intumescent Firestop Sealant.
6. Insulated Pipes:
  - a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE Intumescent Firestop Sealant.
  - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
  - c. 2 Hour Construction: UL System W-L-5096; Hilti FS-ONE Intumescent Firestop Sealant.
  - d. 2 Hour Construction: UL System W-L-5257; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 601S Elastomeric Firestop Sealant.
  - e. 2 Hour Construction: UL System W-L-5244; Hilti CP 648-E Firestop Wrap Strip.
7. HVAC Ducts, Insulated:
  - a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE Intumescent Firestop Sealant.

## 2.06 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements. Foam, caulk, putty or manufactured device.
  1. Fire Ratings: Use any system listed by UL, FM, or ITS (Warnock Hersey) or that has F Rating equal to fire rating of penetrated assembly and minimum T Rating of 0 and that meets all other specified requirements.
  2. Fire Ratings: See Drawings for required systems and ratings.
- B. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements. Foam, caulk, putty or manufactured device.
- C. Firestopping at Cable Tray Penetrations: Any material meeting requirements. Foam, caulk, putty or manufactured device.
- D. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Any material meeting requirements. Foam, caulk, putty or manufactured device.
- E. Firestopping at Control and Expansion Joints (without Penetrations): Any material meeting requirements and caulk.

## **2.07 MATERIALS**

- A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
- C. Foam Firestopping: Single component silicone foam compound.
- D. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers.
- E. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening.
- F. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to arrest liquid material leakage.

### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Install labeling required by code.

## **CLEANING**

### **4.01 CLEAN ADJACENT SURFACES OF FIRESTOPPING MATERIALS.**

### **4.02 PROTECTION**

- A. Clean adjacent surfaces of firestopping materials.
- B. Protect adjacent surfaces from damage by material installation.

**END OF SECTION 07 84 00**

**SECTION 07 90 05**  
**JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealants and joint backer rods.
- B. Precompressed foam sealers.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping: Firestopping sealants.

**1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- D. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
- E. ASTM D1667 - Standard Specification for Flexible Cellular Materials—Poly (Vinyl Chloride) Foam (Closed-Cell).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit two samples, 2 x 1/2 in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

**1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.08 COORDINATION**

- A. Coordinate the work with all sections referencing this section.

**1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.



## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Polyurethane Sealants:
  - 1. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 2. Bostik, Inc [www.bostik-us.com](http://www.bostik-us.com)
  - 3. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Acrylic Sealants (ASTM C920):
  - 1. Pecora Corporation; [www.pecora.com](http://www.pecora.com).
  - 2. Tremco, Inc [www.tremcosealants.com](http://www.tremcosealants.com).
  - 3. Bostik, Inc. [www.bostik-us.com](http://www.bostik-us.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Preformed Compressible Foam Sealers and backer rods:
  - 1. Sandell Manufacturing Company, Inc: [www.sandellmfg.com](http://www.sandellmfg.com).
  - 2. Emseal Joint Systems, Ltd.
  - 3. Dayton Superior Corporation: [www.daytonsuperior.com](http://www.daytonsuperior.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 SEALANTS**

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Product: Dynatrol II manufactured by Pecora.
  - 3. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Other exterior joints for which no other sealant is indicated.
- C. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Product: AC-20 + Silicone manufactured by Pecora.
  - 3. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between door and window frames and wall surfaces.
    - c. Other interior joints for which no other type of sealant is indicated.
- D. Type 3 - Exterior Expansion Joint Sealer: ASTM D 2628, hollow neoprene (polychloroprene) compression gasket.
  - 1. Black color.
  - 2. Size and Shape: . As indicated by drawings.
  - 3. Product: Poly seal manufactured by Sandell mfg.
  - 4. Applications: Use for:
    - a. Exterior wall expansion joints.
- E. Type 4 - Acoustical Sealant: acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
  - 1. Product: AIS-919 manufactured by Pecora.
  - 2. Applications: Use for concealed locations only:

- a. Sealant bead between top stud runner and structure and between bottom stud track and floor and where shown on plans.
- F. Type 5 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; single component.
1. Color: Gray.
  2. Product: Dynatred manufactured by Pecora.
  3. Applications: Use for:
    - a. Joints in sidewalks and vehicular paving.
    - b. Where shown on plans.

### **2.03 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  1. Width/depth ratio of 2:1.
  2. Neck dimension no greater than 1/3 of the joint width.
  3. Surface bond area on each side not less than 75 percent of joint width.
- F. Install bond breaker where joint backing is not used.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- I. Tool joints concave.



- J. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

**3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

**3.05 PROTECTION**

- A. Protect sealants until cured.

**END OF SECTION 07 90 05**

**SECTION 08 11 13**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
1. Standard and custom hollow metal doors and frames.
  2. Steel sidelight, borrowed lite and transom frames.
  3. Louvers installed in hollow metal doors.
  4. Light frames and glazing installed in hollow metal doors.
- B. Related Sections:
1. Division 01 Section "General Conditions".
  2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
  3. Division 08 Section "Flush Wood Doors".
  4. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
  5. Division 08 Section "Door Hardware".
  6. Division 08 Section "Access Control Hardware".
  7. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
  2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
  3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
  5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
  6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
  10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
  11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
  12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
  13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
  14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
  15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
  16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

### 1.03 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

### 1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

### 1.06 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

### 1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (C).
  - 2. Curries Company (CU).
  - 3. Steelcraft (S).

### 2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

### 2.03 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Design: Flush panel.
  - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
  - 3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
  - 4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
  - 5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
  - 6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Manufacturers Basis of Design:
  - 1. Curries Company (CU) - Polystyrene Core - 707 Series.
  - 2. Curries Company (CU) - QMax Core - 707 Series.

### 2.04 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
  - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  - 3. Manufacturers Basis of Design:
    - a. Curries Company (CU) - M Series.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

### 2.05 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.06 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

## 2.07 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.08 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
  - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
  - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
  - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
  - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
  - 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
  5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
  6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
  7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
  8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  9. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
  10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
  11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## 2.09 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.



1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

#### **3.03 INSTALLATION**

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
  1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

### **3.04 ADJUSTING AND CLEANING**

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

### **3.05 FIELD QUALITY CONTROL**

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

**END OF SECTION 08 11 13**



**SECTION 08 14 16**  
**FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush configuration; non-rated.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware.

**1.03 REFERENCE STANDARDS**

- A. ANSI A135.4 - Basic Hardboard.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
- E. ICC (IBC) - International Building Code; 2003.
- F. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
- G. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
- H. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements and Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Qualifications: Submit manufacturer's qualifications.
- C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- D. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- E. Samples: Submit two samples of door veneer, 6 by 8 inches in size illustrating wood grain, stain color, and sheen.
- F. Test Reports: Show compliance with specified requirements for the following:
  - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.
- H. Warranty, executed in North Providence Public Schools's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

### 1.07 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

### 1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in North Providence Public Schools's name and register with manufacturer.
  - 1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
  - 2. Provide for replacing, including cost of rehanging and refinishing, at no cost to Owner, wood doors exhibiting defects in materials or workmanship including warp and delaminating for the life of installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
  - 1. Graham Wood Doors: [www.grahamdoors.com](http://www.grahamdoors.com).
  - 2. Eggers Industries: [www.eggersindustries.com/#sle](http://www.eggersindustries.com/#sle).
  - 3. Marshfield DoorSystems, Inc: [www.marshfielddoors.com/#sle](http://www.marshfielddoors.com/#sle).
  - 4. Oshkosh Door Company: [www.oshkoshdoor.com/#sle](http://www.oshkoshdoor.com/#sle).
  - 5. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 DOORS

- A. All Doors: See drawings for locations and additional requirements.
  - 1. Quality Level: Custom Grade, Extra Heavy Duty performance, in accordance with WDMA I.S.1-A.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches; thick unless otherwise indicated; flush construction.

### 2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated above.

### 2.04 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: White birch "A", veneer grade as specified by quality standard.
  - 1. Cut: Rotary cut.
  - 2. Veneer match: Book match and balanced.
  - 3. Vertical Edges: Same species as face veneer.
- B. Facing Adhesive: Type II - water resistant.

### 2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge for hardware reinforcement.
  - 2. Provide solid blocking for other through bolted hardware.
- C. Fit door edge trim to edge of stiles after applying veneer facing.

- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.
- G. Miter edge of corner-set pocket doors which meet at 90 degrees.

## **2.06 FACTORY FINISHING - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 1, Lacquer, Nitrocellulose.
    - b. Sheen: Flat.
  - 2. Opaque:
    - a. System - 4, Latex Acrylic, Water-based.
    - b. Color: As selected by StudioJAED.
    - c. Sheen: Semigloss.

## **2.07 ACCESSORIES**

- A. Hollow Metal Door Frames: As specified in Section 08 12 13.
- B. Glazed Openings:
  - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
  - 2. Glazing: Single vision units, 1/4 inch thick glass.
  - 3. Tint: Clear.
- C. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style screws. Install wood plug at screw holes.
- D. Door Hardware: As specified in Section 08 71 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Factory prep for hardware. If required, use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

### **3.03 TOLERANCES**

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.
- C. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches surface area.
- D. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.

- E. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

**3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**3.05 SCHEDULE - SEE DRAWINGS**

**END OF SECTION 08 14 16**

**SECTION 08 31 00**  
**ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall access door and frame units.
- B. Ceiling access door and frame units.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 78 39 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- C. Section 09 90 00 - Painting and Coating: Field paint finish.

**1.03 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products.
- B. UL (FRD) - Fire Resistance Directory.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. See Section 01 33 00 - Security Procedures.
- C. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- D. Manufacturer's Installation Instructions: Indicate installation requirements.

**PART 2 PRODUCTS**

**2.01 ACCESS DOOR AND PANEL APPLICATIONS**

- A. Walls, Unless Otherwise Indicated:
  - 1. Material: Steel.
  - 2. Size: 24" x 72" inches, unless otherwise indicated.
  - 3. Standard duty, hinged door.
  - 4. Tool-operated spring or cam lock; no handle.
  - 5. In All Wall Types: Surface mounted face frame and door surface flush with frame surface.
  - 6. In Gypsum Board: Drywall bead frame with door surface flush with wall surface.

**2.02 WALL AND CEILING UNITS**

- A. Manufacturers:
  - 1. Acudor Products Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  - 2. Cendrex, Inc: [www.cendrex.com/#sle](http://www.cendrex.com/#sle).
  - 3. Karp Associates, Inc: [www.karpinc.com/#sle](http://www.karpinc.com/#sle).
  - 4. Milcor by Commercial Products Group of Hart & Cooley, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
- B. Access Doors: Factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
  - 1. Door Style: Single thickness with rolled or turned in edges.
  - 2. Steel Finish: Primed.
  - 3. Primed Finish: Polyester powder coat; manufacturer's standard color.
  - 4. Hardware:
    - a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    - b. Handle: Fixed.
    - c. Latch/Lock: Tamperproof tool-operated cam latch.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

#### **3.03 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.

**END OF SECTION 08 31 00**

**SECTION 08 33 23**  
**OVERHEAD COILING DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior non-fire-rated coiling doors.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for roller shaft counterbalance assembly. Complete forms in North Providence Public Schools's name and register with manufacturer.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Overhead Coiling Metal Doors:
  - 1. Cornell Iron Works, Inc: [www.cornelliron.com/#sle](http://www.cornelliron.com/#sle).
  - 2. Overhead Door Corporation; Model 610 Rolling Service Door: [www.overheaddoor.com/#sle](http://www.overheaddoor.com/#sle).
  - 3. The Cookson Company: [www.cooksondoor.com/#sle](http://www.cooksondoor.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 COILING DOORS**

- A. Interior Non-Fire-Rated Coiling Doors: Steel slat curtain.
  - 1. Single Thickness Slats: Manufacturer's standard.
  - 2. Nominal Slat Size: 2 inches wide by required length.
  - 3. Finish: Factory painted, color as selected.
  - 4. Guides, Angles: Galvanized steel.
  - 5. Hood Enclosure: Manufacturer's standard; primed steel.
  - 6. Manual hand chain lift operation.
  - 7. Mounting: Surface mounted.
  - 8. Locking Devices: Slide bolt on inside.

## 2.03 MATERIALS AND COMPONENTS

- A. Metal Curtain Construction: Interlocking slats.
  - 1. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
  - 2. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
  - 3. Steel Slats: Minimum thickness, \_\_\_ gauge, \_\_\_ inch; ASTM A653/A653M galvanized steel sheet.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
  - 1. Hot-dip galvanized in compliance with ASTM A123/A123M.
- D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
  - 1. Prime painted.
- E. Lock Hardware:
  - 1. Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.
  - 2. Manual Chain Lift: Provide padlockable chain keeper on guide.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that adjacent construction is suitable for door installation.
- B. Verify that electrical services have been installed and are accessible.
- C. Verify that door opening is plumb, header is level, and dimensions are correct.
- D. Notify StudioJAED of any unacceptable conditions or varying dimensions.
- E. Commencement of installation indicates acceptance of substrate and door opening conditions.

### 3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Install enclosure and perimeter trim.

### 3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

### 3.04 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

### 3.05 CLEANING

- A. Clean installed components.



- B. Remove labels and visible markings.

**END OF SECTION 08 33 23**

**SECTION 08 71 00**  
**DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow metal doors.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 14 16 - Flush Wood Doors.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design.
- B. BHMA A156.1 - Standard for Butts and Hinges.
- C. BHMA A156.2 - Bored and Preassembled Locks and Latches.
- D. BHMA A156.3 - Exit Devices.
- E. BHMA A156.4 - Door Closers and Pivots.
- F. BHMA A156.5 - Cylinders and Input Devices for Locks.
- G. BHMA A156.6 - Standard for Architectural Door Trim.
- H. BHMA A156.7 - Template Hinge Dimensions.
- I. BHMA A156.8 - Door Controls - Overhead Stops and Holders.
- J. BHMA A156.16 - Standard for Auxiliary Hardware.
- K. BHMA A156.17 - Self Closing Hinges & Pivots.
- L. BHMA A156.22 - Standard for Gasketing.
- M. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators.
- N. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.
- O. ICC A117.1 - Accessible and Usable Buildings and Facilities.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Keying meeting: Coordinate keying with Owner requirements.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- F. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in North Providence Public Schools's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least ten years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
  - 1. Closers: Five years, minimum.
  - 2. Exit Devices: Three years, minimum.
  - 3. Locksets and Cylinders: Three years, minimum.
  - 4. Other Hardware: Two years, minimum.

### **PART 2 PRODUCTS**

#### **2.01 DESIGN AND PERFORMANCE CRITERIA**

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
  - 1. Applicable provisions of federal, state, and local codes.

#### **2.02 HINGES**

- A. Manufacturers:
  - 1. McKinney; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Bommer Industries, Inc; \_\_\_\_\_: [www.bommer.com/#sle](http://www.bommer.com/#sle).
  - 3. Hager Companies; \_\_\_\_\_: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
- B. Hinges: Complying with BHMA A156.1, Grade 1.
  - 1. Provide hinges on every swinging door.
  - 2. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  - 3. Provide ball-bearing hinges at each door with closer.
  - 4. Provide non-removable pins on exterior outswinging doors.
  - 5. Provide following quantity of butt hinges for each door:
    - a. Doors up to 60 inches High: Two hinges.
    - b. Doors From 60 inches High up to 90 inches High: Three hinges.

#### **2.03 CYLINDRICAL LOCKS**

- A. Manufacturers:
  - 1. Corbin Russwin, Sargent, or Yale; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Best, dormakaba Group: [www.bestaccess.com/#sle](http://www.bestaccess.com/#sle).
  - 3. Schlage, an Allegion brand: [www.allegion.com/us/#sle](http://www.allegion.com/us/#sle).

- B. Cylindrical Locks (Bored): Complying with BHMA A156.2, Grade 1, 4000 Series.
  - 1. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
    - a. Finish: To match lock or latch.
  - 2. Provide a lock for each door, unless otherwise indicated that lock is not required.
  - 3. Provide an office lockset for swinging door where hardware set is not indicated.
  - 4. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.
  - 5. Keying: Grand master keyed.

#### **2.04 CLOSERS**

- A. Manufacturers; Surface Mounted:
  - 1. Corbin Russwin, Norton, Rixson, Sargent, or Yale; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. DORMA USA, Inc; \_\_\_\_: [www.dorma.com/#sle](http://www.dorma.com/#sle).
  - 3. Hager Companies: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
  - 4. LCN, an Allegion brand: [www.allegion.com/us/#sle](http://www.allegion.com/us/#sle).
- B. Closers: Complying with BHMA A156.4, Grade 1.
  - 1. Type: Surface mounted to door.
  - 2. Provide door closer on each exterior door.

#### **2.05 KICK PLATES**

- A. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.

#### **2.06 FLOOR STOPS**

- A. Floor Stops: Complying with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
  - 1. Type: Manual hold-open, with bumper floor stop.
  - 2. Material: Steel housing with rubber insert.

#### **2.07 WALL STOPS**

- A. Wall Stops: Complying with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
  - 1. Type: Bumper, concave, wall stop.
  - 2. Material: Aluminum housing with rubber insert.

#### **2.08 SILENCERS**

- A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
  - 1. Single Door: Provide three on strike jamb of frame.
  - 2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
  - 3. Material: Rubber, gray color.

#### **2.09 FINISHES**

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

#### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.

- C. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
  - 1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.

**3.03 ADJUSTING**

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.

**3.04 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

**3.05 PROTECTION**

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

**END OF SECTION 08 71 00**

## SECTION 09 05 61

### COMMON WORK RESULTS FOR FLOORING PREPARATION

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Thin-set quarry tile.
  - 2. Epoxy flooring system.
- B. Preparation of new concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- E. Patching compound.
- F. Remedial floor coatings.
- G. Adhesive and bond testing.

##### 1.02 RELATED REQUIREMENTS

- A. Section 01 74 19 - Construction Waste Management and Disposal: Handling of existing floor coverings removed.

##### 1.03 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens).
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

##### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, and Section 01 33 00 - Submittal Procedures for submittal procedures.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
  - 1. Manufacturer's qualification statement.
  - 2. **Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.**
  - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  - 4. Manufacturer's installation instructions.

5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- D. Testing Agency's Report:
  1. Description of areas tested; include floor plans and photographs if helpful.
  2. Summary of conditions encountered.
  3. Moisture and alkalinity (pH) test reports.
  4. Copies of specified test methods.
  5. Recommendations for remediation of unsatisfactory surfaces.
  6. Submit report not more than two business days after conclusion of testing.
- E. Adhesive Bond and Compatibility Test Report.

### **1.05 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
- B. Contractor's Responsibility Relating to Independent Agency Testing:
  1. Provide access for and cooperate with testing agency.
  2. Confirm date of start of testing at least 10 days prior to actual start.
  3. Allow at least 4 business days on site for testing agency activities.
  4. Achieve and maintain specified ambient conditions.
- C. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

### **1.07 FIELD CONDITIONS**

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX Feather Finish:  
[www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat:  
[www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).



- c. LATICRETE International, Inc; SKIM LITE: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  - d. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch: [www.usg.com/#sle](http://www.usg.com/#sle).
  - e. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
1. Product shall meet or exceed permeability performance requirements of ASTM F3010.
  2. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  3. Use product recommended by flooring and adhesive manufacturers.
  4. Products:
    - a. ARDEX Engineered Cements; ARDEX VB 100: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; TechMVC Moisture Vapor and Alkalinity Barrier: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. H.B. Fuller Construction Products, Inc; TEC LiquiDam with TEC Level Set 200 SLU: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
    - d. LATICRETE International, Inc; LATICRETE VAPOR BAN E with LATICRETE NXT LEVEL PLUS: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - e. Maxxon Corporation; Maxxon MVP One Primer: [www.maxxon.com/#sle](http://www.maxxon.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 CONCRETE SLAB PREPARATION**

- A. Perform following operations in the order indicated:
1. Prepare slab in accordance with the requirements of the remedial floor coating manufacturer.
  2. Preliminary cleaning.
  3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
  4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  6. Seal cracks and joints as directed by remedial floor coating manufacturer
  7. Specified remediation, applied in accordance with manufacturer instructions.
  8. Patching, smoothing, and leveling, as required.
  9. Other preparation specified.
  10. Adhesive bond and compatibility test.
  11. Protection.
- B. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive

for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

### **3.02 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

### **3.03 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

### **3.04 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A.
  - 1. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- E. Report: Report the information required by the test method.

### **3.05 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
  - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
  - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
  - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.

- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

**3.06 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Fill expansion joints, isolation joints, or other moving joints with compatible, flexible sealant approved by remedial floor coating manufacturer

**3.07 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

**3.08 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.

**3.09 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION 09 05 61**

**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal stud wall, ceiling and soffit framing.
- B. Metal framing for top of wall bracing and ceiling framing.
- C. Acoustic insulation.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Building Framing and Wood blocking .

**1.03 REFERENCE STANDARDS**

- A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- E. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board.
- F. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- J. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- K. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units.
- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- M. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
- N. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- P. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- Q. ASTM E413 - Classification for Rating Sound Insulation.
- R. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association.
- S. GA-216 - Application and Finishing of Gypsum Panel Products.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements and Section 01 33 00 - Submittal Procedures for submittal procedures.

- B. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of this section , with minimum twenty years of experience.
- B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of experience.

## PART 2 PRODUCTS

### 2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies per drawings.
  - 1. See PART 3 for finishing requirements.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

### 2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clarkwestern Dietrich Building Systems LLC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Dietrich Metal Framing: [www.dietrichindustries.com](http://www.dietrichindustries.com).
  - 3. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/360 at 5 psf.
  - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
  - 2. Studs: "C" shaped with flat or formed webs with knurled faces.
  - 3. Runners: U shaped, sized to match studs.
  - 4. Ceiling Channels: C shaped.
  - 5. Resilient Furring Channels: Of depth indicated or 1/2 inch where not indicated, for attachment to substrate through one leg only.
  - 6. Furring: Hat-shaped sections, minimum of depth indicated or 7/8 inch where not indicated.
- D. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
  - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
  - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
  - 3. Provide kickers / framing for top of wall and soffits as necessary.
  - 4. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.

5. Deflection and Firestop Track:

**2.03 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - 3. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - 4. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 1/2 inch.
- C. Impact-Rated Wallboard: Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C1629.
  - 1. Application: Walls.
  - 2. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
  - 3. Thickness: 5/8 inch.
  - 4. Edges: Tapered.
  - 5. Products:
    - a. National Gypsum Company; Gold Bond Hi-Impact Brand XP Wallboard.
    - b. USG Corporation; Fiberock Brand Panels--VHI Abuse-Resistant.
- D. Backing Board For Wet Areas:
  - 1. Application: Surfaces behind tile in wet areas; Restrooms.
  - 2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A108/A118/A136.1 or ASTM C1325.
    - a. Thickness: 1/2 inch.
    - b. Products:
      - 1) Custom Building Products; Wonderboard.
      - 2) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 1/2 in. (12.7 mm): [www.usg.com/#sle](http://www.usg.com/#sle).
      - 3) National Gypsum Company; PermaBase Brand Cement Board.
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Ceilings, unless otherwise indicated.
  - 2. Thickness: 1/2 inch.
  - 3. Edges: Tapered.
  - 4. Products:
    - a. CertainTeed Corporation; Interior Ceiling Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond High Strength LITE Gypsum Board: [www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.

**2.04 ACCESSORIES**

- A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness 3 1/2 inch.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.



1. Products:
  - a. Franklin International, Inc; Titebond Acoustical Smoke & Sound Sealant:  
[www.titebond.com/#sle](http://www.titebond.com/#sle).
  - b. Specified Technologies Inc; Smoke N Sound Acoustical Sealant:  
[www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
  - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Finishing Accessories: ASTM C1047, rigid plastic, unless otherwise indicated.
  1. Types: As detailed or required for finished appearance.
  2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
  1. Corner Beads: Low profile, for 90 degree outside corners.
- E. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
  1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
  3. Ready-mixed vinyl-based joint compound.
  4. Powder-type vinyl-based joint compound.
  5. Chemical hardening type compound.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 FRAMING INSTALLATION**

- A. Studs: Space studs at \_\_ inches on center.
  1. Extend partition framing to structure in all locations.
- B. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- C. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame openings, toilet accessories, hardware and similar items indicated or otherwise required to complete the work. Comply with Section 06 10 00 for wood blocking.

#### **3.03 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install as follows:
  1. Place two beads continuously on substrate before installation of perimeter framing members.
  2. Place continuous bead at perimeter of each layer of gypsum board.
  3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes; and other penetrations.

#### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  1. Exception: Tapered edges to receive joint treatment at right angles to framing.



- C. Cementitious Backing Board: Install over studs where indicated, in accordance with ANSI A108/A118/A136.1 and manufacturer's instructions.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as directed.
  - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

### **3.06 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use fiberglass joint tape, bedded with ready-mixed vinyl-based; or powder-type vinyl-based; or chemical hardening type joint compound and finished with ready-mixed vinyl-based; or powder-type vinyl-based; or chemical hardening type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish or where FRP panel to be installed.

### **3.07 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

### **3.08 FINISH LEVEL SCHEDULE (SEE 1.03 REFERENCES FOR DEFINITION)**

- A. Level 1: Above finished ceilings concealed from view.
- B. Level 2: Utility areas and areas behind cabinetry or where FRP will be applied.
- C. Level 4: Walls and ceilings scheduled to receive flat paint finish.

**END OF SECTION 09 21 16**

## SECTION 09 30 00

### TILING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Non-ceramic trim.

##### 1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07 90 05 - Joint Sealers.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation.

##### 1.03 REFERENCE STANDARDS

- A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
  - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
  - 2. ANSI A108.1b - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set, Modified Dry-Set, or Improved Modified Dry-Set Cement Mortar.
  - 3. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set, Modified Dry-Set, or Improved Modified Dry-Set Cement Mortar.
  - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive.
  - 5. ANSI A108.5 - Setting of Ceramic Tile with Dry-Set Cement Mortar, Modified Dry-Set Cement Mortar, EGP (Exterior Glue Plywood) Modified Dry-Set Cement Mortar, or Improved Modified Dry-Set Cement Mortar.
  - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy.
  - 7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
  - 8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
  - 9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
  - 10. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units.
  - 11. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
  - 12. ANSI A108.12 - Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Modified Dry-Set Mortar.
  - 13. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
  - 14. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar.
  - 15. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar.
  - 16. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation.

17. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation.
  18. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation.
  19. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.
  20. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
  21. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- B. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar.
- C. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements and Section 01 33 00 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Provide two sets of manufacturer's sample boards for each type of tile for initial selection.
- E. Samples: Provide three full sizes sample units of each type of tile.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 10 years of documented experience.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

#### **1.06 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect materials from freezing or overheating in accordance with manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

#### **1.09 EXTRA MATERIALS**

- A. Provide five square feet of each size, color and surface finish of tile specified.

### **PART 2 PRODUCTS**

#### **2.01 TILE**

- A. Manufacturers: All products by the same manufacturer.

1. American Olean Corporation: [www.americanolean.com](http://www.americanolean.com).
  2. Dal-Tile Corporation: [www.daltile.com](http://www.daltile.com).
  3. Florida Tile: [www.floridatile.com](http://www.floridatile.com).
  4. Trinity Tile: [www.trinitytile.com](http://www.trinitytile.com).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Glazed Wall Tile: ANSI A137.1, standard grade.
1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
  2. Size: 4-1/4 by 4-1/4 inch, nominal.
  3. Edges: Cushioned.
  4. Surface Finish: High gloss.
  5. Color(s): (1) One color to be selected by StudioJAED from manufacturer's standard range.
  6. Basis of Design: Color Story Wall by American Olean.
- C. Quarry Tile, Type at Kitchen demolition and restoration: ANSI A137.1, standard grade.
1. Moisture Absorption: Over 3.0 but not more than 5.0 percent as tested in accordance with ASTM C373.
  2. Size, Thickness, Edges, Surface Finish: Match Existing

## 2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, as indicated on drawings for setting using tile mortar or adhesive.
1. Applications: Use in the following locations:
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Transition between floor finishes of different heights.
    - d. Expansion and control joints, floor and wall.
    - e. Floor to wall joints.
  2. Manufacturer:
    - a. Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Thresholds: 4 inches wide by full width of wall or frame opening; beveled edge on both long edges; without holes, cracks, or open seams.
1. Thickness: 1/2 inch.
  2. Material: Granite, honed finish.
  3. Color and Pattern: To be determined.

## 2.03 SETTING MATERIALS

- A. Manufacturers:
1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  3. LATICRETE International, Inc: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
  2. Products:
    - a. ARDEX Engineered Cements; S 28: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. LATICRETE International, Inc; LATICRETE 254 Platinum: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).

## 2.04 ADHESIVE MATERIALS

- A. Manufacturers:
  - 1. LATICRETE International, Inc; LATICRETE 254 Platinum: [www.laticrete.com](http://www.laticrete.com).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.05 GROUTS

- A. Manufacturers:
  - 1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - 2. Bonsal American, Inc: [www.sakrete.com](http://www.sakrete.com)
  - 3. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  - 4. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Standard Grout: Polymer modified cement grout, sanded, as specified in ANSI A118.7.

## 2.06 MAINTENANCE MATERIALS

- A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
  - 1. Composition: Water-based colorless silicone.

## 2.07 THIN-SET ACCESSORY MATERIALS

- A. Floor Patch/Leveler
  - 1. Acceptable Product: Bostik, Floor Patch 101.
- B. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 7/16 inch thick; 2 inch wide coated glass fiber tape for joints and corners.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

### 3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances. Current sloped floor shall be filled to provide flat, level substrate for tile installation. New floor installation will not slope to drain.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

### **3.03 INSTALLATION - GENERAL**

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints. Use standard grout unless otherwise indicated.
- K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Install crack isolation / waterproofing membrane over prepared substrate in accordance with manufacturer's instructions. Extend membrane up wall behind tile base. Install sound fill at joint between floor and wall tile backer board and reinforce joint with manufacturer's reinforcing fabric.
  - 1. Flood floor after membrane has fully cured. Submit report of flood test indicating any/all required repairs and final passing status.
- B. Over concrete substrates, install in tile accordance with TCA Handbook Method F122, dry-set or latex-portland cement bond coat, over crack isolation / waterproofing membrane with standard grout, unless otherwise indicated.

### **3.05 INSTALLATION - WALL TILE**

- A. Over cementitious backer units on studs, install in accordance with The Tile Council of North America Handbook Method W244, using membrane at toilet rooms.

### **3.06 CLEANING**

- A. Clean tile and grout surfaces.
- B. Seal grout joints.

### **3.07 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days or manufacturer's recommended curing time after installation.

**END OF SECTION 09 30 00**

**SECTION 09 51 00**  
**ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Support hangers, channels, and wires.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements and Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 4x4 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.05 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- C. Installer Qualifications: Company specializing in installation of the products specified in this section with minimum five years documented experience.

**1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**1.07 PROJECT CONDITIONS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

**1.08 EXTRA MATERIALS**

- A. See Section 01 60 00 - Product Requirements, for additional provisions.
- B. Provide 200 SF of acoustic panel units for North Providence Public Schools's use in maintenance of project.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:



1. Armstrong World Industries, Inc: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
2. Certaineed Architectural: [www.certainteed.com/ceilings-and-walls/#sle](http://www.certainteed.com/ceilings-and-walls/#sle).
3. Rockfon: [www.rockfon.com/#sle](http://www.rockfon.com/#sle).
4. USG Corporation: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
5. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Suspension Systems:
1. Same as for acoustical units.

## 2.02 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels, Type ACT-1 at Cafeteria & Restroom: Painted mineral fiber, with the following characteristics:
1. Classification: ASTM E1264 Type III.
    - a. Form: 2, water felted.
    - b. Pattern: "C" - perforated, small holes.
  2. Size: 24 by 24 inches.
  3. Thickness: 3/4 inch.
  4. Light Reflectance: 82 percent, determined in accordance with ASTM E1264.
  5. NRC Range: 0.70 to 1.0, determined in accordance with ASTM E1264.
  6. Ceiling Attenuation Class (CAC): 40, determined in accordance with ASTM E1264.
  7. Tile Edge: Square.
  8. Color: White.
  9. Suspension System: Exposed grid.
  10. Products:
    - a. Armstrong World Industries, Inc; School Zone Fine Fissured: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
- C. Acoustical Panels, Type ACT-2 AT Kitchen: Mineral fiber with scrubbable finish, with the following characteristics:
1. Classification: ASTM E1264 Type IX.
    - a. Form: 2, water felted.
    - b. Pattern: "G" - smooth.
  2. Size: 24 by 24 inches.
  3. Thickness: 5/8 inch.
  4. Light Reflectance: 89 percent, determined in accordance with ASTM E1264.
  5. Ceiling Attenuation Class (CAC): 33, determined in accordance with ASTM E1264.
  6. Panel Edge: Square.
  7. Color: White.
  8. Suspension System: Exposed grid.
  9. Products:
    - a. Armstrong World Industries, Inc; Kitchen Zone: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).

## 2.03 SUSPENSION SYSTEM(S) UNLESS NOTED OTHERWISE ABOVE.

- A. Manufacturers:
1. Same as for acoustical units.
  2. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Tee Steel Suspension System Type A: Formed galvanized steel, commercial quality cold rolled; heavy-duty.
1. Profile: Tee; for square edge panels 15/16 inch wide face.

2. Finish: White painted.
3. Products: Armstrong Prelude XL 15/16 inch.

#### **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12-gage 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same material and finish as grid.
  1. Size: As required for installation conditions and specified Seismic Design Category.
  2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
  3. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Metal Edge Trim for Suspension Systems: Steel or extruded aluminum; provide attachment clips, splice plates, and preformed corner pieces for complete trim system.
  1. Trim Height: 4 inch.
  2. Finish: Baked enamel.
  3. Color: White.
- F. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.
- G. Touch-up Paint: Type and color to match acoustical and grid units.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

#### **3.02 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

#### **3.03 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:240.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Locate system on room axis according to reflected plan.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.

- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Install in bed of acoustical sealant or in bed of acoustical sealant.
  - 2. Use longest practical lengths.
  - 3. Miter or Overlap and rivet corners.
- L. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

#### **3.04 INSTALLATION - ACOUSTICAL UNITS**

- A. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- B. Fit border trim neatly against abutting surfaces.
- C. Install units after above-ceiling work is complete.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
  - 1. Cut to fit irregular grid and perimeter edge trim.
  - 2. Make field cut edges of same profile as factory edges.
  - 3. Double cut and field paint exposed reveal edges.
- F. Where round obstructions and bullnose corners occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

#### **3.05 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION 09 51 00**

**SECTION 09 67 23**  
**RESINOUS FLOORING SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resinous Systems of the Following Types:
  - 1. Satin finish, UV-resistant double broadcast four layer system with two layers of a vinyl decorative flake that covers entire floor.
  - 2. Include a fluid applied vapor barrier compatible with finish floor coatings.

**1.02 RELATED SECTIONS**

- A. Section 03 30 00 – Cast-In-Place Concrete.

**1.03 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C 413 - Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - 2. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
  - 3. ASTM D1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
  - 4. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
  - 5. ASTM D 2240 - Standard Test Method for Rubber Property—Durometer Hardness.
  - 6. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - 7. ASTM D 2370 - Standard Test Method for Tensile Properties of Organic Coatings.
  - 8. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
  - 9. ASTM D 4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
  - 10. ASTM D5441 - Standard Test Method for Analysis of Methyl Tert-Butyl Ether (MTBE) by Gas Chromatography.
  - 11. ASTM D 7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
  - 12. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
  - 13. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
  - 14. ASTM G 154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.
- B. National Floor Safety Institute (NFSI):
  - 1. ANSI/NFSI B101.1 - Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01 30 00.
- B. Product Data:
  - 1. Manufacturer's data sheets on each product to be used, including properties, VOC content, wet static coefficient of friction, compressive strength, tensile strength, elongation and similar properties.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Typical installation methods.

- C. Verification Samples: Two representative units of each system, including color and texture.
- D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
- E. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- F. Manufacturer's Project References: Submit manufacturer's list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems furnished.
- G. Applicator's Project References: Submit applicator's list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems applied.
- H. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning instructions.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Applicator's Qualifications:
  - 1. Applicator regularly engaged, for a minimum of 5 years, in application of resinous flooring systems of similar type to that specified.
  - 2. Employ persons trained for application of resinous flooring systems.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
  - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
  - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
  - 3. Retain mock-up during construction as a standard for comparison with completed work.
  - 4. Do not alter or remove mock-up until work is completed or removal is authorized.

#### **1.06 PRE-INSTALLATION CONFERENCE**

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and batch number.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in accordance with manufacturer's instructions.
  - 2. Keep materials in manufacturer's original, unopened containers and packaging until application.
  - 3. Store materials in clean, dry area indoors between 65 and 80 degrees F
  - 4. Store materials out of direct sunlight.
  - 5. Keep materials from freezing.
  - 6. Protect materials during storage, handling, and application to prevent contamination or damage.

## 1.08 PROJECT CONDITIONS

- A. Apply flooring system under the following ambient conditions:
  - 1. Ambient and Concrete Floor Temperatures: Between 65 and 85 degrees F.
  - 2. Material Temperature: Between 65 and 85 degrees F.
  - 3. Relative Humidity: Maximum 80 percent.
  - 4. Dew Point: Floor temperature more than 5 degrees over dew point.
- B. Do not apply flooring system under ambient conditions outside manufacturer's limits.

## 1.09 WARRANTY

- A. Submit manufacturer's standard warranty.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Tennant Coatings Inc., which is located at: 701 N. Lilac Dr.; Minneapolis, MN 55440; Toll Free Tel: 800-228-4943; Email:[request info](mailto:request%20info@tennantco.com) ([Coatings@tennantco.com](mailto:Coatings@tennantco.com)); Web:<http://www.tennantcoatings.com>
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

### 2.02 BASIS OF DESIGN

- A. Tennant Flake DB, MPE\*-MPE\*-TCP-TCP.
  - 1. First Broadcast Coat with decorative vinyl flake (1/8"): Eco-MPE pigmented, 10-12 mils.
  - 2. Second Broadcast Coat with decorative vinyl flake (1/8"): Eco-MPE, 15 mils.
  - 3. Grout Coat: Eco-TCP, 15 mils.
  - 4. Topcoat: Eco-TCP, 8 mils.
  - 5. Color: As selected by Architect from manufacturer's full range.
  - 6. Include a fluid applied vapor barrier compatible with finish floor coatings.

### 2.03 PRODUCT PROPERTIES

- A. Eco-MPE: A neutral, two-component, high solids epoxy.
  - 1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 95.45 (94.56).
  - 2. Volatile Organic Compound-VOC, ASTM D3960, Mixed A + B: 0.41 lb./gal (49 g/L).
  - 3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 83.1.
  - 4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.59-0.62.
  - 5. Adhesion to Concrete, ASTM D5441: 732 psi (4.48 MPa) concrete failed.
  - 6. Adhesion to Concrete, ASTM D7234: 450 psi (3.10 MPa) concrete failed.
  - 7. Compressive Strength, ASTM D695: 13,500 psi (93.079 MPa).
  - 8. Tensile Strength, ASTM D2370: 8,000 psi (55.158 MPa).
  - 9. Percent Elongation, ASTM D2370: 5.
  - 10. Shore D Hardness, ASTM D2240: 80-85 @ 0 sec, 75-80 @ 15 sec.
- B. Eco-TCP: A two-component, high solids, thick coat polyaspartic.
  - 1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 91.59 (91.47).
  - 2. Volatile Organic Compounds-VOC, ASTM 3960: 0.30 lb./gal (37 g/L).
  - 3. Abrasion Resistance, mg loss, Taber Abraser (CS-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions), ASTM D4060: 43.
  - 4. Wet Static Coefficient of Friction, BOT 3000, ANSI/NFSI B101.1: 0.99.
  - 5. Resistance to Yellowing, As measured using ASTM D2244 after 1000 consecutive hours UV exposure in QUV, ASTM G154, <20 increase of yellowing units (CIE Lab ?b
  - 6. Tensile Strength, ASTM D2370: 6,913 psi (47.66 MPa).
  - 7. Percent Elongation, ASTM D2370: 8.
  - 8. Thermal Stability/Heat resistance, MIL-D-3134J Section 4.6.3: No slip/flow, softening or change in appearance.



9. Water Absorption, 24-hour immersion, ASTM C413: 0.2 percent weight increase.
- C. Decorative Flake: Water-based resin material, inorganic minerals, additives, integrally pigmented.
  1. Shape: Random.
  2. Size: 1/8.
  3. Surface Texture: Smooth.
  4. Color: Selected by Architect.
- D. Include a fluid applied vapor barrier compatible with finish floor coatings.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine concrete surfaces to receive flooring system. Verify concrete is structurally sound.
- B. Moisture Testing of Concrete: Perform at least one of the following two tests to determine moisture in concrete. Type of test and frequency as recommended by manufacturer and installer.
  1. In-situ Probe Test:
    - a. Measure relative humidity in concrete in accordance with ASTM F 2170.
    - b. Application of flooring system shall start only if test results are below 75 percent relative concrete humidity.
    - c. If test results are above limits, notify Architect and flooring manufacturer in writing.
- C. Do not begin preparation or installation until satisfactory moisture test results are achieved. Provide flooring manufacturer's recommended moisture vapor control coating if required.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Protection of In-Place Conditions: Protect adjacent surfaces and adjoining walls from contact with flooring system materials.
- C. Surface Preparation:
  1. Prepare concrete surface in accordance with manufacturer's instructions.
  2. Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, sealers, silicones, and other surface contaminants which could adversely affect application of flooring system.
  3. Steel shot blast concrete to a minimum surface profile of ICRI 310.2R, CSP 5.
  4. Key-cut termination points with 1/4-inch by 1/4-inch cut.
  5. Patch depressions, divots, and cracks in concrete in accordance with manufacturer's instructions.
  6. Mechanically remove loose, delaminated, and damaged concrete and repair in accordance with manufacturer's instructions.
  7. Joints: Fill joints in accordance with manufacturer's instructions.

#### **3.03 INSTALLATION**

- A. Install flooring system in accordance with manufacturer's instructions and approved submittals at locations indicated on the Drawings.
- B. Ensure concrete is dry, clean, and prepared in accordance with manufacturer's instructions.
- C. Allow concrete to cure a minimum of 7 days before applying flooring system.
- D. Mixing:
  1. Mix material components together in accordance with manufacturer's instructions.
  2. Mix only enough material that can be applied within working time.
  3. Add and mix colorants with materials in accordance with manufacturer's instructions to achieve uniform color.



- E. Apply flooring system materials to obtain consistent mil thickness and smooth, uniform appearance and texture.
- F. Overlay: Apply overlay in accordance with manufacturer's instructions. Apply overlay to prepared concrete surface.
- G. Traction Aggregate: Broadcast traction aggregate in accordance with manufacturer's instructions. Broadcast traction aggregate into wet overlay.
- H. Cove:
  - 1. Apply cove primer and cove in accordance with manufacturer's instructions at locations indicated on the Drawings.
  - 2. Apply cove to height and shape as indicated on the Drawings.
  - 3. Apply cove to create seamless, smooth transition between flooring and walls.
- I. Seal Coat:
  - 1. Apply seal coat in accordance with manufacturer's instructions.
  - 2. Apply seal coat over traction aggregate.

#### **3.04 CLEANING AND PROTECTION**

- A. Allow flooring system to dry in accordance with manufacturer's instructions before opening to traffic.
- B. Allow flooring system to dry a minimum of 1 week before cleaning by mechanical means.
- C. Protect completed flooring system from damage during construction.

**END OF SECTION 09 67 23**

## SECTION 09 77 20

### DECORATIVE FIBERGLASS REINFORCED WALL PANELS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Prefinished polyester glass reinforced plastic sheets with custom graphics adhered to unfinished gypsum wall board.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials: Standard Specifications (ASTM)
  1. ASTM D 256 -Izod Impact Strengths (ft #/in)
  2. ASTM D 570 -Water Absorption (%)
  3. ASTM D 638 -Tensile Strengths (psi) & Tensile Modulus (psi)
  4. ASTM D 790 -Flexural Strengths (psi) & Flexural Modulus (psi)
  5. ASTM D 2583- Barcol Hardness
  6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
  7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

##### 1.03 SUBMITTALS

- A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
  1. Preparation instructions and recommendations.
  2. Storage and handling requirements and recommendations.
  3. Installation methods.
- B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
- C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
- D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
  1. Submit complete with specified applied finish.
  2. For selected patterns show complete pattern repeat.
  3. Exposed Molding and Trim: Provide samples of each type, finish, and color.
- E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants and other pertinent materials prior to their delivery to the site.

##### 1.04 QUALITY ASSURANCE

- A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
  1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
    - a. Wall Required Rating – Class A.

##### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory packaged on strong pallets.
- B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

##### 1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work

- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
  - 1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

### 1.07 WARRANTY

- A. Furnish one year guarantee against defects in material and workmanship.

## PART 2 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURER

- A. Marlite; 1 Marlite Drive, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com.
- B. Product:
  - 1. Standard FRP
  - 2. Artizan™ FRP with BlueSky™ Advanced Finishing

### 2.02 PANELS

- A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
  - 1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
  - 2. Dimensions:
    - a. Thickness – 0.090 “ nominal
    - b. Width - 4'-0” nominal
    - c. Length – As field conditions require
  - 3. Tolerance:
    - a. Length and Width: +/-1/8 “
    - b. Square - Not to exceed 1/8 “ for 8 foot panels or 5/32 “ for 10 foot panels
- B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
  - 1. Flexural Strength - 1.0 x 104 psi per ASTM D 790.
  - 2. Flexural Modulus - 3.1 x 105 psi per ASTM D 790.
  - 3. Tensile Strength - 7.0 x 103 psi per ASTM D 638.
  - 4. Tensile Modulus - 1.6 x 105 psi per ASTM D 638.
  - 5. Water Absorption - 0.72% per ASTM D 570.
  - 6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
  - 7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256
- C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.
- D. Standard FRP Panels - Front Finish:
  - 1. Color: P100 White
  - 2. Surface. Smooth
  - 3. Fire Rating : Class A
- E. Artizan FRP Panels - Front Finish
  - 1. Color: Custom Graphics and/or Color
  - 2. Surface: Smooth
  - 3. Fire Rating: Class A

### 2.03 MOLDINGS

- A. Aluminum Anodized Trim: Heavy weight extruded aluminum 6063-T5 alloy prefinished at the factory.
  - 1. F 550 Inside Corner
  - 2. F 561 Outside Corner
  - 3. F 565 Division

4. F 570 Edge
  5. Color: Brite Satin Anodized
- B. Outside Corner Guard:
1. F 560SS Stainless Corner Guard

#### **2.04 ACCESSORIES**

- A. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
1. Titebond Advanced Polymer Panel Adhesive – VOC compliant, non-flammable, environmentally safe adhesive.
- B. Sealant:
1. Marlite Brand MS-250 Clear Silicone Sealant.
  2. Marlite Brand MS-251 White Silicone Sealant.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
1. Verify that stud spacing does not exceed 24" (61cm) on-center.
- B. Repair defects prior to installation.
1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

#### **3.02 INSTALLATION**

- A. Comply with manufacturer's recommended procedures and installation sequence.
- B. Cut sheets to meet supports allowing 1/8" (3 mm) clearance for every 8 foot (2.4m) of panel.
1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
  2. Pre-drill fastener holes 1/8" (3mm) oversize with high speed drill bit.
    - a. Space at 8" (200mm) maximum on center at perimeter, approximately 1" from panel edge.
    - b. Space at in field in rows 16' (40.64cm) on center, with fasteners spaced at 12" (30.48 cm) maximum on center.
- C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
1. Install panels with manufacturer's recommended gap for panel field and corner joints.
    - a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
    - b. Drive fasteners for snug fit. Do not over-tighten.
- D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
1. All moldings must provide for a minimum 1/8 " (3mm) of panel expansion at joints and edges, to insure proper installation.
  2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

#### **3.03 CLEANING**

- A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.
- B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

**END OF SECTION 09 77 20**

**SECTION 09 90 00**  
**PAINTS AND COATINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Elevator pit ladders.
  - 3. Exposed surfaces of steel lintels and ledge angles.
  - 4. Surfaces inside cabinets.
  - 5. Mechanical and Electrical:
    - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
  - 6. Floors, unless specifically so indicated.
  - 7. Glass.
  - 8. Acoustical materials, unless specifically so indicated.
  - 9. Concealed pipes, ducts, and conduits.
- E. Painting materials and methods for conduit identification specified in Section 26 05 53.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 78 39 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. NACE (IMP) - Industrial Maintenance Painting; NACE International; Edition date unknown.
- D. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

**1.04 DEFINITIONS**

- A. Conform to ASTM D 16 for interpretation of terms used in this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on all finishing products and special coatings, including VOC content.
- C. Samples: Submit two paper chip samples, 1 X 1 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on aluminum sheet, 6 x 6 inch in size.
- E. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- F. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.
- G. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- H. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

#### **1.09 EXTRA MATERIALS**

- A. See Section 01 60 00 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color, type, texture, and room locations in addition to the manufacturer's label.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. ICI Paints North America: [www.icipaints.com](http://www.icipaints.com)

2. Duron, Inc: [www.duron.com/#sle](http://www.duron.com/#sle).
3. Sherwin Williams: [www.sherwin-williams.com](http://www.sherwin-williams.com)
4. Benjamin Moore & Co: [www.benjaminmoore.com/#sle](http://www.benjaminmoore.com/#sle).

C. Field-Catalyzed Coatings:

D. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  3. Supply each coating material in quantity required to complete entire project's work from a single production run.
  4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.
- D. Chemical Content: The following compounds are prohibited:
1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.
- E. Colors: To be selected from manufacturer's full range of available colors.
1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to North Providence Public Schools.

## 2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
1. Two top coats and one coat primer.
  2. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143-148.
  3. Eggshell: MPI gloss level 3; use this sheen at all locations.
  4. Top Coat Product(s):
    - a. Sherwin-Williams ProMar 200 Zero VOC Interior Latex. (MPI #43, 44, 52, 54, 144)
  5. Primer(s): As recommended by manufacturer of top coats.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
1. Two top coats and one coat primer.
  2. Eggshell: MPI gloss level 3; use this sheen at all locations.
  3. Top Coat Product(s):
    - a. Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd.
- C. Paint I-OP-MD-WC - Medium Duty Vertical/Overhead: Including gypsum board and concrete masonry.
1. Applications: At Restroom walls.



2. Two top coats and one coat primer.
3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115, 215.
4. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
5. Top Coat Product(s):
  - a. Sherwin-Williams Waterbased Catalyzed Epoxy.
6. Primer(s): As recommended by manufacturer of top coats.

#### **2.04 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Plaster and Stucco: 12 percent.
  3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  5. Concrete Floors and Traffic Surfaces: 8 percent.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- E. Marks: Seal with shellac or stain blocker those which may bleed through surface finishes.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.
- J. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

- K. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- L. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- M. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- N. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- O. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- P. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- Q. Exterior and Interior Wood to Receive Opaque Latex Stain Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after initial coat has been applied. Back stain concealed surfaces before installation.
- R. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's instructions.
- D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- F. Apply each coat to uniform appearance.
- G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT**

- A. Refer to Section 22 05 53, Section 23 05 53 and Section 26 05 53 for schedule of color coding of equipment, duct work, piping, and conduit.

- B. Paint shop-primed equipment, where indicated.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Finish equipment, piping, conduit, and exposed duct work in utility areas in colors according to the color coding scheme indicated.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

### **3.06 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.07 PROTECTION**

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

### **3.08 SCHEDULE - SURFACES TO BE FINISHED**

- A. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically noted.
  - 2. Fire rating labels, equipment serial number and capacity labels.
  - 3. Stainless steel items.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
  - 1. Where indicated as exposed, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment occurring in finished areas to match background surfaces.
  - 2. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.
  - 3. Paint shop-primed items occurring in finished areas.
  - 4. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
  - 5. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

**END OF SECTION 09 90 00**

## SECTION 10 14 00

### SIGNAGE

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Room and door signs.

##### 1.02 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
- B. ADA Standards - 2010 ADA Standards for Accessible Design.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities.

##### 1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
  - 2. Submit for approval by North Providence Public Schools through StudioJAED prior to fabrication.
- D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- E. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- F. Maintenance Materials: Furnish the following for North Providence Public Schools's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

##### 1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

##### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

##### 1.06 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Flat Signs:
  - 1. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
  - 2. InPro Corporation; Aspen produced in one piece photopolymer media: [www.inprocorp.com](http://www.inprocorp.com).

3. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
4. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).
5. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
  1. Sign Type: Flat signs with applied character panel media as specified.
  2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  3. Character Height: 1 inch.
  4. Sign Height: 8 inches, unless otherwise indicated.
  5. Sign Width" 8 inches, unless otherwise indicated
  6. Rest Rooms:
    - a. Men's Room: Identify with man and accessible pictograms, text "RESTROOM", with pictogram] and braille.
    - b. Women's Room: Identify with woman and accessible pictograms, text "RESTROOM", [with pictogram] and braille.

## 2.03 SIGN TYPES

- A. Flat Signs: Signage media without frame.
  1. Edges: Square.
  2. Corners: Radiused.
  3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
  4. Wall Mounting of One-Sided Signs: Signs shall be mounted using double-sided vinyl foam tape (1/16" thickness) or silicon adhesive as per the approved shop drawings..
- B. Color and Font: Unless otherwise indicated:
  1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: To be selected from manufacturer's full range..
  4. Character Color: Contrasting color.

## 2.04 TACTILE SIGNAGE MEDIA

- A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
  1. Total Thickness: 1/8 inch.
  2. Letter Thickness: 1/8 inch.
  3. Letter Edges: Square.

## 2.05 ACCESSORIES

- A. Tape Adhesive: Double sided vinyl foam tape (1/16" thickness), permanent adhesive.
- B. Silicon Adhesive

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. A. Examine signage for defects prior to installation. Do not install damaged signage.
- B. Inspect conditions of installation areas and other conditions which may affect installation of signage to ensure that conditions are suitable for installation.
- C. Do not begin installation until installation areas are within manufacturer's specified tolerances and have been prepared in accordance with manufacturer's instructions.

- D. If installation area preparation is the responsibility of another installer, do not proceed with installation. Notify Architect of unsatisfactory preparation immediately.
- E. Commencement of work is deemed as acceptance of installation conditions.

### **3.02 PREPARATION**

- A. Verify mounting heights and locations for signage will comply with specified requirements.
- B. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- D. Verify completion of other installation conditions needed for sign installation including backing materials, reinforcement, electrical and data.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.
- D. Protect from damage until Substantial Completion; repair or replace damage items.
- E. When flat sign must be glass mounted, provide blank sign for other side of glass to cover tape adhesive.

### **3.04 TRAINING & CLOSEOUT**

- A. Provide manufacturer's written warranty and cleaning/maintenance instructions.
- B. Provide digital templates for end-user updatable inserts.
- C. Provide necessary tools and source for consumables for end-user updateable inserts.

**END OF SECTION 10 14 00**

**SECTION 10 21 13.19**  
**PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Solid plastic toilet compartments.
- B. Urinal screens.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

**1.03 REFERENCE STANDARDS**

- A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples for Initial Selection: Chain set of Manufacturer's standard colors.
- E. Samples for Verification: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special procedures.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Solid Plastic Toilet Compartments:
  - 1. Basis-of-Design:
    - a. Scranton Products; Hiny Hiders Partitions: [www.scrantonproducts.com/#sle](http://www.scrantonproducts.com/#sle).
  - 2. Available Manufacturers: Subject to the requirements of the specification, products from the following manufacturers may be provided.
    - a. Metpar Corp: [www.metpar.com/#sle](http://www.metpar.com/#sle).
    - b. Scranton Products: [www.scrantonproducts.com/#sle](http://www.scrantonproducts.com/#sle).
    - c. Partition Systems International of South Carolina: [www.psisc.com/#sle](http://www.psisc.com/#sle).
    - d. Substitutions: Section 01 60 00 - Product Requirements.

**2.02 PLASTIC TOILET COMPARTMENTS**

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted headrail-braced.
  - 1. Color: Single color as selected from manufacturer's full range.
  - 2. Doors:
    - a. Thickness: 1 inch.
    - b. Width: 26 inch.
    - c. Width for Handicapped Use: 36 inch, out-swinging, self closing.
    - d. Height: 55 inch.



3. Panels:
  - a. Thickness: 1 inch.
  - b. Height: 55 inch.
4. Pilasters:
  - a. Thickness: 1 inch.
  - b. Width: As required to fit space; minimum 3 inch.
5. Screens: Without doors; to match compartments; mounted to wall with continuous panel brackets.

### **2.03 ACCESSORIES**

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
- B. Head Rails: Extruded aluminum, anti-grip profile.
- C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
- E. Hinges: Stainless steel, manufacturer's standard finish.
- F. Door Hardware: Stainless steel, manufacturer's standard finish.
  1. Door Latch: Slide type with exterior emergency access feature.
  2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
  3. Provide door pull for outswinging doors.
- G. Coat Hook: One per compartment, mounted on door.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

### **3.02 INSTALLATION**

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

### **3.03 TOLERANCES**

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

### **3.04 ADJUSTING**

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

**END OF SECTION 10 21 13.19**

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PLASTIC TOILET COMPARTMENTS  
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**SECTION 10 26 01**  
**WALL AND CORNER GUARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Corner guards.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.
- C. Samples: Submit two sections of corner guard, 24 inch long, illustrating component design, configuration, color and finish.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Wall and Corner Guards:
  - 1. Babcock-Davis: [www.babcockdavis.com/sle](http://www.babcockdavis.com/sle).
  - 2. Inpro: [www.inprocorp.com](http://www.inprocorp.com).
  - 3. Nystrom, Inc: [www.nystrom.com/sle](http://www.nystrom.com/sle).

**2.02 COMPONENTS**

- A. Corner Guards - Surface Mounted:
  - 1. Material: Type 304 stainless steel, No. 4 finish, 14 gage.
  - 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
  - 3. Width of Wings: 3 inches.
  - 4. Corner: Square.
  - 5. Color: As selected from manufacturer's standard colors.
  - 6. Length: One piece.

**2.03 FABRICATION**

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard 4 inches above finished floor up to as indicated on drawings.

**3.02 TOLERANCES**

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

**END OF SECTION 10 26 01**

## SECTION 10 28 00

### TOILET, BATH, AND LAUNDRY ACCESSORIES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Commercial toilet accessories.

##### 1.02 REFERENCE STANDARDS

- A. ASTM C1036 - Standard Specification for Flat Glass.
- B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror.

##### 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

##### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Basis-of-Design: Bobrick Washroom Equipment, inc.
- B. Available Manufacturers: Subject to the requirements of the specification, equivalent products from the following manufacturers may be provided.
  1. AJW Architectural Products: [www.ajw.com/#sle](http://www.ajw.com/#sle).
  2. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  3. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
  4. Georgia-Pacific Professional: [www.blue-connect.com/#sle](http://www.blue-connect.com/#sle).
  5. Substitutions: Section 01 60 00 - Product Requirements.

##### 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Keys: Provide 2 keys for each accessory to North Providence Public Schools; master key lockable accessories.
- C. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- D. Adhesive: Two component epoxy type, waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

##### 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

##### 2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Towel Dispenser: Provided by the Owner and installed by the Contractor.
- B. Paper Towel Dispenser: Provided by the Owner and installed by the Contractor.
- C. Soap Dispenser: Provided by the Owner and installed by the Contractor.
- D. Waster Can: Provided by the Owner and placed by the Contractor.
- E. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.

1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
2. Size: as noted on drawings.
3. Products:
  - a. Bobrick Washroom Equipment, Inc.; [www.bobrick.com](http://www.bobrick.com).
  - b. Substitutions: Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

#### **3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

#### **3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

#### **3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION 10 28 00**

**SECTION 12 36 00**  
**COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.
- B. Sinks molded into countertops.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- 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. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.04 FIELD 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.

**PART 2 PRODUCTS**

**2.01 COUNTERTOPS**

- A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
  - 1. Flat Sheet Thickness: 1/2 inch, minimum.
  - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Manufacturers:
      - 1) Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
      - 2) Meganite, Inc: [www.meganite.com/#sle](http://www.meganite.com/#sle).
      - 3) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
    - b. Sinks and Bowls: Integral castings; minimum 3/4 inch wall thickness; comply with IAPMO Z124.
    - c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
    - d. Color and Pattern: As selected by StudioJAED from manufacturer's full line.
  - 3. Other Components Thickness: 1/2 inch, minimum.

4. Exposed Edge Treatment: Built up to minimum 1 1/2 inch thick; edge profile as indicated on drawings; use marine edge at sinks.
5. Back and Side Splashes: Same sheet material, square top; minimum 4 inches high.
6. Skirts: As indicated on drawings.
7. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

## **2.02 MATERIALS**

- A. Wood-Based Components:
  1. Wood fabricated from old growth timber is not permitted.
- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- D. Joint Sealant: Mildew-resistant silicone sealant, white.

## **2.03 ACCESSORIES**

- A. Fixed Top-Mounted Countertop Support Brackets:
  1. Material: Steel.
  2. Finish: Manufacturer's standard, factory-applied, textured powder coat.

## **2.04 FABRICATION**

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  1. Join lengths of tops using best method recommended by manufacturer.
  2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify StudioJAED of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.



- B. Seal joint between back/end splashes and vertical surfaces.

#### **3.04 TOLERANCES**

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

#### **3.05 CLEANING**

- A. Clean countertops surfaces thoroughly.

#### **3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION 12 36 00**

**SECTION 21 05 00**  
**COMMON WORK RESULTS FOR FIRE SUPPRESSION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Above ground piping.
- B. Buried piping.
- C. Pipe, fittings, valves, and connections for sprinkler, standpipe and fire hose, and combination sprinkler and standpipe systems.
- D. Pipe hangers and supports.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 90 00 - Painting and Coating: Preparation and painting of fire protection piping systems.
- B. Section 21 05 53 - Identification for Fire Supp. Piping and Equipment: Piping identification.
- C. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Piping identification.
- D. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

**1.03 REFERENCE STANDARDS**

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators.
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
- D. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250.
- E. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
- F. ASME B16.9 - Factory-Made Wrought Butt welding Fittings.
- G. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded.
- H. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- I. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- J. ASME B16.25 - Butt welding Ends.
- K. ASME B36.10M - Welded and Seamless Wrought Steel Pipe.
- L. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
- M. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- N. ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe.
- O. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- P. ASTM A795/A795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- Q. ASTM B32 - Standard Specification for Solder Metal.
- R. ASTM B75/B75M - Standard Specification for Seamless Copper Tube.
- S. ASTM B75M - Standard Specification for Seamless Copper Tube (Metric).
- T. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

- U. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric).
- V. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- W. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- X. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
- Y. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings.
- Z. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- AA. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.
- AB. NFPA 13 - Standard for the Installation of Sprinkler Systems.
- AC. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems.
- AD. NFPA 24 - Standard for the Installation of Private Fire Service Mains and Their Appurtenances; National Fire Protection Association; 1995.
- AE. UL (DIR) - Online Certifications Directory.
- AF. UL 262 - Gate Valves for Fire-Protection Service; Underwriters Laboratories Inc..
- AG. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories Inc..

#### **1.04 SUBMITTALS**

- A. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
- C. Project Record Documents: Record actual locations of components and tag numbering.
- D. Operation and Maintenance Data: Include installation instructions and spare parts lists.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience. approved by manufacturer.
- C. Conform to UL requirements.
- D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store valves in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

#### **1.07 EXTRA MATERIALS**

- A. Provide two valve stem packings for each size and type of valve installed.

### **PART 2 PRODUCTS**

#### **2.01 FIRE PROTECTION SYSTEMS**

- A. Sprinkler Systems: Conform work to NFPA 13.
- B. Standpipe and Hose Systems: Conform to NFPA 14.

C. Welding Materials and Procedures: Conform to ASME Code.

## 2.02 BURIED PIPING

- A. Steel Pipe: ASTM A53/A53M Schedule 40, black, with AWWA C105 polyethylene jacket, or double layer, half-lapped polyethylene tape.
  - 1. Steel Fittings: ASME B16.9, wrought steel, butt welded; with double layer, half-lapped polyethylene tape.
  - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings.
  - 3. Joints: Welded in accordance with AWS D1.1.
  - 4. Casing: Closed glass cell insulation.
- B. Copper Tube: ASTM B75 (ASTM B75M), O60 or O50 temper.
  - 1. Type: Type K (A).
  - 2. Fittings: ASME B16.18, cast copper alloy, solder joint, pressure type.
  - 3. Joints: AWS A5.8 Classification BCuP-3 or BCuP-4 copper/silver braze.
  - 4. Casing: Closed glass cell insulation.
- C. Cast Iron Pipe: AWWA C151/A21.51.
  - 1. Fittings: AWWA C110, standard thickness.
  - 2. Joints: AWWA C111, rubber gasket.
  - 3. Mechanical Couplings: Shaped composition sealing gasket, steel bolts, nuts, and washers.

## 2.03 ABOVE GROUND PIPING

- A. Steel Pipe: ASTM A795 Schedule 10 or ASTM A53 Schedule 40, black.
  - 1. Steel Fittings: ASME B16.9, wrought steel, butt welded.
  - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings.
  - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings.
  - 4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.
  - 5. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), H58 drawn.
  - 1. Fittings: ASME B16.18, cast copper alloy, grooved.
  - 2. Mechanical Grooved Couplings: Ductile iron housing with alkyd enamel paint coating clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers.
- C. Cast Iron Pipe: AWWA C151/A21.51.
  - 1. Fittings: AWWA C110/A21.10, standard thickness.
  - 2. Joints: AWWA C111, rubber gasket.
  - 3. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

## 2.04 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
- C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- D. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
- E. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
- F. Vertical Support: Steel riser clamp.

- G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- H. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## **2.05 GATE VALVES**

- A. Up to and including 2 inches:
  - 1. Bronze body, bronze trim, rising stem, handwheel, solid wedge or disc, threaded ends.
- B. Over 2 inches:
  - 1. Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, handwheel, OS&Y, solid rubber covered bronze or cast iron wedge, flanged ends.
- C. Over 4 inches:
  - 1. Iron body, bronze trim, non-rising stem with bolted bonnet, solid bronze wedge, flanged ends, iron body indicator post assembly.

## **2.06 GLOBE VALVES**

- A. Up to and including 2 inches:
  - 1. Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable rubber disc, threaded ends, with backseating capacity repackable under pressure.
- B. Over 2 inches:
  - 1. Iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.

## **2.07 BALL VALVES**

- A. Up to and including 2 inches:
  - 1. Bronze two piece body, brass, chrome plated bronze, or stainless steel ball, teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends .
- B. Over 2 inches:
  - 1. Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle or gear drive handwheel for sizes 10 inches and over, flanged.

## **2.08 BUTTERFLY VALVES**

- A. Bronze Body:
  - 1. Stainless steel disc, resilient replaceable seat, threaded or grooved ends, extended neck, handwheel and gear drive and integral indicating device, and built-in tamper proof switch rated 10 amp at 115 volt AC.
- B. Cast or Ductile Iron Body
  - 1. Cast or ductile iron, chrome or nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM seat, wafer, lug, or grooved ends, extended neck, handwheel and gear drive and integral indicating device, and internal tamper switch rated 10 amp at 115 volt AC.

## **2.09 CHECK VALVES**

- A. Up to and including 2 inches:
  - 1. Bronze body and swing disc, rubber seat, threaded ends.
- B. Over 2 inches:
  - 1. Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends with automatic ball check.
- C. 4 inches and Over:
  - 1. Iron body, bronze disc, stainless steel spring, resilient seal, threaded, wafer, or flanged ends.

## 2.10 DRAIN VALVES

- A. Compression Stop:
  - 1. Bronze with hose thread nipple and cap.
- B. Ball Valve:
  - 1. Brass with cap and chain, 3/4 inch hose thread.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.02 INSTALLATION

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Install standpipe piping, hangers, and supports in accordance with NFPA 14.
- C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- D. Install piping to conserve building space, to not interfere with use of space and other work.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipes passing through partitions, walls, and floors.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- H. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.
- I. Pipe Hangers and Supports:
  - 1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 2. Place hangers within 12 inches of each horizontal elbow.
  - 3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 4. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
  - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 6. Provide copper plated hangers and supports for copper piping.
  - 7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- J. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- K. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Refer to Section 09 90 00.

- L. Do not penetrate building structural members unless indicated.
- M. Provide sleeves when penetrating footings, floors, and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- N. Escutcheons:
  - 1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
  - 2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
  - 3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.
- O. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- P. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.
- Q. Install valves with stems upright or horizontal, not inverted. Remove protective coatings after installation.
- R. Provide gate, ball, or butterfly valves for shut-off or isolating service.
- S. Provide drain valves at main shut-off valves, low points of piping and apparatus.

**END OF SECTION 21 05 00**



## SECTION 21 05 48

### VIBRATION AND SEISMIC CONTROLS FOR EQUIPMENT

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Equipment support bases.
- B. Vibration isolators.
- C. Seismic restraints.

##### 1.02 SUBMITTALS

- A. Product Data:
- B. Shop Drawings: Indicate inertia bases and locate vibration isolators, with static and dynamic load on each. Indicate seismic control measures.
- C. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Isolation Technology, Inc: [www.isolationtech.com](http://www.isolationtech.com).
- B. Kinetics Noise Control, Inc: [www.kineticsnoise.com](http://www.kineticsnoise.com).
- C. Mason Industries: [www.mason-ind.com](http://www.mason-ind.com).

##### 2.02 PERFORMANCE REQUIREMENTS

- A. General:
  - 1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.

##### 2.03 EQUIPMENT SUPPORT BASES

##### 2.04 VIBRATION ISOLATORS

- A. Open Spring Isolators:
  - 1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  - 2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
  - 3. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
  - 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- B. Restrained Open Spring Isolators:
  - 1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  - 2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
  - 3. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
  - 4. Restraint: Provide heavy mounting frame and limit stops.
  - 5. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- C. Closed Spring Isolators:

1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
  2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance.
  4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- D. Restrained Closed Spring Isolators:
1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
  2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance and limit stops.
  4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- E. Spring Hanger:
1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  2. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators.
  3. Misalignment: Capable of 20 degree hanger rod misalignment.
  4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- F. Neoprene Pad Isolators:
1. Rubber or neoprene waffle pads.
    - a. Hardness: 30 durometer.
    - b. Thickness: Minimum 1/2 inch.
    - c. Maximum Loading: 50 psi.
    - d. Rib Height: Maximum 0.7 times width.
  2. Configuration: Single layer.
  3. Configuration: 1/2 inch thick waffle pads bonded each side of 1/4 inch thick steel plate.
- G. Rubber Mount or Hanger: Molded rubber designed for 0.4 inch deflection with threaded insert.
- H. Glass Fiber Pads: Neoprene jacketed pre-compressed molded glass fiber.
- I. Seismic Snubbers:
1. Type: Non-directional and double acting unit consisting of interlocking steel members restrained by neoprene elements.
  2. Elements: Replaceable neoprene, minimum of 0.75 inch thick with minimum 1/8 inch air gap.
  3. Capacity: 4 times load assigned to mount groupings at 0.4 inch deflection.
  4. Attachment Points and Fasteners: Capable of withstanding 3 times rated load capacity of seismic snubber.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Install in accordance with manufacturer's instructions.
- B. Comply with the requirements of NFPA 13.

- C. Bases:
  - 1. Set steel bases for one inch clearance between housekeeping pad and base.
  - 2. Set concrete inertia bases for 2 inches clearance between housekeeping pad and base.
  - 3. Adjust equipment level.
- D. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.
- E. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
- F. Provide seismic snubbers for all equipment, piping, and ductwork mounted on isolators. Each inertia base shall have minimum of four seismic snubbers located close to isolators. Snub equipment designated for post-disaster use to 0.05 inch maximum clearance. Other snubbers shall have clearance between 0.15 inch and 0.25 inch.
- G. Support piping connections to equipment mounted on isolators using isolators or resilient hangers for scheduled distance.
  - 1. Up to 4 Inches Pipe Size: First three points of support.
  - 2. 5 to 8 Inches Pipe Size: First four points of support.
  - 3. 10 inches Pipe Size and Over: First six points of support.
  - 4. Select three hangers closest to vibration source for minimum 1.0 inch static deflection or static deflection of isolated equipment. Select remaining isolators for minimum 1.0 inch static deflection or 1/2 static deflection of isolated equipment.

### **3.02 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect isolated equipment after installation and submit report. Include static deflections.

### **3.03 SCHEDULES**

- A. Pipe Isolation Schedule.
  - 1. 1 Inch Pipe Size: Isolate 120 diameters from equipment.
  - 2. 2 Inch Pipe Size: Isolate 90 diameters from equipment.
  - 3. 3 Inch Pipe Size: Isolate 80 diameters from equipment.
  - 4. 4 Inch Pipe Size: Isolate 75 diameters from equipment.
  - 5. 6 Inch Pipe Size: Isolate 60 diameters from equipment.
  - 6. 8 Inch Pipe Size: Isolate 60 diameters from equipment.
  - 7. 10 Inch Pipe Size: Isolate 54 diameters from equipment.
  - 8. 12 Inch Pipe Size: Isolate 50 diameters from equipment.
  - 9. 16 Inch Pipe Size: Isolate 45 diameters from equipment.
  - 10. 24 Inch Pipe Size: Isolate 38 diameters from equipment.
  - 11. Over 24 Inch Pipe Size: As indicated.

**END OF SECTION 21 05 48**

## SECTION 21 05 53

### IDENTIFICATION FOR FIRE SUPP. PIPING AND EQUIPMENT

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe Markers.

##### 1.02 RELATED REQUIREMENTS

- A. Section 09 90 00 - Painting and Coating: Identification painting.

##### 1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.

##### 1.04 SUBMITTALS

- A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- E. Project Record Documents: Record actual locations of tagged valves.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Brady Corporation: [www.bradycorp.com](http://www.bradycorp.com).
- B. Champion America, Inc: [www.Champion-America.com](http://www.Champion-America.com).
- C. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).
- D. Substitutions: See Section 01 60 00 - Product Requirements.

##### 2.02 NAMEPLATES

- A. Description: Laminated three-layer plastic with engraved letters.
  - 1. Letter Color: White.
  - 2. Letter Height: 1/4 inch.
  - 3. Background Color: Black.

##### 2.03 TAGS

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

##### 2.04 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
  - 1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
  - 2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.

3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
  4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.
  5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
  6. Equipment: 2-1/2 inch high letters.
- B. Stencil Paint: As specified in Section 09 90 00, semi-gloss enamel, colors conforming to ASME A13.1.

## **2.05 PIPE MARKERS**

- A. Color: Conform to ASME A13.1.
- B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

## **2.06 CEILING TACKS**

- A. Description: Steel with 3/4 inch diameter color coded head.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.

### **3.02 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Apply stencil painting in accordance with Section 09 90 00.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- F. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- G. Identify pumps and valves with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- H. Identify control panels and major control components outside panels with plastic nameplates.
- I. Identify thermostats relating to terminal boxes or valves with nameplates.
- J. Identify valves in main and branch piping with tags.
- K. Tag automatic controls, instruments, and relays. Key to control schematic.
- L. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

- M. Locate ceiling tacks to locate valves above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

**END OF SECTION 21 05 53**

**SECTION 21 13 00**  
**FIRE SUPPRESSION SPRINKLERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

**1.02 RELATED REQUIREMENTS**

- A. Section 21 05 00 - Common Work Results for Fire Suppression: Pipe, fittings, and valves.
- B. Section 21 05 48 - Vibration and Seismic Controls for Equipment.
- C. Section 21 05 53 - Identification for Fire Supp. Piping and Equipment.
- D. Section 22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- E. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. FM P7825 - Approval Guide; Factory Mutual Research Corporation.
- B. ITS (DIR) - Directory of Listed Products.
- C. NFPA 13 - Standard for the Installation of Sprinkler Systems.
- D. NFPA 13R - Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies.
- E. UL (DIR) - Online Certifications Directory.

**1.04 SUBMITTALS**

- A. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- B. Shop Drawings:
  - 1. Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
  - 2. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
  - 3. Submit shop drawings and hydraulic calculations to authority having jurisdiction and Fire Marshall for approval. Submit proof of approval to StudioJAED.
- C. Samples: Submit one of each style of sprinkler specified.
- D. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- E. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.
- F. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- G. Maintenance Materials: Furnish the following for North Providence Public Schools's use in maintenance of project.
  - 1. Extra Sprinklers: Type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
  - 2. Sprinkler Wrenches: For each sprinkler type.



### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of referenced design and installation standard on site.
- B. Conform to UL requirements.
- C. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- E. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience approved by manufacturer.
- F. Equipment and Components: Provide products that bear UL label or marking.
- G. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

### **1.06 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

### **1.08 EXTRA MATERIALS**

- A. Provide extra sprinklers of type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
- B. Provide suitable wrenches for each sprinkler type.
- C. Provide metal storage cabinet located adjacent to alarm valve.

## **PART 2 PRODUCTS**

### **2.01 SPRINKLER SYSTEM**

- A. Sprinkler System: Provide coverage for building areas noted.
- B. Occupancy: comply with NFPA 13.
- C. Water Supply: Determine volume and pressure from water flow test data.
  - 1. Revise design when test data available prior to submittals.
- D. Interface system with building fire and smoke alarm system.
- E. Provide fire department connections where indicated.
- F. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.

### **2.02 SPRINKLERS**

- A. Suspended Ceiling Type: Standard, Semi-recessed, Recessed or Concealed pendant type with matching push on, clamp on or screw on escutcheon plate.
  - 1. Finish: Brass or Chrome plated.
    - a. Within Standard Acoustical Tile Ceilings: White with White Escutcheon Plate
    - b. Within Wooden Finish Acoustical Clouds: Chrome Plated with Chrome Plated Escutcheon Plate
  - 2. Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- B. Exposed Area Type: Standard upright type with guard.
  - 1. Finish: Chrome plated.
  - 2. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

- C. Sidewall Type: Standard, Semi-recessed or Recessed horizontal sidewall type with matching push on escutcheon plate and guard.
  - 1. Finish: Chrome plated.
  - 2. Escutcheon Plate Finish: Chrome plated.
  - 3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- D. Dry Sprinklers: Standard, Recessed or Exposed pendant type with matching push on escutcheon plate.
  - 1. Finish: Chrome plated.
  - 2. Escutcheon Plate Finish: Chrome plated.
  - 3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- E. Guards: Finish to match sprinkler finish.
- F. Spray Nozzles: Brass with solid cone discharge, 30 degrees of arc with blow-off dust cap.

### **2.03 PIPING SPECIALTIES**

- A. Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber faced clapper to automatically actuate water motor alarm and electric alarm, with pressure retard chamber and variable pressure trim; with test and drain valve.
- B. Flooding Deluge Valve: Gate type valve with rubber faced disc actuated manually with water motor alarm and electric alarm, with alarm testing trim.
- C. Water Motor Alarm: Hydraulically operated impeller type alarm with aluminum alloy chrome plated gong and motor housing, nylon bearings, and inlet strainer.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with referenced NFPA design and installation standard.
- B. All sprinkler heads are to be replaced within the area of work with new flexible heads. All new heads are to be centered in ceiling tiles.
- C. The existing sprinkler system within the area of work is to be cleaned and modified to suit the new layout.
- D. Install equipment in accordance with manufacturer's instructions.
- E. Place pipe runs to minimize obstruction to other work.
- F. Place piping in concealed spaces above finished ceilings.
- G. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- H. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- I. Install and connect to fire pump system in accordance with Section 21 30 00.
- J. Flush entire piping system of foreign matter.
- K. Install guards on sprinklers where indicated.
- L. Hydrostatically test entire system.
- M. Require test be witnessed by Fire Marshal and authority having jurisdiction.

### **3.02 INTERFACE WITH OTHER PRODUCTS**

- A. Ensure required devices are installed and connected as required to fire alarm system.

**END OF SECTION 21 13 00**

**SECTION 22 07 19**  
**PLUMBING PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flexible elastomeric cellular insulation.
- B. Piping insulation.
- C. Jackets and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping.
- B. Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- E. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
- F. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
- G. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- H. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- I. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
- J. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation.
- K. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- L. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing.
- M. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
- N. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
- O. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
- P. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- R. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
- S. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.
- T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Samples: Submit two samples of any representative size illustrating each insulation type.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience, or and approved by manufacturer.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

#### **1.07 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.

### **PART 2 PRODUCTS**

#### **2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION**

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

#### **2.02 GLASS FIBER**

- A. Manufacturers:
  - 1. Knauf Insulation: [www.knaufusa.com](http://www.knaufusa.com).
  - 2. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 3. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  - 4. CertainTeed Corporation; : [www.certainteed.com](http://www.certainteed.com).
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
  - 1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
  - 2. Maximum service temperature: 850 degrees F; 1200 degrees F; 1600 degrees F.
  - 3. Maximum moisture absorption: 0.2 percent by volume.
- C. Insulation: ASTM C547 ; semi-rigid, noncombustible, end grain adhered to jacket.
  - 1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
  - 2. Maximum service temperature: 650 degrees F.
  - 3. Maximum moisture absorption: 0.2 percent by volume.
- D. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- F. Vapor Barrier Lap Adhesive:
  - 1. Compatible with insulation.

#### **2.03 CELLULAR GLASS**

- A. Manufacturers:
  - 1. Pittsburgh Corning Corporation: [www.foamglasinsulation.com/#sle](http://www.foamglasinsulation.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation: ASTM C552, Grade 1.

1. 'K' value: 0.37 at 100 degrees F.
2. Service Temperature: Up to 900 degrees F.
3. Water Vapor Permeability: 0.005 perm inch.
4. Water Absorption: 0.2 percent by volume, maximum.

#### **2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION**

- A. Manufacturer:
  1. Armacell International: [www.armacell.com/#sle](http://www.armacell.com/#sle).
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Grade 3; grade 2; grade 1 use molded tubular material wherever possible.
  1. Minimum Service Temperature: -40 degrees F.
  2. Maximum Service Temperature: 220 degrees F.
  3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

#### **2.05 JACKETS**

- A. PVC Plastic.
  1. Manufacturers:
    - a. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F.
    - b. Maximum Service Temperature: 150 degrees F.
    - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
    - d. Thickness: 20 mil; 30 mil.
    - e. Connections: Brush on welding adhesive, tacks, pressure sensitive color matching vinyl tape.
  3. Covering Adhesive Mastic:

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert location: Between support shield and piping and under the finish jacket.
  - 4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.
- K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

### 3.03 INTERIOR INSULATION APPLICATION SCHEDULE

- A. Service: Domestic hot, recirculated hot water.
  - 1. Operating Temperature: 60 to 140 deg F.
  - 2. Insulation Material: Flexible elastomeric or glass fiber.
  - 3. Insulation Thickness: Apply the following insulation thicknesses:
    - a. Pipe, All Sizes: 1.0 inch.
  - 4. Jacket:
    - a. Exposed Spaces (mechanical rooms, closets, etc.) = PVC
    - b. Concealed Spaces = None
  - 5. Vapor Retarder Required: No.
  - 6. Finish: None.
- B. Service: Domestic cold water.
  - 1. Operating Temperature: 35 to 60 deg F.
  - 2. Insulation Material: Flexible elastomeric or glass fiber.
  - 3. Insulation Thickness: Apply the following insulation thicknesses:
    - a. Pipe, 1" or less: 0.5 inch.
    - b. Pipe, 1¼" to 2" : 0.5 inch.
    - c. Pipe, 2-1/2" to 4": 1.0 inch.
    - d. Pipe, 5" and up : 1.0 inch.
  - 4. Jacket:
    - a. Exposed Spaces (mechanical rooms, closets, etc.) = PVC
    - b. Concealed Spaces = None
  - 5. Vapor Retarder Required: Yes.
  - 6. Finish: None.
- C. Service: Rainwater conductors.
  - 1. Operating Temperature: 32 to 100 deg F.
  - 2. Insulation Material: Mineral fiber.
  - 3. Insulation Thickness: Apply the following insulation thicknesses:
    - a. Pipe, 3" and up: 1.0 inch.
  - 4. Jacket:
    - a. Concealed Piping - None

- b. Exposed Piping - PVC
- 5. Vapor Retarder Required: Yes.
- 6. Finish: None.
- D. Service: Roof drain bodies.
  - 1. Operating Temperature: 32 to 100 deg F.
  - 2. Insulation Material: Mineral fiber.
  - 3. Insulation Thickness: 1.0 inch.
  - 4. Jacket:
    - a. Concealed - None
    - b. Exposed - PVC
  - 5. Vapor Retarder Required: Yes.
  - 6. Finish: None
- E. Service: Sanitary waste piping where heat tracing is installed.
  - 1. Operating Temperature: 35 to 100 deg F.
  - 2. Insulation Material: Mineral fiber.
  - 3. Insulation Thickness: Apply the following insulation thicknesses:
    - a. Pipe, 3" and up: 1.0 inch.
  - 4. Jacket: Aluminum.
  - 5. Vapor Retarder Required: Yes.
  - 6. Finish: None.
- F. Service: Condensate drain piping.
  - 1. Operating Temperature: 35 to 75 deg F.
  - 2. Insulation Material: Flexible elastomeric.
  - 3. Insulation Thickness: 0.5 inch.
  - 4. Jacket: None.
  - 5. Vapor Retarder Required: Yes.
  - 6. Finish: None.
- G. Service: Exposed sanitary drains and domestic water supplies and stops for fixtures for the disabled.
  - 1. Operating Temperature: 35 to 120 deg F.
  - 2. Insulation Material: Molded closed cell vinyl.
  - 3. Insulation Thickness: 3/16 inch.
  - 4. Vapor Retarder Required: No.
  - 5. Finish: None.

**END OF SECTION 22 07 19**



**SECTION 22 10 05**  
**PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Domestic water.
  - 3. Storm water.
  - 4. Gas.
  - 5. Flanges, unions, and couplings.
  - 6. Pipe hangers and supports.
  - 7. Ball valves.
  - 8. Valves.
  - 9. Check.
  - 10. Relief valves.
  - 11. Strainers.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 23 16 - Excavation.
- B. Section 31 23 23 - Fill.
- C. Section 31 23 16.13 - Trenching.
- D. Section 33 01 10.58 - Disinfection of Water Utility Piping Systems.
- E. Section 07 84 00 - Firestopping.
- F. Section 08 31 00 - Access Doors and Panels.
- G. Section 09 90 00 - Painting and Coating.
- H. Section 22 05 16 - Expansion Fittings and Loops for Plumbing Piping.
- I. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- J. Section 22 07 19 - Plumbing Piping Insulation.
- K. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.
- L. Section 33 01 10.58 - Disinfection of Water Utility Piping Systems.

**1.03 REFERENCE STANDARDS**

- A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems.
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
- D. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- G. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV.
- H. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
- I. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings—DWV.
- J. ASME B31.1 - Power Piping.
- K. ASME B31.2 - Fuel Gas Piping; The American Society of Mechanical Engineers.
- L. ASME B31.9 - Building Services Piping.

- M. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers.
- N. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators.
- O. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
- P. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- Q. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
- R. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- S. ASTM B32 - Standard Specification for Solder Metal.
- T. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
- U. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
- V. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed.
- W. ASTM B68M - Standard Specification for Seamless Copper Tube, Bright Annealed (Metric).
- X. ASTM B75/B75M - Standard Specification for Seamless Copper Tube.
- Y. ASTM B75M - Standard Specification for Seamless Copper Tube (Metric).
- Z. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- AA. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric).
- AB. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- AC. ASTM B302 - Standard Specification for Threadless Copper Pipe, Standard Sizes.
- AD. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV).
- AE. ASTM C4 - Standard Specification for Clay Drain Tile and Perforated Clay Drain Tile.
- AF. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
- AG. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
- AH. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- AI. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).
- AJ. ASTM C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
- AK. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- AL. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
- AM. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- AN. ASTM C700 - Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
- AO. ASTM C1053 - Standard Specification for Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications.

- AP. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- AQ. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- AR. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
- AS. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
- AT. ASTM D2447 - Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter; 2003.
- AU. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- AV. ASTM D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings.
- AW. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- AX. ASTM D2609 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
- AY. ASTM D2661 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings.
- AZ. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
- BA. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping.
- BB. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- BC. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- BD. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
- BE. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems.
- BF. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
- BG. ASTM D2996 - Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- BH. ASTM D2997 - Standard Specification for Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- BI. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- BJ. ASTM D3262 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- BK. ASTM D3517 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe.
- BL. ASTM D3754 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.

- BM. ASTM D3840 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Fittings for Nonpressure Applications.
- BN. ASTM F437 - Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- BO. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
- BP. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- BQ. ASTM F441/F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
- BR. ASTM F442/F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).
- BS. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- BT. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- BU. ASTM F628 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core.
- BV. ASTM F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
- BW. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
- BX. ASTM F1281 - Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.
- BY. ASTM F1282 - Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.
- BZ. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- CA. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
- CB. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings.
- CC. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- CD. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.
- CE. AWWA C651 - Disinfecting Water Mains.
- CF. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. through 60 In. (100 mm through 1500 mm).
- CG. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. (19 mm) Through 3 In. (76 mm), for Water Service.
- CH. AWWA C950 - Fiberglass Pressure Pipe.
- CI. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- CJ. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- CK. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.
- CL. MSS SP-67 - Butterfly Valves.
- CM. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..
- CN. MSS SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends.

- CO. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends.
- CP. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends.
- CQ. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves.
- CR. MSS SP-85 - Gray Iron Globe and Angle Valves, Flanged and Threaded Ends.
- CS. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..
- CT. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- CU. NFPA 54 - National Fuel Gas Code; National Fire Protection Association.
- CV. NFPA 58 - Liquefied Petroleum Gas Code; National Fire Protection Association.
- CW. NSF 61 - Drinking Water System Components - Health Effects.
- CX. NSF 372 - Drinking Water System Components - Lead Content.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- B. Project Record Documents: Record actual locations of valves.

#### **1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with local standards.
  - 1. Maintain one copy on project site.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with local plumbing code.
- B. Conform to applicable code for installation of backflow prevention devices.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

#### **1.08 FIELD CONDITIONS**

- A. Do not install underground piping when bedding is wet or frozen.

#### **1.09 EXTRA MATERIALS**

- A. Provide two repacking kits for each size valve.

### **PART 2 PRODUCTS**

#### **2.01 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING**

- A. Cast Iron Pipe: ASTM A74 service weight.
  - 1. Fittings: Cast iron.

2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless.
  1. Fittings: Cast iron.
  2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.

## **2.02 SANITARY SEWER PIPING, ABOVE GRADE**

- A. Cast Iron Pipe: ASTM A74, service weight.
  1. Fittings: Cast iron.
  2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.
  1. Fittings: Cast iron.
  2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe: ASTM D1785 Schedule 40, or ASTM D2241 SDR 26 for not less than 150 psi pressure rating.
  1. Fittings: ASTM D2466, PVC.
  2. Joints: Solvent welded, with ASTM D2564 Solvent cement.

## **2.03 WATER PIPING, ABOVE GRADE**

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
  1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  2. Joints: ASTM B32, alloy Sn95 solder.
  3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.

## **2.04 STORM WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING**

- A. Cast Iron Pipe: ASTM A74 service weight.
  1. Fittings: Cast iron.
  2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Concrete Pipe: Nonreinforced, ASTM C14 (ASTM C14M) Class 1.
  1. Fittings: Concrete, as specified for pipe.
  2. Joints: Elastomeric gaskets; ASTM C443 (ASTM C443M).
- C. PVC Pipe: ASTM D2665 or ASTM D3034.
  1. Fittings: PVC.
  2. Joints: Solvent welded, with ASTM D2564 solvent cement.

## **2.05 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING**

- A. Cast Iron Pipe: ASTM A74 service weight.
  1. Fittings: Cast iron.
  2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.
  1. Fittings: Cast iron.
  2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe: ASTM D2665 or ASTM D3034.
  1. Fittings: PVC.
  2. Joints: Solvent welded, with ASTM D2564 solvent cement.

## **2.06 STORM WATER PIPING, ABOVE GRADE**

- A. Cast Iron Pipe: ASTM A74 service weight.
  1. Fittings: Cast iron.
  2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.



1. Fittings: Cast iron.
  2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe: ASTM D2665 or ASTM D3034.
1. Fittings: PVC.
  2. Joints: Solvent welded, with ASTM D2564 solvent cement.

## **2.07 NATURAL GAS PIPING, ABOVE GRADE**

- A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
  2. Joints: NFPA 54, threaded or welded to ASME B31.1 or ASME B31.9.

## **2.08 FLANGES, UNIONS, AND COUPLINGS**

- A. Unions for Pipe Sizes 3 Inches and Under:
1. Ferrous pipe: Class 150 malleable iron threaded unions.
  2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Size Over 1 Inch:
1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Grooved and Shouldered Pipe End Couplings:
1. Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
  2. Sealing gasket: "C" shape composition sealing gasket.
- D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

## **2.09 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  3. Trapeze Hangers: Welded steel channel frames attached to structure.
  4. Vertical Pipe Support: Steel riser clamp.
- B. Plumbing Piping - Drain, Waste, and Vent:
1. Conform to ASME B31.9.
  2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
  3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  7. Vertical Support: Steel riser clamp.
  8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
1. Conform to ASME B31.9.
  2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.



3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## 2.10 GATE VALVES

- A. Manufacturers:
  1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Up To and Including 3 Inches:
  1. 1, Class 125, bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder ends.
- C. 2 Inches and Larger:
  1. 1, Class 125, iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

## 2.11 GLOBE VALVES

- A. Manufacturers:
  1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Up To and Including 3 Inches:
  1. 1, Class 125, bronze body, bronze trim, handwheel, bronze disc, solder ends.
- C. 2 Inches and Larger:
  1. 1, Class 125, iron body, bronze trim, handwheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

## 2.12 BALL VALVES

- A. Manufacturers:
  1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).

- B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.
- C. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.

### 2.13 PLUG VALVES

- A. Manufacturers:
  - 1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  - 2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Construction 2-1/2 Inches and Larger: 1, 175 psi CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

### 2.14 BUTTERFLY VALVES

- A. Manufacturers:
  - 1. Hammond Valve: [www.hammondvalve.com](http://www.hammondvalve.com).
  - 2. Crane Co.: [www.cranevalve.com](http://www.cranevalve.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Construction 1-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM, Buna N, or EPT seat, wafer, lug, or grooved ends, extended neck, 10 position lever handle.
- C. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

### 2.15 SWING CHECK VALVES

- A. Manufacturers:
  - 1. Hammond Valve: [www.hammondvalve.com](http://www.hammondvalve.com).
  - 2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Up to 3 Inches:
  - 1. 1, Class 125, bronze body and cap, bronze swing disc with rubber seat, solder ends.
- C. Over 3 Inches:
  - 1. 1, Class 125, iron body, bronze swing disc, renewable disc seal and seat, flanged or grooved ends.

### 2.16 SPRING LOADED CHECK VALVES

- A. Manufacturers:
  - 1. Hammond Valve: [www.hammondvalve.com](http://www.hammondvalve.com).
  - 2. Crane Co.: [www.cranevalve.com](http://www.cranevalve.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

### 2.17 STRAINERS

### 2.18 RELIEF VALVES

- A. Pressure Relief:
  - 1. Manufacturers:
    - a. Cla-Val Co: [www.cla-val.com](http://www.cla-val.com).

- b. Henry Technologies: [www.henrytech.com](http://www.henrytech.com).
- c. Watts Regulator Company: [www.wattsregulator.com](http://www.wattsregulator.com).
- 2. AGA Z21.22 certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.
- B. Temperature and Pressure Relief:
  - 1. Manufacturers:
    - a. Cla-Val Co: [www.cla-val.com](http://www.cla-val.com).
    - b. Henry Technologies: [www.henrytech.com](http://www.henrytech.com).
    - c. Watts Regulator Company: [www.wattsregulator.com](http://www.wattsregulator.com).
  - 2. AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME (BPV IV) certified and labelled.

## 2.19 STRAINERS

- A. Manufacturers:
  - 1. Armstrong International, Inc: [www.armstronginternational.com](http://www.armstronginternational.com).
  - 2. Green Country Filter Manufacturing: [www.greencountryfilter.com](http://www.greencountryfilter.com).
  - 3. WEAMCO: [www.weamco.com](http://www.weamco.com).
- B. Size 2 inch and Under:
  - 1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
  - 2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
- C. Size 1-1/2 inch to 4 inch:
  - 1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.
- D. Size 5 inch and Larger:
  - 1. Class 125, flanged iron body, basket pattern with 1/8 inch stainless steel perforated screen.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### 3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.03 INSTALLATION

- A. All gas piping shall be painted standard ANSI yellow.
- B. Install in accordance with manufacturer's instructions.
- C. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- D. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- E. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- F. Group piping whenever practical at common elevations.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 05 16.
- H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 19.

- I. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 31 00.
- J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly .
- K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- L. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting as shown on drawings. Refer to Section 09 90 00.
- M. Excavate in accordance with Section 31 23 16.
- N. Backfill in accordance with Section 31 23 23.
- O. Install bell and spigot pipe with bell end upstream.
- P. Install valves with stems upright or horizontal, not inverted.
- Q. Install water piping to ASME B31.9.
- R. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- S. Sleeve pipes passing through partitions, walls and floors.
- T. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.
- U. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
  - 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 8. Provide copper plated hangers and supports for copper piping.
  - 9. Prime coat exposed steel hangers and supports. Refer to Section 09 90 00. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
  - 10. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 22 05 48.
  - 11. Support cast iron drainage piping at every joint.

### 3.04 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

- D. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- E. Install globe valves for throttling, bypass, or manual flow control services.
- F. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- G. Provide spring loaded check valves on discharge of water pumps.
- H. Provide plug valves in natural gas systems for shut-off service.
- I. Provide flow controls in water recirculating systems where indicated.

### 3.05 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

### 3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect water distribution system in accordance with Section 33 01 10.58.
- B. Prior to starting work, verify system is complete, flushed and clean.
- C. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- D. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- F. Maintain disinfectant in system for 24 hours.
- G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- I. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

### 3.07 SCHEDULES

- A. Pipe Hanger Spacing:
  - 1. Metal Piping:
    - a. Pipe size: 1/2 inches to 1-1/4 inches:
      - 1) Maximum hanger spacing: 6.5 ft.
      - 2) Hanger rod diameter: 3/8 inches.
    - b. Pipe size: 1-1/2 inches to 2 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 3/8 inch.
    - c. Pipe size: 2-1/2 inches to 3 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 1/2 inch.
    - d. Pipe size: 4 inches to 6 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 5/8 inch.
    - e. Pipe size: 8 inches to 12 inches:
      - 1) Maximum hanger spacing: 14 ft.
      - 2) Hanger rod diameter: 7/8 inch.
    - f. Pipe size: 14 inches and Over:
      - 1) Maximum hanger spacing: 20 ft.
      - 2) Hanger rod diameter: 1 inch.
  - 2. Plastic Piping:

- a. Pipe Size 1" to 6":
  - 1) Maximum hanger spacing: 6 ft.
  - 2) Hanger rod diameter: 3/8 inch.
- b. Pipe Size 8" and Over:
  - 1) Maximum hanger spacing: 6 ft.
  - 2) Hanger rod diameter: 7/8 inch.

**END OF SECTION 22 10 05**

**SECTION 22 10 06**  
**PLUMBING PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof and floor drains.
- B. Cleanouts.
- C. Hydrants.
- D. Backflow preventers.
- E. Water hammer arrestors.
- F. Interceptors.
- G. Thermostatic mixing valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 33 05 61 - Concrete Manholes.
- B. Section 03 30 00 - Cast-in-Place Concrete: Manhole bottoms.
- C. Section 22 10 05 - Plumbing Piping.
- D. Section 22 40 00 - Plumbing Fixtures.
- E. Section 22 30 00 - Plumbing Equipment.
- F. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. ASME A112.6.3 - Floor Drains.
- B. ASME A112.6.4 - Roof, Deck, and Balcony Drains.
- C. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.
- D. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent.
- E. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies.
- F. ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance.
- G. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.
- H. ASTM C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections (Metric).
- I. PDI-WH 201 - Water Hammer Arresters.

**1.04 SUBMITTALS**

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- D. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.
- E. Operation Data: Indicate frequency of treatment required for interceptors.
- F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.



### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

## PART 2 PRODUCTS

### 2.01 DRAINS

- A. Manufacturers:
  - 1. Josam Company: [www.josam.com/#sle](http://www.josam.com/#sle).
  - 2. Jay R. Smith Manufacturing Company: [www.jayrsmith.com](http://www.jayrsmith.com).
  - 3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Roof Drains:
  - 1. Assembly: ASME A112.6.4.
  - 2. Body: Lacquered cast iron with sump.
  - 3. Strainer: Removable polyethylene, cast metal, cast bronze, or cast iron dome with vandal proof screws.
  - 4. Accessories: Coordinate with roofing type.
    - a. Membrane flange and membrane clamp with integral gravel stop.
    - b. Adjustable under deck clamp.
    - c. Roof sump receiver.
    - d. Waterproofing flange.
    - e. Controlled flow weir.
    - f. Leveling frame.
    - g. Adjustable extension sleeve for roof insulation.
    - h. Perforated or slotted ballast guard extension for inverted roof.
    - i. Perforated stainless steel ballast guard extension.
- C. Parapet Drains:
  - 1. Lacquered or Galvanized cast iron body with aluminum flashing clamp collar and epoxy coated or nickel bronze sloping grate.
- D. Canopy and Cornice Drains:
  - 1. Lacquered or Galvanized cast iron body with aluminum flashing clamp collar and epoxy coated or nickel bronze flat strainer.
- E. Roof Overflow Drains:
  - 1. Lacquered or Galvanized cast iron body and clamp collar and bottom clamp ring; pipe extended to above flood elevation.
- F. Downspout Nozzles:
  - 1. Bronze round with straight bottom section.
- G. Area Drains:
  - 1. Assembly: ASME A112.6.4.
  - 2. Body: Lacquered cast iron with sump.
  - 3. Strainer: Round nickel-bronze.
  - 4. Accessories: Membrane flange and membrane clamp with integral gravel stop, with adjustable under deck clamp, roof sump receiver, waterproofing flange, levelling frame, adjustable extension sleeve (for insulation), and perforated stainless steel ballast guard extension.
- H. Floor Drain:

1. Round, type 304 stainless steel adjustable floor drain with anchor flange and medium-duty vertically adjustable satin finish top.

## **2.02 CLEANOUTS**

- A. Manufacturers:
  1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com/#sle](http://www.jayrsmith.com/#sle).
  2. Josam Company: [www.josam.com/#sle](http://www.josam.com/#sle).
  3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Cleanouts at Exterior Surfaced Areas:
  1. Round cast nickel bronze access frame and non-skid cover.
- C. Cleanouts at Exterior Unsurfaced Areas:
  1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.
- D. Cleanouts at Interior Finished Floor Areas:
  1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- E. Cleanouts at Interior Finished Wall Areas:
  1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
- F. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

## **2.03 WATER HAMMER ARRESTORS**

- A. Manufacturers:
  1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com/#sle](http://www.jayrsmith.com/#sle).
  2. Watts Regulator Company: [www.wattsregulator.com/#sle](http://www.wattsregulator.com/#sle).
  3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  4. Souix Chief Company.
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Water Hammer Arrestors:
  1. Stainless steel construction, bellows or piston type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psi working pressure.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.
- E. Install approved portable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- F. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories, sinks, washing machines, toilets, urinal and any other quick closing valves .

**END OF SECTION 22 10 06**

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**SECTION 22 40 00**  
**PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water closets.
- B. Lavatories.
- C. Sinks.
- D. Service sinks.
- E. Drinking fountains.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 90 05 - Joint Sealers: Seal fixtures to walls and floors.
- B. Section 22 10 05 - Plumbing Piping.
- C. Section 22 10 06 - Plumbing Piping Specialties.
- D. Section 22 30 00 - Plumbing Equipment.
- E. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design.
- B. ANSI Z124.1 - American National Standard for Plastic Bathtub Units; 1995.
- C. ANSI Z124.2 - American National Standard for Plastic Shower Units; 1995.
- D. IAPMO Z124 - Plastic Plumbing Fixtures.
- E. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment.
- F. ARI 1010 - Self-Contained, Mechanically-Refrigerated Drinking-Water Coolers; Air-Conditioning and Refrigeration Institute.
- G. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.
- H. ASME A112.18.1 - Plumbing Supply Fittings.
- I. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures; The American Society of Mechanical Engineers.
- J. ASME A112.19.2 - Ceramic Plumbing Fixtures.
- K. ASME A112.19.3 - Stainless Steel Plumbing Fixtures.
- L. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures.
- M. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks.
- N. ASME A112.19.14 - Six-Liter Water Closets Equipped with a Dual Flushing Device.
- O. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices.
- P. IAPMO Z124 - Plastic Plumbing Fixtures.

**1.04 SUBMITTALS**

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- B. Samples: Submit two sets of color chips for each standard color.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.
- D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in North Providence Public Schools's name and registered with manufacturer.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of experience.

#### **1.06 MOCK-UP**

- A. Provide mock-up of typical bathroom group.
- B. Mock-up may remain as part of the Work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

#### **1.08 WARRANTY**

- A. Provide five year manufacturer warranty for electric water cooler.

#### **1.09 EXTRA MATERIALS**

- A. Supply two sets of faucet washers, flush valve service kits, and lavatory supply fittings.

### **PART 2 PRODUCTS**

#### **2.01 FLUSH VALVE WATER CLOSETS**

- A. Water Closets: Vitreous china, ASME A112.19.2, wall hung, siphon jet flush action, china bolt caps.
  - 1. Flush Volume: 1.1 GPF, maximum.
  - 2. Flush Valve: Exposed (top spud).
  - 3. Flush Operation: Sensor operated, push-button override.
  - 4. Handle Height: 44 inches or less.
  - 5. Manufacturers:
    - a. American Standard Inc: [www.americanstandard.com](http://www.americanstandard.com).
    - b. Kohler.
    - c. Toto USA: [www.totousa.com](http://www.totousa.com).
    - d. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
  - 1. Sensor-Operated Type: Solenoid operator, battery powered with self-generating hydro-electric turbine, infrared sensor and over-ride push button.
  - 2. ASME A112.19.2; floor mounted, siphon jet or wall hung blow out vitreous china closet bowl, with elongated rim, 1-1/2 inch top spud, china bolt caps.
  - 3. Manufacturers:
    - a. Toto USA: [www.totousa.com](http://www.totousa.com)
    - b. American Standard: <https://www.americanstandard-us.com>.
    - c. Zurn Industries, Inc: [www.zurn.com](http://www.zurn.com).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Seats:
  - 1. Manufacturers:
    - a. American Standard, Inc; \_\_\_\_\_: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
    - b. Bemis Manufacturing Company: [www.bemismfg.com/#sle](http://www.bemismfg.com/#sle).
    - c. Church Seat Company: [www.churchseats.com/#sle](http://www.churchseats.com/#sle).
    - d. Olsonite: [www.olsonite.com/#sle](http://www.olsonite.com/#sle).

- e. Substitutions: See Section 01 60 00 - Product Requirements.
- 2. Solid plastic, open front, extended back, brass bolts, with cover.
- D. Water Closet Carriers:
  - 1. Manufacturers:
    - a. JR Smith.
    - b. Sloan Valve Company: [www.sloanvalve.com](http://www.sloanvalve.com).
    - c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

## 2.02 WALL HUNG URINALS

- A. Wall Hung Urinal Manufacturers:
  - 1. American Standard, Inc; \_\_\_\_\_: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  - 2. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).
  - 3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
- B. Urinals: Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
  - 1. Flush Volume: 1/8 gallon (0.5 liter).
  - 2. Flush Style: Washout.
  - 3. Trap: Integral.
- C. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
  - 1. Sensor-Operated Type: Solenoid operator, battery powered with self-generating hydro-electric turbine, infrared sensor and over-ride push button.
- D. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
- E. Manufacturers:
  - 1. American Standard, Inc; \_\_\_\_\_: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  - 2. Toto USA: [www.totousa.com](http://www.totousa.com)
  - 3. Sloan Valve Company; Model \_\_\_\_\_: [www.sloanvalve.com/#sle](http://www.sloanvalve.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
  - 5. ASME A112.18.1; exposed chrome plated, diaphragm type with low voltage or battery operated solenoid operator, infrared sensor and over-ride button in chrome plated plate, wheel handle stop and vacuum breaker; maximum 1 gallon flush volume.
- F. Carriers:
  - 1. Manufacturers:
    - a. JR Smith
    - b. Sloan Valve Company: [www.sloanvalve.com](http://www.sloanvalve.com).
    - c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  - 2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

## 2.03 LAVATORIES

- A. Lavatory Manufacturers:
  - 1. American Standard Inc
  - 2. Eljer
  - 3. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).
  - 4. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  - 5. Bradley.
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Sensor Operated Faucet: Cast brass, chrome plated, deck mounted with sensor located on neck of spout.
1. Spout Style: Standard,
  2. Power Supply: Self-generating, hydro-powered turbine charging rechargeable battery.
  3. Mixing Valve: automatic.
  4. Water Supply: 1/2 inch compression connections.
  5. Aerator: Vandal resistant, 1 GPM, .
  6. Automatic Shut-off: 30 seconds.
  7. Sensor range: Automatically adjusts.
    - a. Accessory: Optional remote reprogrammer module to adjust pre-set factory functions.
  8. Finish: Polished chrome.
  9. Accessory: 4 inch or 8 inch deck plate.
  10. Sensor Operated Faucet Manufacturers:
    - a. American Standard Inc: [www.americanstandard.com](http://www.americanstandard.com).
    - b. Sloan Valve Company: [www.sloanvalve.com/#sle](http://www.sloanvalve.com/#sle).
    - c. Toto USA: [www.totousa.com/#sle](http://www.totousa.com/#sle).
    - d. Zurn industries, Inc: [www.zurn.com](http://www.zurn.com).
- C. Accessories:
1. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
  2. Offset waste with perforated open strainer.
  3. Screwdriver stops.
  4. Rigid supplies.
  5. Carrier:
    - a. Manufacturers:
      - 1) JR Smith
      - 2) Sloan Valve Company: [www.sloanvalve.com](http://www.sloanvalve.com).
      - 3) Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
    - b. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, or concealed arm supports bearing plate and studs.

#### **2.04 WALL-HUNG MULTI-STATION LAVATORY UNITS - SOLID SURFACE**

- A. Description: Rectilinear, level-surface deck, seamless and integral elongated basin, with stainless steel enclosed pedestal cabinet.
- B. Deck and Bowl Material: Fabricate from molded engineered stone material consisting of natural quartz, granite, and other minerals in a matrix of thermoset acrylic modified bio-based polyester resin and meeting requirements of IAPMO Z124.
- C. Surface Burning Characteristics: Smoke developed index less than 450, and flame spread index less than 25, Class A, when tested in accordance with ASTM E84.
- D. Number of Wash Stations: Two.
- E. Unit Length: \_\_\_\_\_ inches.
- F. Soap Dispenser:
- G. Water Supply: Thermostatic mixing valve assembly.
- H. Color: As selected by Architect from manufacturer's full line.
- I. Faucet Drilling: 4 inch (100 mm) centerset drilling.
- J. Sensor-Operated Faucets:
1. High profile metering faucet with infrared and external temperature control.
  2. Vandal-resistant meeting requirements of ASME A112.18.1 and ADA Standards compliant.



3. Body: Polished chrome plated commercial solid cast brass, with 4 inch (102 mm) centerset mounting with anti-rotation trim plate.
  4. Tempered Water Supply: ADA Standards compliant lever on faucet body.
  5. Aerator: Flow rate of 0.35 gal/min at an operating range of 20 to 80 psi.
  6. Sensor Module: Water conserving, vandal-resistant adjustable sensor unit with timing turn-off delay and stationary object automatic timed cutoff, with battery diagnostic light, serviceable from above deck.
  7. Power Supply: Battery-operated single faucet with 6V lithium battery and single 115 VAC plug-in adapter.
- K. Access Panel: Stainless steel.
- L. Support Frame: Wall mounted, heavy gauge, stainless steel.
- M. Manufacturers:
1. Bradley Corporation; Express Lavatory System - ELX-2: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).

## 2.05 SINKS

- A. Sink Manufacturers:
1. American Standard, Inc; \_\_\_\_\_: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  2. Kohler Company; \_\_\_\_\_: [www.kohler.com/#sle](http://www.kohler.com/#sle).
  3. Elkay Company[]: <https://www.elkay.com/us/en.html>.
  4. Bradley.
- B. Single Compartment Bowl: 1; \_\_\_\_\_ by \_\_\_\_\_ by \_\_\_\_\_ inch outside dimensions 20 gauge, 0.0359 inch thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
1. Drain: 1-1/2 inch chromed brass drain.
- C. Double Compartment Bowl: 1; \_\_\_\_\_ by \_\_\_\_\_ by \_\_\_\_\_ inch outside dimensions 20 gauge, 0.0359 inch thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
1. Drain: 1-1/2 inch chromed brass drain.
- D. Manufacturers:
1. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.06 WATER FOUNTAINS

- A. Electric Water Cooler Manufacturers:
1. Tri Palm International/Oasis: [www.tripalmint.com](http://www.tripalmint.com).
  2. Elkay Manufacturing Company: [www.elkay.com/#sle](http://www.elkay.com/#sle).
  3. Haws Corporation: [www.hawscor.com/#sle](http://www.hawscor.com/#sle).
- B. Fountain:
1. A surface handicapped-height, fully ADA compliant mounted water fountain with stainless steel top, stainless steel; stainless steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, push button, bottle filling station, and mounting bracket.

## 2.07 SERVICE SINKS

- A. Service Sink Manufacturers:
1. Kohler
  2. Elkay Manufacturing Company: [www.elkay.com/#sle](http://www.elkay.com/#sle).
- B. Bowl:
1. White floor mounted, with one inch wide shoulders. Vinyl bumper guard stainless steel strainer.
- C. Trim:

1. ASME A112.18.1 exposed wall type supply with cross handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.
- D. Accessories:
1. 5 feet of 1/2 inch diameter plain end reinforced plastic or rubber hose.
  2. Hose clamp hanger.
  3. Mop hanger.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

#### **3.02 PREPARATION**

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

#### **3.03 INSTALLATION**

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with screwdriver stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports or wall carriers and bolts.
- E. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 90 05, color to match fixture.
- F. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

#### **3.04 INTERFACE WITH WORK OF OTHER SECTIONS**

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

#### **3.05 ADJUSTING**

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

#### **3.06 CLEANING**

- A. Clean plumbing fixtures and equipment.

**END OF SECTION 22 40 00**

**SECTION 26 05 01**  
**MINOR ELECTRICAL DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical demolition.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

**PART 2 PRODUCTS**

**2.01 MATERIALS AND EQUIPMENT**

- A. Materials and equipment for patching and extending work: As specified in individual sections.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation .
- D. Report discrepancies to North Providence Public Schools before disturbing existing installation.
- E. Report discrepancies to StudioJAED before disturbing existing installation.
- F. Beginning of demolition means installer accepts existing conditions.

**3.02 PREPARATION**

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from North Providence Public Schools at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify North Providence Public Schools before partially or completely disabling system.
  - 2. Notify local fire service.
  - 3. Make notifications at least 24 hours in advance.
  - 4. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System and Information Technology Wiring and Equipment: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify North Providence Public Schools at least 24 hours before partially or completely disabling system.

2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
  3. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing security System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
1. Obtain permission from North Providence Public Schools at least 24 hours before partially or completely disabling system.
  2. Obtain permission from at least 24 hours before partially or completely disabling system.
  3. Make temporary connections to maintain service in areas adjacent to work area.>>

### **3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK**

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- E. Disconnect and remove abandoned panelboards and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

### **3.04 CLEANING AND REPAIR**

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- D. Any lighting or ceiling-mounted devices removed during construction must be reinstalled.

**END OF SECTION 26 05 01**

## SECTION 26 05 19

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Service entrance cable.
- D. Armored cable.
- E. Metal-clad cable.
- F. Variable-frequency drive cable.
- G. Wiring connectors.
- H. Electrical tape.
- I. Heat shrink tubing.
- J. Oxide inhibiting compound.
- K. Wire pulling lubricant.
- L. Cable ties.

##### 1.02 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 01 - Minor Electrical Demolition: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 28 46 00 - Fire Detection and Alarm: Fire alarm system conductors and cables.
- F. Section 31 23 16 - Excavation.
- G. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.
- H. Section 31 23 23 - Fill: Bedding and backfilling.

##### 1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes.
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation.
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- H. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable.

- I. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF).
- J. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
- K. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems.
- L. NFPA 70 - National Electrical Code.
- M. UL 4 - Armored Cable.
- N. UL 44 - Thermoset-Insulated Wires and Cables.
- O. UL 83 - Thermoplastic-Insulated Wires and Cables.
- P. UL 486A-486B - Wire Connectors.
- Q. UL 486C - Splicing Wire Connectors.
- R. UL 486D - Sealed Wire Connector Systems.
- S. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables.
- T. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.
- U. UL 1569 - Metal-Clad Cables.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
  - 3. Notify StudioJAED of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Sustainable Design Documentation: Submit manufacturer's product data on conductor and cable showing compliance with specified lead content requirements.
- D. Wire Pulling Lubricant: Certification of compatibility with conductors/cables where used with the following insulation/jacket types:
- E. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify StudioJAED and obtain direction before proceeding with work.

### **PART 2 PRODUCTS**

#### **2.01 CONDUCTOR AND CABLE APPLICATIONS**

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Metal-clad cable is permitted only as follows:
  - 1. Where not otherwise restricted, may be used:
    - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
      - 1) Maximum Length: 6 feet.
    - b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
  - 2. In addition to other applicable restrictions, may not be used:
    - a. Unless approved by North Providence Public Schools.
    - b. Where not approved for use by the authority having jurisdiction.
    - c. Where exposed to damage.
    - d. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.
    - e. For isolated ground circuits, unless provided with an additional isolated/insulated grounding conductor.

#### **2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS**

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.



- H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- I. Conductor Material:
  - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
  - 3. Tinned Copper Conductors: Comply with ASTM B33.
- J. Minimum Conductor Size:
  - 1. Branch Circuits: 12 AWG.
    - a. Exceptions:
      - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
      - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
      - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
  - 2. Control Circuits: 14 AWG.
- K. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
    - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
  - 3. Color Code:
    - a. 480Y/277 V, 3 Phase, 4 Wire System:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
      - 4) Neutral/Grounded: Gray.
    - b. 208Y/120 V, 3 Phase, 4 Wire System:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Neutral/Grounded: White.
    - c. Equipment Ground, All Systems: Green.
    - d. Isolated Ground, All Systems: Green with yellow stripe.
    - e. Travelers for 3-Way and 4-Way Switching: Pink.
    - f. For control circuits, comply with manufacturer's recommended color code.

### 2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
  - 1. Copper Building Wire:
    - a. Cerro Wire LLC: [www.cerrowire.com/#sle](http://www.cerrowire.com/#sle).
    - b. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
    - c. Houston Wire & Cable co.
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
  - 1. Feeders and Branch Circuits:
    - a. Size 10 AWG and Smaller: Solid.

- b. Size 8 AWG and Larger: Stranded.
- 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
  - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
    - a. Size 4 AWG and Larger: Type XHHW-2.
    - b. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

#### **2.04 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE**

- A. Manufacturers:
  - 1. Cerro Wire LLC: [www.cerrowire.com/#sle](http://www.cerrowire.com/#sle).
  - 2. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
  - 3. Houston Wire & Cable co..
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
- C. Provide equipment grounding conductor unless otherwise indicated.
- D. Conductor Stranding:
  - 1. Size 10 AWG and Smaller: Solid.
  - 2. Size 8 AWG and Larger: Stranded.
- E. Insulation Voltage Rating: 600 V.

#### **2.05 ARMORED CABLE**

- A. Manufacturers:
  - 1. AFC Cable Systems Inc: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  - 2. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).
  - 3. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
  - 1. Size 10 AWG and Smaller: Solid.
  - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN.
- F. Grounding: Combination of interlocking armor and integral bonding wire.
  - 1. Provide additional full-size integral insulated equipment grounding conductor for redundant grounding, suitable for general purpose, non-essential electrical systems in non-hazardous patient care areas of health care facilities.
- G. Armor: Steel, interlocked tape.

#### **2.06 METAL-CLAD CABLE**

- A. Manufacturers:
  - 1. AFC Cable Systems Inc: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  - 2. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).
  - 3. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
  - 1. Size 10 AWG and Smaller: Solid.
  - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Provide dedicated neutral conductor for each phase conductor where indicated or required.
- G. Grounding: Full-size integral equipment grounding conductor.
  - 1. Provide additional isolated/insulated grounding conductor where indicated or required.
- H. Armor: Steel, interlocked tape.
- I. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

## 2.07 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.
- C. Wiring Connectors for Splices and Taps:
  - 1. Copper Conductors Sizes 10 and under: Use twist-on insulated spring connectors.
  - 2. Copper Conductors Sizes 8 and larger: Use mechanical connectors.
- D. Wiring Connectors for Terminations:
  - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  - 4. Conductors for Control Circuits: Use crimped terminals for all connections.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
    - c. NSI Industries LLC: [www.nsiindustries.com/#sle](http://www.nsiindustries.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Mechanical Connectors: Provide bolted type or set-screw type.
  - 1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilsco.com/#sle](http://www.ilsco.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
  1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilsco.com/#sle](http://www.ilsco.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.08 WIRING ACCESSORIES

- A. Electrical Tape:
  1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Plymouth Rubber Europa: [www.plymouthrubber.com/#sle](http://www.plymouthrubber.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
    - a. Product: 3 M.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
    - a. Product: 3 M.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
  5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
  6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
  7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
  1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Burndy: [www.burndy.com](http://www.burndy.com).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
  1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
    - c. IlSCO: [www.ilsco.com/#sle](http://www.ilsco.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

1. Manufacturers:
  - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
  - b. American Polywater Corporation: [www.polywater.com/#sle](http://www.polywater.com/#sle).
  - c. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Cable Ties: Material and tensile strength rating suitable for application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as shown on the drawings.
- E. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 PREPARATION**

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

#### **3.03 INSTALLATION**

- A. Circuiting Requirements:
  1. Unless dimensioned, circuit routing indicated is diagrammatic.
  2. When circuit destination is indicated and routing is not shown, determine exact routing required.
  3. Arrange circuiting to minimize splices.
  4. Include circuit lengths required to install connected devices within 10 ft of location shown.
  5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
  6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
  7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is not permitted.
- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- E. Install armored cable (Type AC) in accordance with NECA 120.
- F. Install metal-clad cable (Type MC) in accordance with NECA 120.
- G. Installation in Raceway:
  1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  2. Pull all conductors and cables together into raceway at same time.
  3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- H. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

- I. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- J. Terminate cables using suitable fittings.
  - 1. Armored Cable (Type AC):
    - a. Use listed fittings and anti-short, insulating bushings.
    - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
  - 2. Metal-Clad Cable (Type MC):
    - a. Use listed fittings.
    - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- K. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.
- L. Install conductors with a minimum of 12 inches of slack at each outlet.
- M. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- N. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- O. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- P. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
  - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- Q. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
    - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
    - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
  - 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
    - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.

- b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
- 3. Wet Locations: Use heat shrink tubing.
- R. Insulate ends of spare conductors using vinyl insulating electrical tape.
- S. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- T. Identify conductors and cables in accordance with Section 26 05 53.
- U. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- V. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- D. Correct deficiencies and replace damaged or defective conductors and cables.

**END OF SECTION 26 05 19**



## SECTION 26 05 26

### GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.
- F. Ground access wells.
- G. Grounding and bonding components.
- H. Provide all components necessary to complete the grounding system(s) consisting of:
  - 1. Existing metal underground water pipe.
  - 2. Metal frame of the building.
  - 3. Existing metal underground gas piping system.
  - 4. Metal underground gas piping system.

##### 1.02 RELATED REQUIREMENTS

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 56 00 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

##### 1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems.
- E. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- F. NFPA 70 - National Electrical Code.
- G. NFPA 780 - Standard for the Installation of Lightning Protection Systems.
- H. UL 467 - Grounding and Bonding Equipment.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Verify exact locations of underground metal water service pipe entrances to building.
  - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 3. Notify StudioJAED of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

### **1.05 PERFORMANCE REQUIREMENTS**

- A. Grounding System Resistance: 25 ohms.

### **1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- C. Shop Drawings:
- D. Product Data: Provide for grounding electrodes and connections.
- E. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
- F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Project Record Documents: Record actual locations of grounding electrode system components and connections.
- H. Project Record Documents: Record actual locations of components and grounding electrodes.

### **1.07 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 GROUNDING AND BONDING REQUIREMENTS**

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by StudioJAED. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
  - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.

- E. Grounding Electrode System:
1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    - a. Provide continuous grounding electrode conductors without splice or joint.
    - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
  2. Metal Underground Water Pipe(s):
    - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
    - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
    - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
  3. Metal Building or Structure Frame:
    - a. Provide connection to metal building or structure frame effectively grounded in accordance with NFPA 70 at nearest accessible location.
  4. Ground Rod Electrode(s):
    - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
    - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
    - c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
    - d. Provide ground access well for each electrode.
  5. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- F. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
  2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
  7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
    - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
    - b. Metal gas piping.
  8. Provide bonding for interior metal air ducts.
  9. Provide bonding for metal building frame where not used as a grounding electrode.
- H. Isolated Ground System:
1. Where isolated ground receptacles or other isolated ground connections are indicated, provide separate isolated/insulated equipment grounding conductors.
  2. Connect isolated/insulated equipment grounding conductors only to separate isolated/insulated equipment ground busses.
  3. Connect the isolated/insulated equipment grounding conductors to the solidly bonded equipment ground bus only at the service disconnect or separately derived system disconnect. Do not make any other connections between isolated ground system and normal equipment ground system on the load side of this connection.
- I. Lightning Protection Systems:
1. Do not use grounding electrode dedicated for lightning protection system for component of building grounding electrode system provided under this section.
  2. Provide bonding of building grounding electrode system provided under this section and lightning protection grounding electrode system in accordance with NFPA 70 and NFPA 780.
- J. Pole-Mounted Luminaires: Also comply with Section 26 56 00.

## 2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 05 19:
1. Use insulated copper conductors unless otherwise indicated.
    - a. Exceptions:
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
    - a. Exceptions:
      - 1) Use mechanical connectors for connections to electrodes at ground access wells.
  3. Unless otherwise indicated, use exothermic welded connections for accessible connections.
    - a. Exceptions:
      - 1) Use exothermic welded connections for connections to metal building frame.
  4. Manufacturers - Mechanical and Compression Connectors:
    - a. Advanced Lightning Technology (ALT): [www.altfab.com/#sle](http://www.altfab.com/#sle).

- b. Burndy: [www.burndy.com](http://www.burndy.com).
- c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- d. Substitutions: See Section 01 60 00 - Product Requirements.
- 5. Manufacturers - Exothermic Welded Connections:
  - a. Burndy: [www.burndy.com](http://www.burndy.com).
  - b. Cadweld, a brand of Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
  - c. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com/#sle](http://www.thermoweld.com/#sle).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Ground Bars:
  - 1. Description: Copper rectangular ground bars with mounting brackets and insulators.
  - 2. Size: As indicated.
  - 3. Holes for Connections: As indicated or as required for connections to be made.
  - 4. Manufacturers:
    - a. Advanced Lightning Technology (ALT): [www.altfab.com/#sle](http://www.altfab.com/#sle).
    - b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
    - c. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - d. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com/#sle](http://www.thermoweld.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Ground Rod Electrodes:
  - 1. Comply with NEMA GR 1.
  - 2. Material: Copper-bonded (copper-clad) steel.
  - 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.
  - 4. Manufacturers:
    - a. Advanced Lightning Technology (ALT): [www.altfab.com/#sle](http://www.altfab.com/#sle).
    - b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
    - c. Galvan Industries, Inc: [www.galvanelectrical.com/#sle](http://www.galvanelectrical.com/#sle).
    - d. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Ground Access Wells:
  - 1. Description: Open bottom round or rectangular well with access cover for testing and inspection; suitable for the expected load at the installed location.
  - 2. Size: As required to provide adequate access for testing and inspection, but not less than minimum size requirements specified.
    - a. Round Wells: Not less than 8 inches in diameter.
  - 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 10 inches.
  - 4. Cover: Factory-identified by permanent means with word "GROUND".
  - 5. Manufacturers:
    - a. Advanced Lightning Technology (ALT): [www.altfab.com/#sle](http://www.altfab.com/#sle).
    - b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
    - c. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - d. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com](http://www.thermoweld.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.03 MANUFACTURERS

- A. Cooper Power Systems: [www.cooperpower.com](http://www.cooperpower.com).
- B. Framatome Connectors International: [www.fciconnect.com](http://www.fciconnect.com).
- C. Lightning Master Corporation: [www.lightningmaster.com](http://www.lightningmaster.com).
- D. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.04 CONNECTORS AND ACCESSORIES**

- A. Mechanical Connectors: Bronze.
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Wire: Stranded copper.
- C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify existing conditions prior to beginning work.
- E. Verify that final backfill and compaction has been completed before driving rod electrodes.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
  - 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
- D. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 05 53.
- F. Provide bonding to meet requirements described in Quality Assurance.
- G. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Each of branch circuits and feeder circuits shall have dedicated equipment grounding conductor, sharing this conductor with other grounding conductors is not permitted.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform inspection in accordance with Section 01 40 00.
- B. Inspect and test in accordance with NETA STD ATS except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.

- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

**END OF SECTION 26 05 26**



## SECTION 26 05 29

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

##### 1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 05 50 00 - Metal Fabrications: Materials and requirements for fabricated metal supports.
- C. Section 26 05 34 - Conduit: Additional support and attachment requirements for conduits.
- D. Section 26 05 37 - Boxes: Additional support and attachment requirements for boxes.
- E. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- F. Section 26 56 00 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

##### 1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- D. MFMA-4 - Metal Framing Standards Publication.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- F. NFPA 70 - National Electrical Code.
- G. UL 5B - Strut-Type Channel Raceways and Fittings.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify StudioJAED of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

##### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
- D. Installer's Qualifications: Include evidence of compliance with specified requirements.
- E. Product Data: Provide manufacturer's catalog data for fastening systems.
- F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with NFPA 70.
- B. Comply with applicable building code.
- C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- D. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.
- E. Installer Qualifications for Field-Welding: As specified in Section 05 50 00.
- F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  - 1. Comply with the following. Where requirements differ, comply with most stringent.
    - a. NFPA 70.
    - b. Requirements of authorities having jurisdiction.
  - 2. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
  - 3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated, where applicable.
  - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Materials for Metal Fabricated Supports: Comply with Section 05 50 00.

- C. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
  3. Conduit Clamps: Bolted type unless otherwise indicated.
  4. Manufacturers:
    - a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
    - c. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - d. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - d. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).
    - e. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - f. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - g. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.
  2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
  3. Channel Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
  4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
  5. Minimum Channel Dimensions: 1-5/8 inch width by 1-5/8 inch height.
  6. Manufacturers:
    - a. Cooper B-Line, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - b. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - c. Unistrut, a brand of Atkore International Inc: [www.unistrut.com/#sle](http://www.unistrut.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
    - e. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.
- F. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
    - c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.

- d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
  - e. Outlet Boxes: 1/4 inch diameter.
  - f. Luminaires: 1/4 inch diameter.
- G. Anchors and Fasteners:
1. Manufacturers - Mechanical Anchors:
    - a. Dewalt: [anchors.dewalt.com/#sle](http://anchors.dewalt.com/#sle).
    - b. Hilti, Inc: [www.hilti.com/#sle](http://www.hilti.com/#sle).
    - c. Simpson Strong-Tie Company Inc: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
  3. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  4. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  5. Hollow Masonry: Use toggle bolts.
  6. Hollow Stud Walls: Use toggle bolts.
  7. Steel: Use beam clamps, machine bolts, or welded threaded studs.
  8. Sheet Metal: Use sheet metal screws.
  9. Powder-actuated fasteners are not permitted.
  10. Hammer-driven anchors and fasteners are not permitted.
  11. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    - a. Comply with MFMA-4.
    - b. Channel Material: Use galvanized steel.
    - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

## 2.02 MANUFACTURERS

- A. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- B. Threaded Rod Company: [www.threadedrod.com](http://www.threadedrod.com).
- C. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.03 MATERIALS

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of structural steel or formed steel members; galvanized.
- C. Anchors and Fasteners:
  1. Do not use powder-actuated anchors.
  2. Obtain permission from StudioJAED before using powder-actuated anchors.
  3. Concrete Structural Elements: Use precast inserts.
  4. Steel Structural Elements: Use beam clamps.
  5. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
  6. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use hollow wall fasteners.
  7. Solid Masonry Walls: Use expansion anchors.
  8. Sheet Metal: Use sheet metal screws.
  9. Wood Elements: Use wood screws.
- D. Formed Steel Channel:
  1. Product: manufactured by [B-Line].
  2. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by StudioJAED, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by StudioJAED, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
  - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 26 05 34.
- I. Box Support and Attachment: Also comply with Section 26 05 37.
- J. Interior Luminaire Support and Attachment: Also comply with Section 26 51 00.
- K. Exterior Luminaire Support and Attachment: Also comply with Section 26 56 00.
- L. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- M. Secure fasteners according to manufacturer's recommended torque settings.
- N. Remove temporary supports.
- O. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with NFPA 70.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION 26 05 29**

**SECTION 26 05 34**  
**CONDUIT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Electrical metallic tubing (EMT).
- E. Rigid polyvinyl chloride (PVC) conduit.
- F. Conduit fittings.
- G. Accessories.
- H. Conduit, fittings and conduit bodies.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 07 84 00 - Firestopping.
- C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.
- D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- E. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- F. Section 26 0553 - Identification for Electrical Systems.
- G. Section 26 05 37 - Boxes.
- H. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 31 23 16 - Excavation.
- J. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

**1.03 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S).
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A).
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT).
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC).
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
- H. NFPA 70 - National Electrical Code.
- I. UL 1 - Flexible Metal Conduit.
- J. UL 6 - Electrical Rigid Metal Conduit-Steel.
- K. UL 360 - Liquid-Tight Flexible Metal Conduit.
- L. UL 514B - Conduit, Tubing, and Cable Fittings.
- M. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.



- N. UL 797 - Electrical Metallic Tubing-Steel.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
  4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
  5. Notify StudioJAED of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
  2. Include proposed locations of roof penetrations and proposed methods for sealing.
- D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.
- E. Product Data: Provide for metallic conduit and flexible metal conduit.
- F. Samples of Materials Actually Delivered to Site:
1. Two pieces each of conduit, 2 feet long.
- G. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- D. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.



## **PART 2 PRODUCTS**

### **2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
  - 1. Under Slab on Grade: Use rigid PVC conduit.
  - 2. Exterior, Direct-Buried: Use rigid PVC conduit.
  - 3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
  - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
  - 5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
- D. Embedded Within Concrete:
  - 1. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) where emerging from concrete.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit.
- F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit.
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
  - 1. Locations subject to physical damage include, but are not limited to:
    - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
- K. Exposed, Interior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- L. Exposed, Exterior: Use galvanized steel rigid metal conduit.
- M. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.
- N. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
  - 1. Maximum Length: 6 feet.
- O. Connections to Vibrating Equipment:
  - 1. Dry Locations: Use flexible metal conduit.
  - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
  - 3. Maximum Length: 6 feet unless otherwise indicated.
  - 4. Vibrating equipment includes, but is not limited to:
    - a. Transformers.
    - b. Motors.
    - c. HVAC equipment.
- P. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

### **2.02 CONDUIT REQUIREMENTS**

- A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

- B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
- C. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
  - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
  - 3. Control Circuits: 1/2 inch (16 mm) trade size.
  - 4. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
  - 5. Underground, Interior: 3/4 inch (21 mm) trade size.
  - 6. Underground, Exterior: 1 inch (27 mm) trade size.
- D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

### **2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)**

- A. Manufacturers:
  - 1. Allied Tube & Conduit: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 2. Republic Conduit: [www.republic-conduit.com/#sle](http://www.republic-conduit.com/#sle).
  - 3. Wheatland Tube Company: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
  - 1. Manufacturers:
    - a. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - b. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 3. Material: Use steel or malleable iron.
  - 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

### **2.04 METAL CONDUIT**

- A. Manufacturers:
  - 1. Allied Tube & Conduit: [www.alliedtube.com](http://www.alliedtube.com).
  - 2. Beck Manufacturing, Inc: [www.beckmfg.com](http://www.beckmfg.com).
  - 3. Wheatland Tube Company: [www.wheatland.com](http://www.wheatland.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

### **2.05 FLEXIBLE METAL CONDUIT (FMC)**

- A. Manufacturers:
  - 1. AFC Cable Systems, Inc: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  - 2. Electri-Flex Company: [www.electriflex.com/#sle](http://www.electriflex.com/#sle).
  - 3. International Metal Hose: [www.metalhose.com/#sle](http://www.metalhose.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:

1. Manufacturers:
    - a. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - b. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel or malleable iron.
- D. Description: Interlocked steel construction.
- E. Fittings: NEMA FB 1.

## **2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)**

- A. Manufacturers:
1. AFC Cable Systems, Inc: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  2. Electri-Flex Company: [www.electriflex.com/#sle](http://www.electriflex.com/#sle).
  3. International Metal Hose: [www.metalhose.com/#sle](http://www.metalhose.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
1. Manufacturers:
    - a. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - b. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel or malleable iron.

## **2.07 ELECTRICAL METALLIC TUBING (EMT)**

- A. Manufacturers:
1. Allied Tube & Conduit: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  2. Republic Conduit: [www.republic-conduit.com/#sle](http://www.republic-conduit.com/#sle).
  3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
1. Manufacturers:
    - a. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - b. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel or malleable iron.
  4. Connectors and Couplings: Use compression (gland) or set-screw type.
    - a. Do not use indenter type connectors and couplings.
  5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

## **2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT**

- A. Manufacturers:
  1. Cantex Inc: [www.cantexinc.com/#sle](http://www.cantexinc.com/#sle).
  2. Carlon, a brand of Thomas & Betts Corporation: [www.carlon.com/#sle](http://www.carlon.com/#sle).
  3. JM Eagle: [www.jmeagle.com/#sle](http://www.jmeagle.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
  1. Manufacturer: Same as manufacturer of conduit to be connected.
  2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

## **2.09 ACCESSORIES**

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify routing and termination locations of conduit prior to rough-in.
- E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- E. Conduit Routing:
  1. Unless dimensioned, conduit routing indicated is diagrammatic.
  2. When conduit destination is indicated and routing is not shown, determine exact routing required.
  3. Conceal all conduits unless specifically indicated to be exposed.
  4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.

- c. Within joists in areas with no ceiling.
  5. Arrange conduit to maintain adequate headroom, clearances, and access.
  6. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
  7. Arrange conduit to provide no more than 150 feet between pull points.
  8. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
  9. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
  10. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    - a. Heaters.
    - b. Hot water piping.
    - c. Flues.
  11. Group parallel conduits in the same area together on a common rack.
- F. Conduit Support:
  1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
  4. Use conduit strap to support single surface-mounted conduit.
    - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
  5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
  6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
  7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
  8. Use of spring steel conduit clips for support of conduits is not permitted.
  9. Use of wire for support of conduits is not permitted.
    - a. For securing conduits to studs in hollow stud walls.
    - b. For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).
- G. Connections and Terminations:
  1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  3. Use suitable adapters where required to transition from one type of conduit to another.
  4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
  7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- H. Penetrations:
  1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  2. Make penetrations perpendicular to surfaces unless otherwise indicated.

3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
  4. Conceal bends for conduit risers emerging above ground.
  5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
  6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
  8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- I. Underground Installation:
1. Provide trenching and backfilling in accordance with Section 31 23 16.13.
  2. Minimum Cover, Unless Otherwise Indicated or Required:
    - a. Underground, Exterior: 24 inches.
    - b. Under Slab on Grade: 12 inches to bottom of slab.
  3. Provide underground warning tape in accordance with Section 26 05 53 along entire conduit length.
- J. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 30 00 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.
- K. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with NFPA 70.
- L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  2. Where conduits are subject to earth movement by settlement or frost.
- M. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
    - a. Where conduits enter building from outside.
    - b. Where service conduits enter building from underground distribution system.
    - c. Where conduits enter building from underground.
    - d. Where conduits may transport moisture to contact live parts.
  2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
    - a. Where conduits pass from outdoors into conditioned interior spaces.
    - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- N. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
  2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- O. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

- P. Provide grounding and bonding in accordance with Section 26 05 26.
- Q. Identify conduits in accordance with Section 26 05 53.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

### **3.04 CLEANING**

- A. Clean interior of conduits to remove moisture and foreign matter.

### **3.05 PROTECTION**

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

### **3.06 INTERFACE WITH OTHER PRODUCTS**

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- B. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation specified in Section roofing section.

**END OF SECTION 26 05 34**



## SECTION 26 05 37

### BOXES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Floor boxes.
- D. Wall and ceiling outlet boxes.
- E. Floor boxes.
- F. Pull and junction boxes.

##### 1.02 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- C. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- D. Section 26 05 34 - Conduit:
  - 1. Conduit bodies and other fittings.
- E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 27 26 - Wiring Devices:
  - 1. Wall plates.
  - 2. Floor box service fittings.
- G. Section 26 27 16 - Electrical Cabinets and Enclosures.
- H. Section 26 27 26 - Wiring Devices: Wall plates in finished areas, floor box service fittings, fire-rated poke-through fittings, and access floor boxes.

##### 1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- G. NFPA 70 - National Electrical Code.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
- J. UL 508A - Industrial Control Panels.
- K. UL 514A - Metallic Outlet Boxes.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify StudioJAED of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- E. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 BOXES**

- A. General Requirements:
  1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
  2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
  5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
  1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
  2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
  3. Use suitable concrete type boxes where flush-mounted in concrete.
  4. Use suitable masonry type boxes where flush-mounted in masonry walls.

5. Use raised covers suitable for the type of wall construction and device configuration where required.
  6. Use shallow boxes where required by the type of wall construction.
  7. Do not use "through-wall" boxes designed for access from both sides of wall.
  8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
  9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
  10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
  11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
  12. Minimum Box Size, Unless Otherwise Indicated:
    - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
    - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
  13. Wall Plates: Comply with Section 26 27 26.
  14. Manufacturers:
    - a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - b. Hubbell Incorporated; Bell Products: [www.hubbell-rtb.com/#sle](http://www.hubbell-rtb.com/#sle).
    - c. O-Z/Gedney, a brand of Emerson Electric Co: [www.emerson.com/#sle](http://www.emerson.com/#sle).
    - d. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
  2. NEMA 250 Environment Type, Unless Otherwise Indicated:
    - a. Indoor Clean, Dry Locations: Type 1, painted steel.
    - b. Outdoor Locations: Type 3R, painted steel.
  3. Junction and Pull Boxes Larger Than 100 cubic inches:
    - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- D. Floor Boxes:
1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
  2. Use sheet-steel or cast iron floor boxes within slab above grade.
  3. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
  4. Manufacturer: Same as manufacturer of floor box service fittings.

## 2.02 MANUFACTURERS

- A. Appleton Electric: [www.appletonelec.com](http://www.appletonelec.com).
- B. Steel City
- C. Substitutions: Reco, Inc. See Section 01 60 00 - Product Requirements.

## 2.03 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
  1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.

2. Concrete Ceiling Boxes: Concrete type.
- B. Nonmetallic Outlet Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- D. Wall Plates for Finished Areas: As specified in Section 26 2726.

#### **2.04 FLOOR BOXES**

- A. Floor Boxes: NEMA OS 1, fully adjustable, \_4 inches deep.
- B. Material: Cast metal.
- C. Shape: Rectangular.
- D. Service Fittings: As specified in Section 26 2726.

#### **2.05 PULL AND JUNCTION BOXES**

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 26 2716.
- C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
  1. Material: Galvanized cast iron; Cast Aluminum.
  2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
  1. Material: Galvanized cast iron; Cast Aluminum.
  2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
  3. Cover Legend: "ELECTRIC".

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

##### **3.02**

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

#### **3.03 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Supports:
  1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- E. Install boxes plumb and level.

- F. Flush-Mounted Boxes:
  - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
  - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- G. Install boxes as required to preserve insulation integrity.
- H. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.
- I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- J. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- K. Close unused box openings.
- L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- M. Provide grounding and bonding in accordance with Section 26 05 26.
- N. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- O. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- P. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.
- Q. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- R. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
  - 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
- S. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.
- T. Maintain headroom and present neat mechanical appearance.
- U. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- V. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- W. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- X. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- Y. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- Z. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- AA. Use flush mounting outlet box in finished areas.
- AB. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- AC. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- AD. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- AE. Use stamped steel bridges to fasten flush mounting outlet box between studs.

- AF. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- AG. Use adjustable steel channel fasteners for hung ceiling outlet box.
- AH. Do not fasten boxes to ceiling support wires.
- AI. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- AJ. Use gang box where more than one device is mounted together. Do not use sectional box.
- AK. Use gang box with plaster ring for single device outlets.
- AL. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- AM. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- AN. Set floor boxes level.
- AO. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

#### **3.04 ADJUSTING**

- A. Adjust floor boxes flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

#### **3.05 CLEANING**

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

#### **3.06 PROTECTION**

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

**END OF SECTION 26 05 37**

**SECTION 26 05 53**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Warning signs and labels.
- G. Field-painted identification of conduit.

**1.02 REFERENCE STANDARDS**

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels.
- C. NFPA 70 - National Electrical Code.
- D. UL 969 - Marking and Labeling Systems.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.
- D. Product Data: Provide catalog data for nameplates, labels, and markers.
- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

**1.06 FIELD CONDITIONS**

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

**1.07 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements for additional requirements.



## **PART 2 PRODUCTS**

### **2.01 IDENTIFICATION REQUIREMENTS**

- A. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
  - 2. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
- B. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
  - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- C. Identification for Raceways:
  - 1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
- D. Identification for Boxes:
  - 1. Use voltage markers to identify highest voltage present.
  - 2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
    - a. For exposed boxes in public areas, use only identification labels.
- E. Identification for Devices:
  - 1. Identification for Communications Devices: Comply with Section 27 10 00.
  - 2. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
  - 3. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles and light switches.

### **2.02 MANUFACTURERS**

- A. Brady Corporation: [www.bradycorp.com](http://www.bradycorp.com).
- B. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).
- C. HellermannTyton: [www.hellermanntyton.com](http://www.hellermanntyton.com).
- D. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.03 IDENTIFICATION NAMEPLATES AND LABELS**

- A. Identification Nameplates:
  - 1. Manufacturers:
    - a. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
    - b. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
    - c. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Materials:
    - a. Indoor Clean, Dry Locations: Use plastic nameplates.
    - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
  - 3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.

4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
  5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
  6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
1. Manufacturers:
    - a. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
    - b. Brother International Corporation: [www.brother-usa.com/#sle](http://www.brother-usa.com/#sle).
    - c. Panduit Corp: [www.panduit.com/#sle](http://www.panduit.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
  3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
  2. Legend:
    - a. System designation where applicable:
      - 1) Emergency Power System: Identify with text "EMERGENCY".
      - 2) Fire Alarm System: Identify with text "FIRE ALARM".
    - b. Equipment designation or other approved description.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height:
    - a. System Designation: 1 inch.
    - b. Equipment Designation: 1/2 inch.
  5. Color:
    - a. Normal Power System: White text on black background.
- D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch by 2.5 inches.
  2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 1/4 inch.
  5. Color: Black text on white background unless otherwise indicated.
- E. Format for Caution and Warning Messages:
1. Minimum Size: 2 inches by 4 inches.
  2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 1/2 inch.
  5. Color: Black text on yellow background unless otherwise indicated.
- F. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
  2. Legend: Power source and circuit number or other designation indicated.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch.
  5. Color: Black text on clear background.
- G. Format for Control Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.

2. Legend: Load controlled or other designation indicated.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch.
  5. Color: Black text on clear background.
- H. Format for Fire Alarm Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
  2. Legend: Designation indicated and device zone or address.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch.
  5. Color: Red text on white background.
- I. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- J. Locations:
1. Each electrical distribution and control equipment enclosure.
  2. Communication cabinets.
  3. Disconnect switches, and starters.
- K. Letter Size:
1. Use 1/8 inch letters for identifying individual equipment and loads.
  2. Use 1/4 inch letters for identifying grouped equipment and loads.

#### **2.04 WIRE AND CABLE MARKERS**

- A. Manufacturers:
1. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  2. HellermannTyton: [www.hellermanntyton.com/#sle](http://www.hellermanntyton.com/#sle).
  3. Panduit Corp: [www.panduit.com/#sle](http://www.panduit.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- F. Minimum Text Height: 1/8 inch.
- G. Color: Black text on white background unless otherwise indicated.
- H. Description: split sleeve type wire markers.
- I. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.
- J. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
  2. Control Circuits: Control wire number indicated on shop drawings.

#### **2.05 VOLTAGE MARKERS**

- A. Manufacturers: Panduit Corp
1. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  2. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  3. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

- C. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- D. Minimum Size:
  - 1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
  - 2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
  - 3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
  - 4. Markers for Junction Boxes: 1/2 by 2 1/4 inches.
- E. Legend:
  - 1. Markers for Voltage Identification: Highest voltage present.
  - 2. Markers for System Identification:
    - a. Emergency Power System: Text "EMERGENCY".
    - b. Other Systems: Type of service.
- F. Color: Black text on orange background unless otherwise indicated.
- G. Location: Furnish markers for each conduit longer than 6 feet.
- H. Spacing: 20 feet on center.
- I. Color:
  - 1. 480 Volt System: Brown.
  - 2. 208 Volt System: Yellow.
  - 3. Fire Alarm System: Red.
- J. Legend:
  - 1. 480 Volt System: brown.
  - 2. 208 Volt System: yellow.
  - 3. Fire Alarm System: red.

## 2.06 UNDERGROUND WARNING TAPE

- A. Manufacturers:
  - 1. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  - 2. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- D. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.
- E. Legend: Type of service, continuously repeated over full length of tape.
- F. Color:
  - 1. Tape for Buried Power Lines: Black text on red background.
  - 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

## 2.07 WARNING SIGNS AND LABELS

- A. Manufacturers:
  - 1. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  - 2. Clarion Safety Systems, LLC: [www.clarionsafety.com/#sle](http://www.clarionsafety.com/#sle).
  - 3. Insite Solutions, LLC: [www.stop-painting.com/#sle](http://www.stop-painting.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- C. Warning Signs:
  - 1. Materials:

- a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
  - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
  2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
  3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- D. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
  2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
  3. Minimum Size: 2 by 4 inches unless otherwise indicated.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  1. Surface-Mounted Equipment: Enclosure front.
  2. Flush-Mounted Equipment: Inside of equipment door.
  3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  4. Elevated Equipment: Legible from the floor or working platform.
  5. Interior Components: Legible from the point of access.
  6. Conduits: Legible from the floor.
  7. Boxes: Outside face of cover.
  8. Conductors and Cables: Legible from the point of access.
  9. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
- G. Secure rigid signs using stainless steel screws.
- H. Mark all handwritten text, where permitted, to be neat and legible.

#### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

**END OF SECTION 26 05 53**

**SECTION 26 27 17**  
**EQUIPMENT WIRING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical connections to equipment.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 26 05 34 - Conduit.
- C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables (600 V and Less).
- D. Section 26 05 37 - Boxes.
- E. Section 26 27 26 - Wiring Devices.
- F. Section 26 28 16.16 - Enclosed Switches.
- G. Section 26 29 13 - Enclosed Controllers.

**1.03 REFERENCE STANDARDS**

- A. NEMA WD 1 - General Color Requirements for Wiring Devices.
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications.
- C. NFPA 70 - National Electrical Code.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
  - 2. Determine connection locations and requirements.
- B. Sequencing:
  - 1. Install rough-in of electrical connections before installation of equipment is required.
  - 2. Make electrical connections before required start-up of equipment.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.07 COORDINATION**

- A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- D. Sequence electrical connections to coordinate with start-up of equipment.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
  - 1. Colors: Conform to NEMA WD 1.
  - 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
  - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
  - 4. Product:
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Disconnect Switches: As specified in Section and in individual equipment sections.
- C. Wiring Devices: As specified in Section 26 27 26.
- D. Flexible Conduit: As specified in Section 26 05 34.
- E. Wire and Cable: As specified in Section 26 05 19.
- F. Boxes: As specified in Section 26 05 37.

### **2.02 EQUIPMENT CONNECTIONS**

- A. As required by equipment manufacturer:

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

### **3.02 ELECTRICAL CONNECTIONS**

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

**END OF SECTION 26 27 17**



**SECTION 26 27 26**  
**WIRING DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates.
- E. Floor box service fittings.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- C. Section 26 05 33.23 - Surface Raceways: Surface raceway systems, including multioutlet assemblies.
- D. Section 26 05 37 - Boxes.
- E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
- G. Section 26 27 17 - Equipment Wiring: Cords and plugs for equipment.
- H. Section 26 29 13 - Enclosed Controllers: Manual motor starters and horsepower rated motor-starting switches without overload protection.
- I. Section 27 10 05 - Structured Cabling for Voice and Data - Inside-Plant: Voice and data jacks.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices.
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications.
- G. NFPA 70 - National Electrical Code.
- H. UL 20 - General-Use Snap Switches.
- I. UL 498 - Attachment Plugs and Receptacles.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices.
- K. UL 943 - Ground-Fault Circuit-Interrupters.
- L. UL 1472 - Solid-State Dimming Controls.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
  3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
  4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
  5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
  6. Notify StudioJAED of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Operation and Maintenance Data:
  1. GFCI Receptacles: Include information on status indicators.
- E. Project Record Documents: Record actual installed locations of wiring devices.
- F. Maintenance Materials: Furnish the following for North Providence Public Schools's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Wall Plates: One of each style, size, and finish.
  3. Extra Flush Floor Service Fittings: Two of each type.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Products: Listed, classified, and labeled as suitable for the purpose intended.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

#### **1.08 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Furnish two of each style, size, and finish wall plate.

### **PART 2 PRODUCTS**

#### **2.01 WIRING DEVICES - GENERAL REQUIREMENTS**

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.

## 2.02 MANUFACTURERS

- A. Hubbell Incorporated; : [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
- B. Leviton Manufacturing Company, Inc; : [www.leviton.com](http://www.leviton.com).
- C. Lutron Electronics Company, Inc: [www.lutron.com](http://www.lutron.com).
- D. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us](http://www.legrand.us)
- E. Cooper Wiring Devices: [www.cooperwiringdevices.com](http://www.cooperwiringdevices.com).
- F. Leviton Manufacturing, Inc: [www.leviton.com](http://www.leviton.com).
- G. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

## 2.03 APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.
- D. Provide GFI protection for all receptacles installed within 6 feet of sinks.
- E. Provide GFCI protection for receptacles serving electric drinking fountains.
- F. Unless noted otherwise, do not use combination switch/receptacle devices.
- G. For flush floor service fittings, use carpet flanges for installations in carpeted floors.

## 2.04 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## 2.05 WALL SWITCHES

- A. Manufacturers:
  - 1. Hubbell Incorporated; : [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
  - 2. Leviton Manufacturing Company, Inc; : [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us/#sle](http://www.legrand.us/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.
- D. Wall Switches: Heavy Duty, AC only general-use snap switch, complying with NEMA WD 6 and WD 1.
  - 1. Body and Handle: Black plastic with toggle handle.
  - 2. Ratings:
    - a. Voltage: 120 - 277 volts, AC.
    - b. Current: 20 amperes.
  - 3. Ratings: Match branch circuit and load characteristics.
- E. Switch Types: Single pole, double pole, 3-way, and 4-way.

## 2.06 WALL DIMMERS

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 2. Lutron Electronics Company, Inc; Maestro Series: [www.lutron.com](http://www.lutron.com).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Wall Dimmers: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.
- C. Control: Slide control type with separate on/off switch.

## 2.07 RECEPTACLES

- A. Manufacturers:
  - 1. Hubbell Incorporated; : [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
  - 2. Leviton Manufacturing Company, Inc; : [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us/#sle](http://www.legrand.us/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  - 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
  - 1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, tamper resistant; single or duplex as indicated on the drawings.
    - a. Products:
      - 1) Hubbell Wiring Devices.
      - 2) Leviton.
      - 3) Pass & Saymore.
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- D. GFI Receptacles:
  - 1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
  - 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, tamper resistant.
- E. Receptacles: Heavy duty, complying with NEMA WD 6 and WD 1.
  - 1. Device Body: Black plastic.
  - 2. Configuration: NEMA WD 6, type as specified and indicated.
  - 3. Tamper resistant type.
- F. Convenience Receptacles: Type 5 - 20.
- G. Single Convenience Receptacles.
- H. Duplex Convenience Receptacles.
- I. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

## 2.08 TELEPHONE JACKS

- A. Product: AMP manufacturing

- B. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.09 WALL PLATES

- A. Manufacturers:
1. Hubbell Incorporated; : [www.hubbell-wiring.com/#sle](http://www.hubbell-wiring.com/#sle).
  2. Leviton Manufacturing Company, Inc; : [www.leviton.com/#sle](http://www.leviton.com/#sle).
  3. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us/#sle](http://www.legrand.us/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  2. Size: Standard; .
  3. Screws: Metal with slotted heads finished to match wall plate finish.
- C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.
- F. Decorative Cover Plates: stainless steel.
- G. Jumbo Cover Plates: stainless steel.
- H. Weatherproof Cover Plates: Gasketed cast metal with hinged cover.

## 2.10 FLOOR BOX SERVICE FITTINGS

- A. Manufacturers:
1. Hubbell Incorporated; : [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
  2. Thomas & Betts Corporation; : [www.tnb.com/#sle](http://www.tnb.com/#sle).
  3. Wiremold, a brand of Legrand North America, Inc; : [www.legrand.us/#sle](http://www.legrand.us/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Service fittings compatible with floor boxes provided under Section 26 05 37 with all components, adapters, and trims required for complete installation.
- C. Flush Floor Service Fittings:
1. Dual Service Flush Combination Outlets:
    - a. Cover: Rectangular.
    - b. Configuration:
      - 1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
      - 2) Communications: Two Data Drops.
      - 3) Voice and Data Jacks: As specified in Section 27 10 00.
  2. Accessories:
    - a. Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.

## 2.11 POKE-THROUGH ASSEMBLIES

- A. Description: Assembly comprising floor service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination; fire rating listed to match fire rating of floor and suitable for floor thickness where installed.
- B. Flush Floor Service Fittings:
1. Dual Service Flush Combination Outlets:

- a. Cover: Hinged door(s).
- b. Configuration:
  - 1) Power: One standard convenience duplex receptacle(s).
  - 2) Communications: Two data drops..
  - 3) Voice and Data Jacks: As specified in Section 27 10 00.
2. Accessories:
  - a. Closure Plugs: Size and fire rating as required to seal unused core hole and maintain fire rating of floor.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that floor boxes are adjusted properly.
- F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- G. Verify that openings in access floor are in proper locations.
- H. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

#### **3.03 INSTALLATION**

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1, including mounting heights specified in that standard unless otherwise indicated.
- C. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of wiring devices provided under this section.
  1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
  2. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify StudioJAED to obtain direction prior to proceeding with work.
- D. Install wiring devices in accordance with manufacturer's instructions.
- E. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- F. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- G. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- H. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.



- I. For isolated ground receptacles, connect wiring device grounding terminal only to identified branch circuit isolated equipment grounding conductor. Do not connect grounding terminal to outlet box or normal branch circuit equipment grounding conductor.
- J. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.
- K. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
- L. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- M. Install wall switches with OFF position down.
- N. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- O. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- P. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- Q. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- R. Identify wiring devices in accordance with Section 26 05 53.
- S. Install poke-through closure plugs in each unused core holes to maintain fire rating of floor.
- T. Install receptacles with grounding pole on top.
- U. Connect wiring device grounding terminal to outlet box with bonding jumper.
- V. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- W. Connect wiring devices by wrapping conductor around screw terminal.
- X. Use jumbo size plates for outlets installed in masonry walls.
- Y. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

### **3.04 INTERFACE WITH OTHER PRODUCTS**

- A. Coordinate locations of outlet boxes provided under Section 26 05 37 to obtain mounting heights.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 18 inches above finished floor.
- D. Install convenience receptacle 6 inches above backsplash of counter.
- E. Install telephone jack 18 inches above finished floor.
- F. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches above finished floor.
- G. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches above finished floor.
- H. Coordinate installation of access floor boxes with access floor system provided under Section 09 6900.
- I. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0540.

### **3.05 FIELD QUALITY CONTROL**

- A. Perform field inspection, testing, adjusting, and balancing in accordance with Section 01 40 00.



- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Operate each wall switch with circuit energized and verify proper operation.
- E. Verify that each receptacle device is energized.
- F. Test each receptacle to verify operation and proper polarity.
- G. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- H. Correct wiring deficiencies and replace damaged or defective wiring devices.
- I. Verify that each telephone jack is properly connected and circuit is operational.

**3.06 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.

**3.07 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

**END OF SECTION 26 27 26**

**SECTION 26 51 00**  
**INTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. Lamps.
- E. Luminaire accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 05 37 - Boxes.
- B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 09 23 - Lighting Control Devices.
- D. Section 26 09 23 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.
- E. Section 26 27 26 - Wiring Devices: Manual wall switches and wall dimmers.
- F. Section 26 56 00 - Exterior Lighting.

**1.03 REFERENCE STANDARDS**

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns.
- B. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast.
- C. ANSI C82.4 - American National Standard for Lamp Ballasts - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.
- D. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts.
- E. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.
- F. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; Illuminating Engineering Society.
- G. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources .
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- I. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems.
- J. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems.
- K. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility.
- L. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association.
- M. NFPA 70 - National Electrical Code.
- N. NFPA 101 - Life Safety Code.
- O. UL 924 - Emergency Lighting and Power Equipment.

- P. UL 935 - Fluorescent-Lamp Ballasts.
- Q. UL 1598 - Luminaires.
- R. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
  - 2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
  - 3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
  - 4. Notify StudioJAED of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
  - 2. Provide photometric calculations where luminaires are proposed for substitution upon request.
- C. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- D. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
  - 1. LED Luminaires:
    - a. Include estimated useful life, calculated based on IES LM-80 test data.
    - b. Include IES LM-79 test report upon request.
- E. Sustainable Design Documentation: Submit manufacturer's product data on lamp mercury content and rated lamp life, showing compliance with specified requirements.
- F. Field Quality Control Reports.
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- I. Maintenance Materials: Furnish the following for North Providence Public Schools's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
  - 3. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.

- 4. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.
- J. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Conform to requirements of NFPA 70 and NFPA 101.
- D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

#### **1.08 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty for all linear fluorescent ballasts.

#### **1.10 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Furnish two of each plastic lens type.
- C. Furnish one replacement lamps for each lamp type.
- D. Furnish two of each ballast type.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acuity Brands, Inc; : [www.acuitybrands.com](http://www.acuitybrands.com).
- B. Hubbell Lighting, Inc; : [www.hubbellighting.com](http://www.hubbellighting.com).
- C. Lightolier: [www.lightolier.com](http://www.lightolier.com).
- D. Lithonia Lighting: [www.lithonia.com](http://www.lithonia.com).
- E. Columbia Lighting.
- F. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 LUMINAIRES**

- A. Manufacturers:
  - 1. Acuity Brands, Inc; : [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
  - 2. Cooper Lighting, a division of Cooper Industries; : [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  - 3. Hubbell Lighting, Inc; : [www.hubbellighting.com/#sle](http://www.hubbellighting.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

- D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Recessed Luminaires:
  - 1. Ceiling Compatibility: Comply with NEMA LE 4.
  - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
  - 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
- I. LED Luminaires:
  - 1. Components: UL 8750 recognized or listed as applicable.
  - 2. Tested in accordance with IES LM-79 and IES LM-80.
  - 3. LED Estimated Useful Life: Minimum of 200,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.
- J. LED Luminaires: Listed and labeled as complying with UL 8750.
- K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.
- L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

### **2.03 EMERGENCY LIGHTING UNITS**

- A. Manufacturers:
  - 1. Acuity Brands, Inc; : [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
  - 2. Cooper Lighting, a division of Cooper Industries; : [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  - 3. Hubbell Lighting, Inc; : [www.hubbellighting.com/#sle](http://www.hubbellighting.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924. Emergency and Exit light combination unit with (2) unit mounted lamps and LED exit light with battery backup. This combination unit shall have spare capacity to power remote emergency lamp heads.
- C. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Battery:
  - 1. Sealed maintenance-free nickel cadmium unless otherwise indicated.
  - 2.
  - 3. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- E. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- F. Provide low-voltage disconnect to prevent battery damage from deep discharge.

- G. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.
- H. Accessories:
  - 1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
  - 2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
  - 3. Provide compatible accessory wire guards where indicated.
  - 4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

## 2.04 LUMINAIRES

- A. Furnish products as indicated in Schedule attached to this section.
- B. Substitutions: See Section 01 60 00 - Product Requirements.
  - 1. Input Voltage: 120 or 277 volts.

## 2.05 EXIT SIGNS

- A. Manufacturers:
  - 1. Acuity Brands, Inc; : [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
  - 2. Cooper Lighting, a division of Cooper Industries; : [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  - 3. Hubbell Lighting, Inc; : [www.hubbellighting.com/#sle](http://www.hubbellighting.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single or double as indicated or as required for the installed location.
  - 2. Directional Arrows: As indicated or as required for the installed location.
- C. Self-Powered Exit Signs:
  - 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
  - 2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
  - 3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
  - 4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
  - 5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.
- D. Accessories:
  - 1. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
  - 2. Provide compatible accessory wire guards where indicated.
- E. Manufacturers: As indicated on lighting fixture schedule.
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Exit Signs: Exit sign fixture .
  - 1. Housing: Plastic.
  - 2. Face: Translucent glass face with red letters on white background.
  - 3. Face: Aluminum stencil face with red letters.
  - 4. Directional Arrows: Universal type for field adjustment.
  - 5. Mounting: Universal, for field selection.
  - 6. Battery: 12 volt, nickel-cadmium type, with 1.5 hour capacity.

7. Battery Charger: Dual-rate type, with sufficient capacity to recharge discharged battery to full charge within twelve hours.
8. Lamps: Manufacturer's standard.
9. Input Voltage: 120/277 volts.

## 2.06 BALLASTS

- A. Manufacturers:
  1. General Electric Company/GE Lighting; : [www.gelighting.com/#sle](http://www.gelighting.com/#sle).
  2. Osram Sylvania; : [www.sylvania.com/#sle](http://www.sylvania.com/#sle).
  3. Philips Lighting Electronics/Advance; : [www.advance.philips.com](http://www.advance.philips.com).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
  5. Manufacturer Limitations: Where possible, for each type of luminaire provide ballasts produced by a single manufacturer.
- B. All Ballasts:
  1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
  2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
- C. Fluorescent Ballasts:
  1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
    - a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
    - b. Total Harmonic Distortion: Not greater than 10 percent.
    - c. Power Factor: Not less than 0.95.
    - d. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
    - e. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
    - f. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
    - g. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
      - 1) Do not operate lamp(s) within the frequencies from 30 kHz through 40 kHz in order to avoid interference with infrared devices.
    - h. Lamp Current Crest Factor: Not greater than 1.7.
    - i. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
    - j. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
    - k. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
    - l. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
    - m. Provide high efficiency T8 lamp ballasts certified as NEMA premium where indicated.
    - n. Ballast Marking: Include wiring diagrams with lamp connections.
  2. Non-Dimming Fluorescent Ballasts:
    - a. Lamp Starting Method:
      - 1) T8 Lamp Ballasts: Programmed start unless otherwise indicated.
      - 2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
      - 3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.
    - b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F, and energy saving lamp(s) at a minimum of 60 degrees F unless otherwise indicated.



- D. Dimmable LED Drivers:
1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
  2. Control Compatibility: Fully compatible with the dimming controls to be installed.
    - a. Wall Dimmers: See Section 26 27 26.
    - b. Daylighting Controls: See Section 26 09 23.

## 2.07 LAMPS

- A. Manufacturers:
1. General Electric Company/GE Lighting; : [www.gelighting.com/#sle](http://www.gelighting.com/#sle).
  2. Osram Sylvania; : [www.sylvania.com/#sle](http://www.sylvania.com/#sle).
  3. Philips Lighting Company; : [www.lighting.philips.com](http://www.lighting.philips.com).
  4. Philips Lighting Co of NA: [www.lighting.philips.com](http://www.lighting.philips.com).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. All Lamps:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
  2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
  3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
  4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the StudioJAED to be inconsistent in perceived color temperature.
- C. Compact Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
1. Low Mercury Content: Provide lamps that pass the EPA Toxicity Characteristic Leaching Procedure (TCLP) test for characteristic hazardous waste.
  2. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
  3. Color Rendering Index (CRI): Not less than 80.
  4. Average Rated Life: Not less than 10,000 hours for an operating cycle of three hours per start.
- D. Linear Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
1. Low Mercury Content: Provide lamps that pass the EPA Toxicity Characteristic Leaching Procedure (TCLP) test for characteristic hazardous waste.
  2. T8 Linear Fluorescent Lamps:
    - a. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
    - b. Color Rendering Index (CRI): Not less than 80.
    - c. Average Rated Life: Not less than 20,000 hours for an operating cycle of three hours per start.
  3. T5 Linear Fluorescent Lamps:
    - a. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
    - b. Color Rendering Index (CRI): Not less than 80.
    - c. Average Rated Life: Not less than 20,000 hours for an operating cycle of three hours per start.
- E. Lamp Types: As specified for each luminaire.
- F. Fluorescent Lamps:
1. Product: Phillips Lighting - Type T5 or T8.
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- G. High Intensity Discharge (HID) Lamps:
1. Product: Match Lighting Fixture Type

2. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.08 ACCESSORIES**

- A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.
- B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
- D. Tube Guards for Linear Fluorescent Lamps: Provide clear virgin polycarbonate sleeves with endcaps where indicated.
- E. Product: As indicated in lighting fixture schedule.
  1. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.03 INSTALLATION**

- A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- E. Suspended Ceiling Mounted Luminaires:
  1. Do not use ceiling tiles to bear weight of luminaires.
  2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
  3. Secure pendant-mounted luminaires to building structure.
  4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
  5. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
  6. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- F. Recessed Luminaires:
  1. Install trims tight to mounting surface with no visible light leakage.
  2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- G. Suspended Luminaires:
  1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  2. Install canopies tight to mounting surface.
- H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- I. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).
- J. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- K. Support luminaires independent of ceiling framing.
- L. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- M. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- N. Exposed Grid Ceilings: Support surface mounted luminaires in grid ceiling directly from building structure.
- O. Exposed Grid Ceilings: Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires.
- P. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.
- Q. Install recessed luminaires to permit removal from below.
- R. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- S. Install clips to secure recessed grid-supported luminaires in place.
- T. Install wall mounted luminaires, emergency lighting units, and exit signs at height as scheduled.
- U. Install accessories furnished with each luminaire.
- V. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- W. Bond products and metal accessories to branch circuit equipment grounding conductor.
- X. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.
- Y. Air Handling Luminaires: Interface with air handling accessories furnished and installed under Section 23 36 00.
- Z. Emergency Lighting Units:
  1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- AA. Exit Signs:
  1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- AB. Install lamps in each luminaire.
- AC. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Perform field inspection, testing, and adjusting in accordance with Section 01 4000.
- D. Operate each luminaire after installation and connection to verify proper operation.
- E. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- F. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by StudioJAED.

### **3.05 ADJUSTING**

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by StudioJAED. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by StudioJAED or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by StudioJAED or authority having jurisdiction.
- D. Aim and adjust luminaires as indicated.
- E. Position exit sign directional arrows as indicated.

### **3.06 CLEANING**

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

### **3.07 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Just prior to Substantial Completion, replace all lamps that have failed.

### **3.08 PROTECTION**

- A. Protect installed luminaires from subsequent construction operations.

### **3.09 PROTECTION**

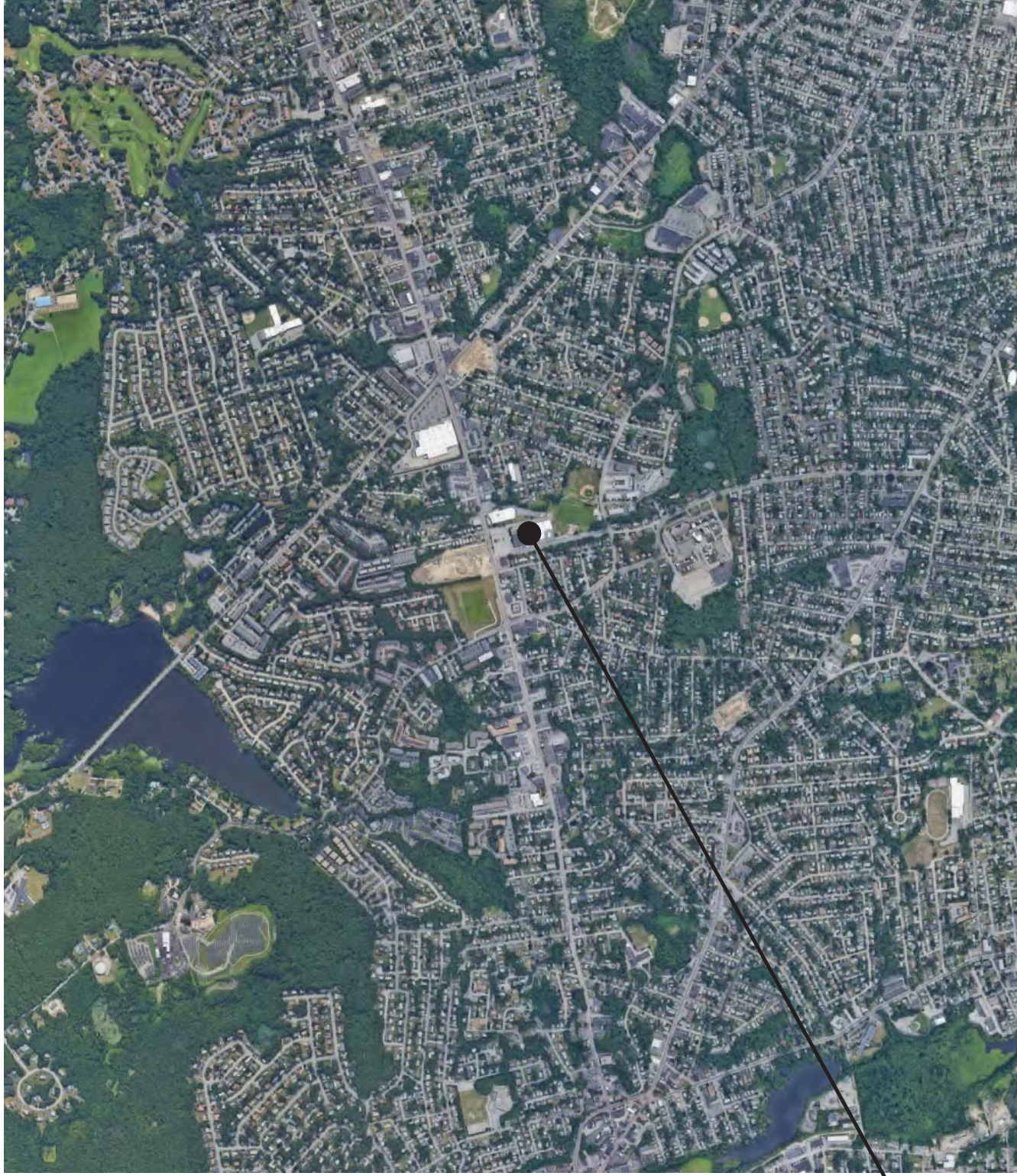
- A. Relamp luminaires that have failed lamps at Substantial Completion.

### **3.10 SCHEDULE - ATTACHED**

**END OF SECTION 26 51 00**

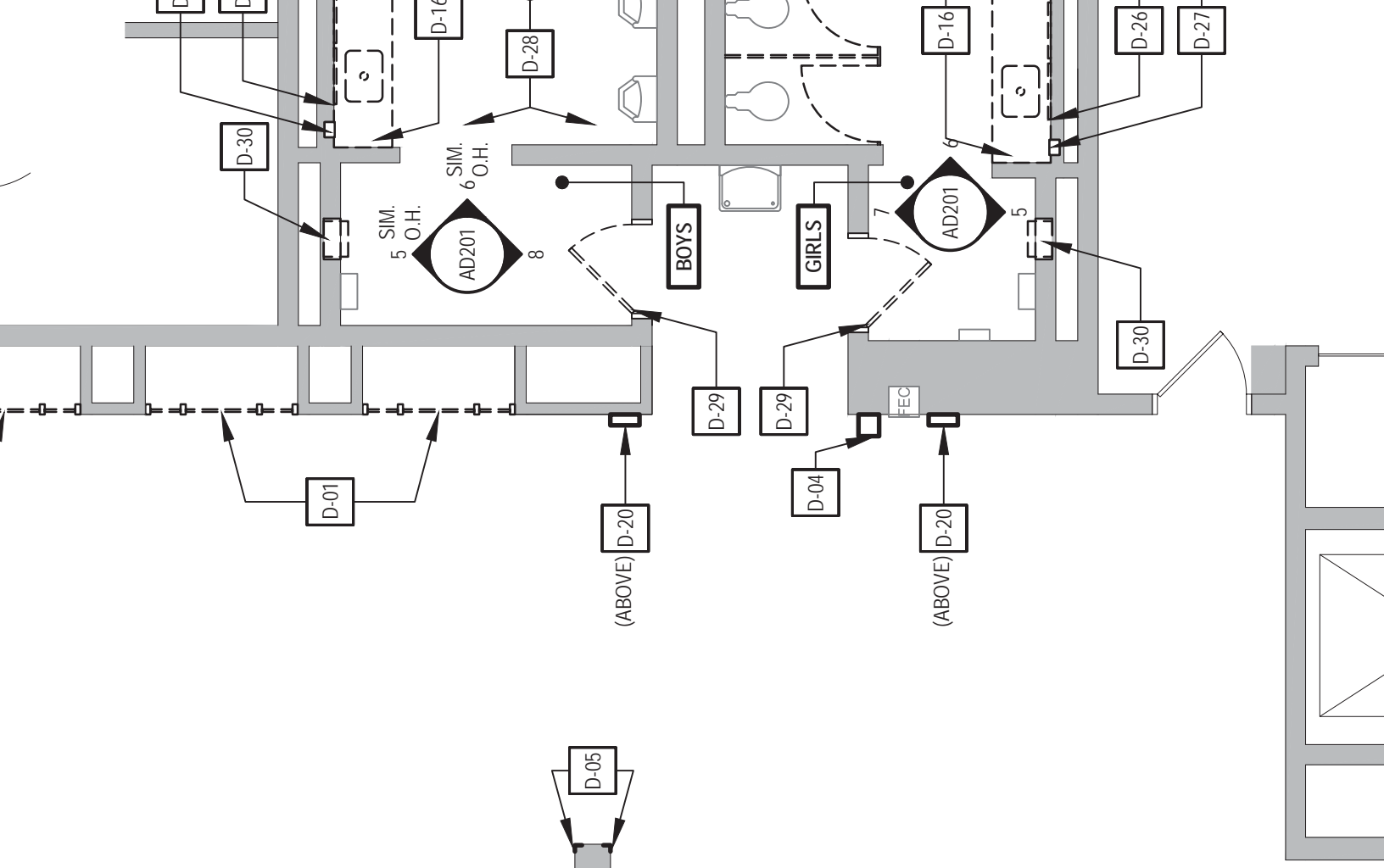


CATION MAPS



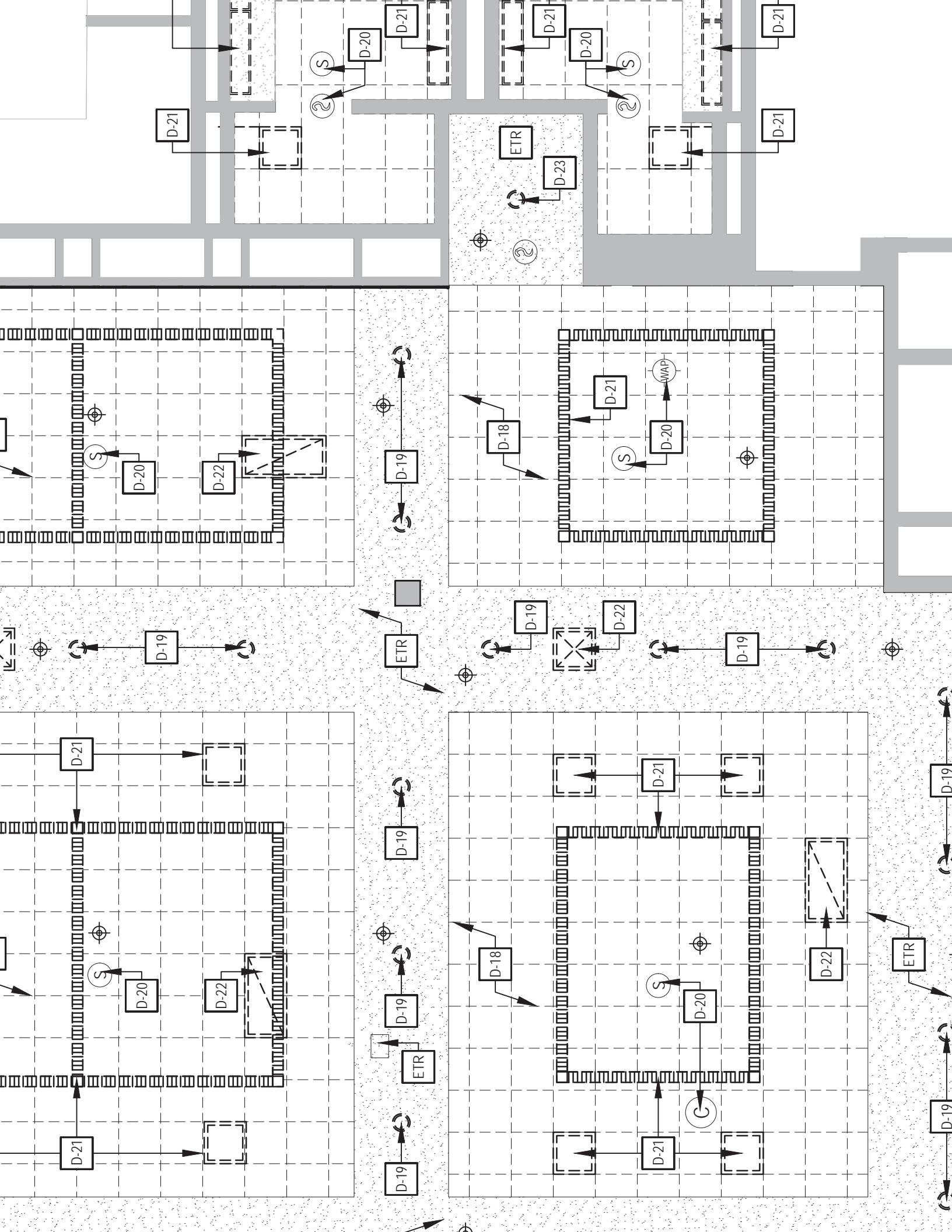
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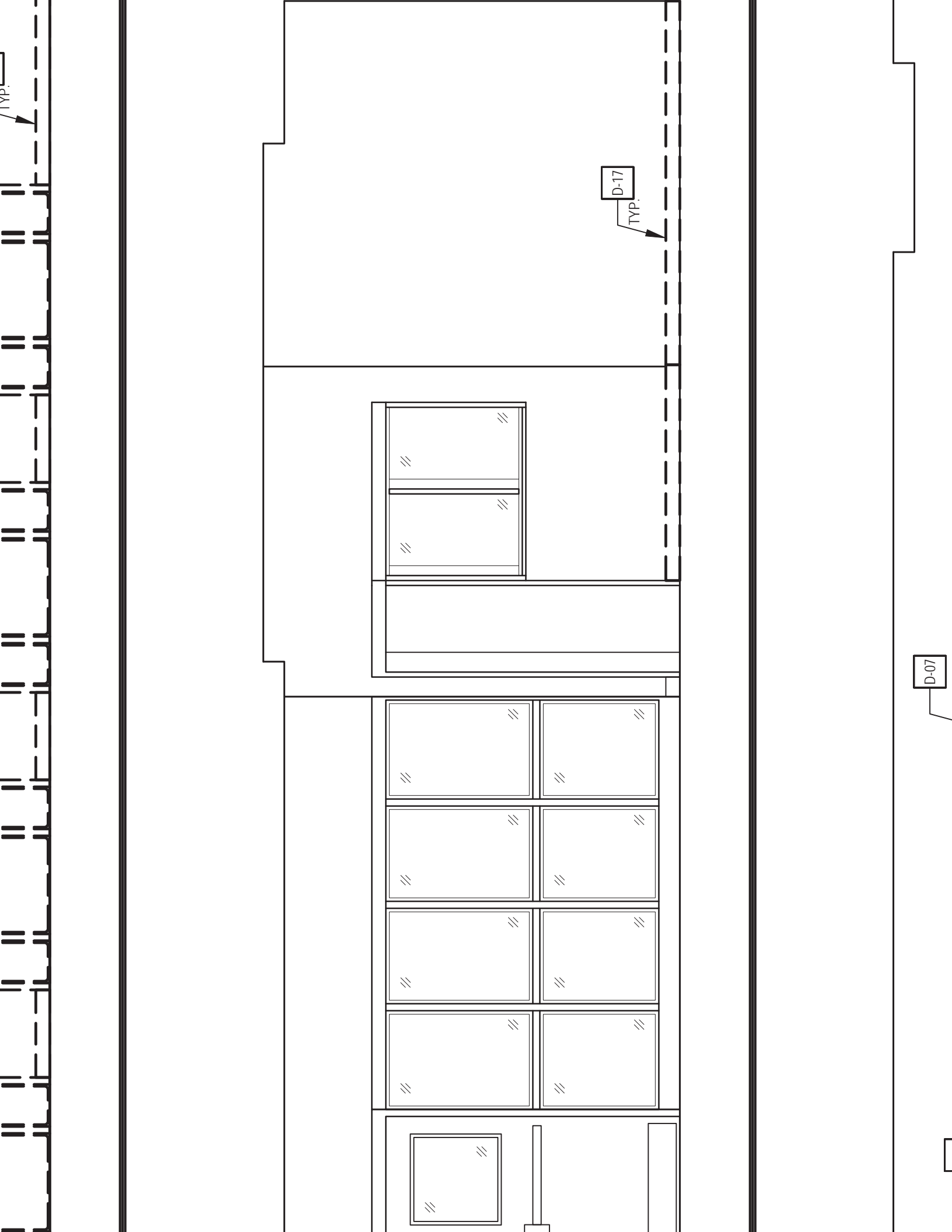


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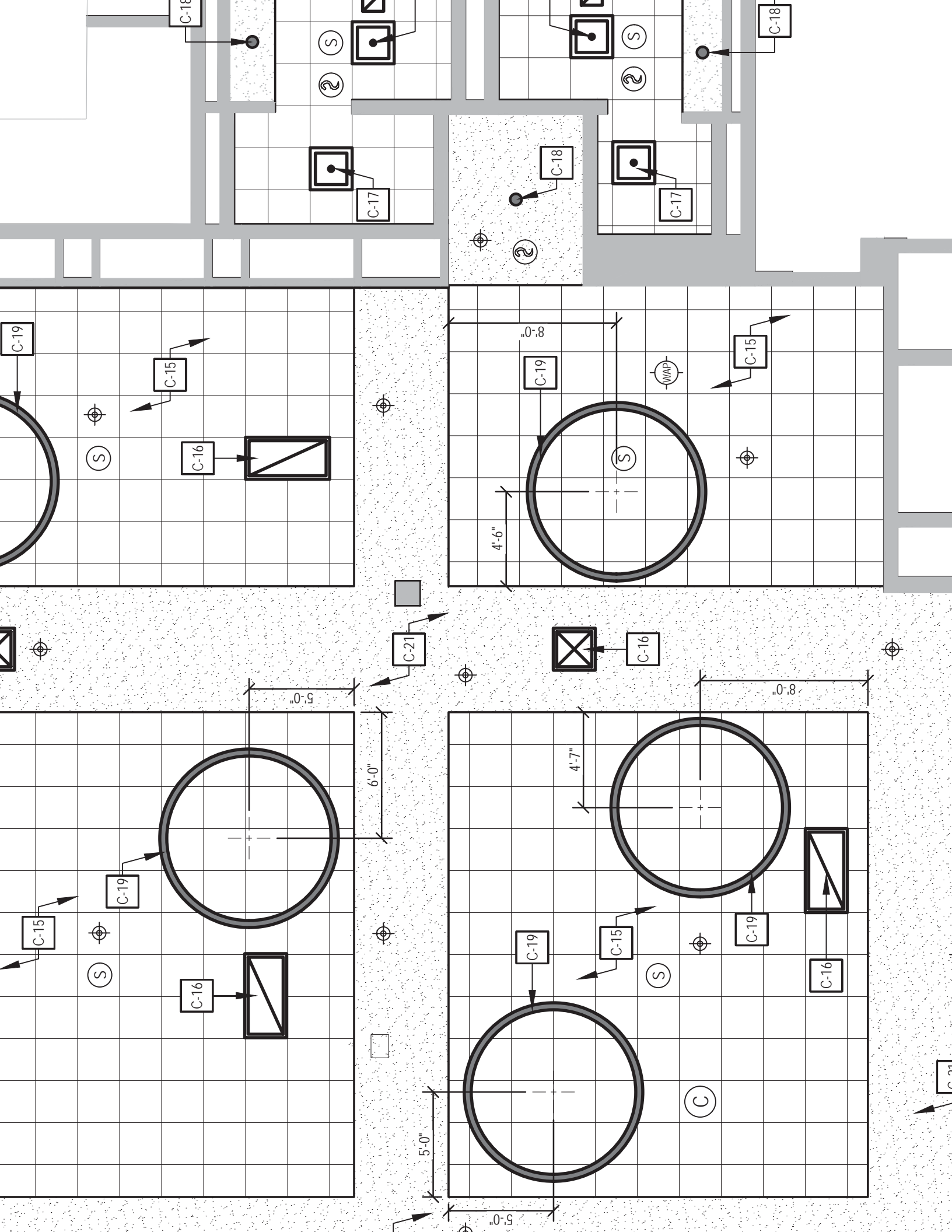


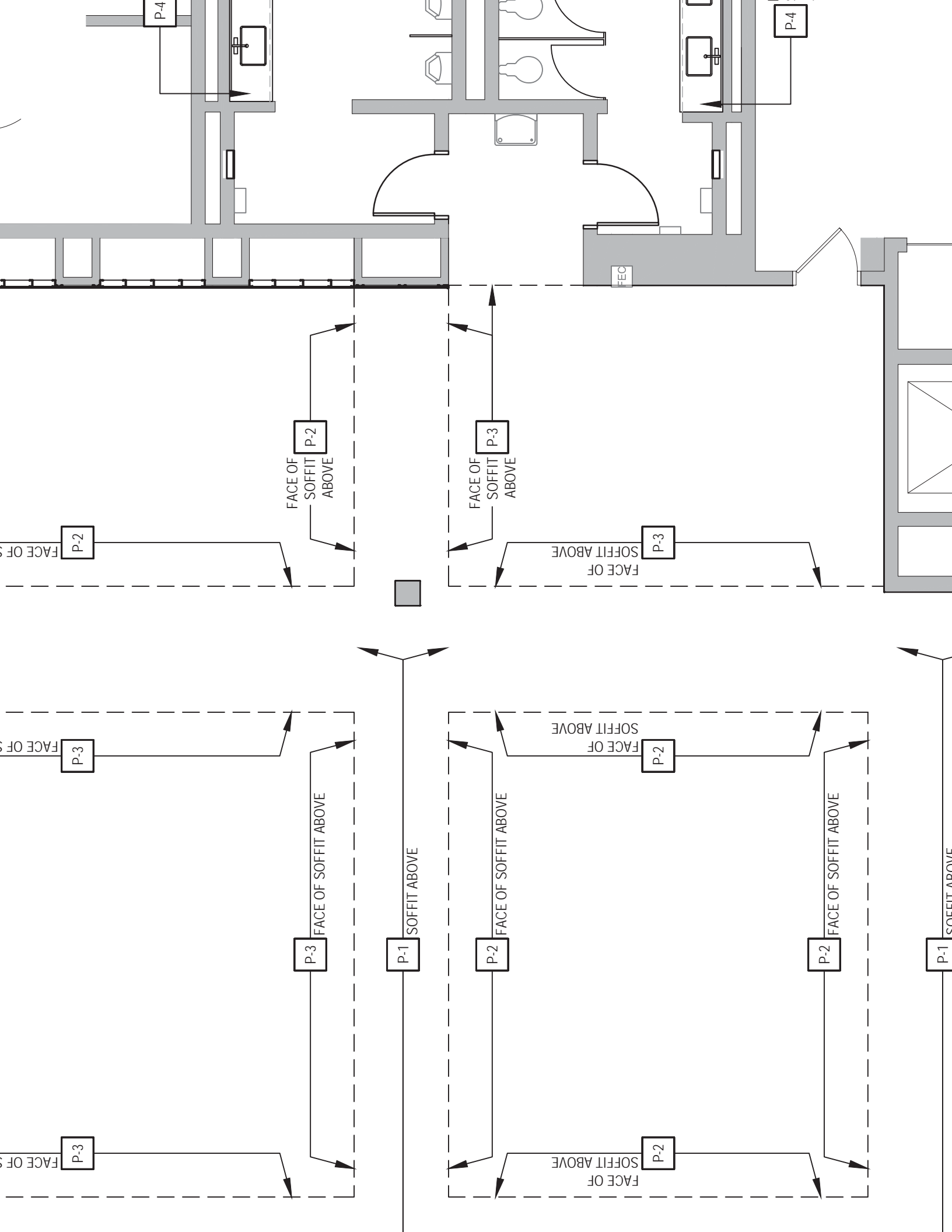


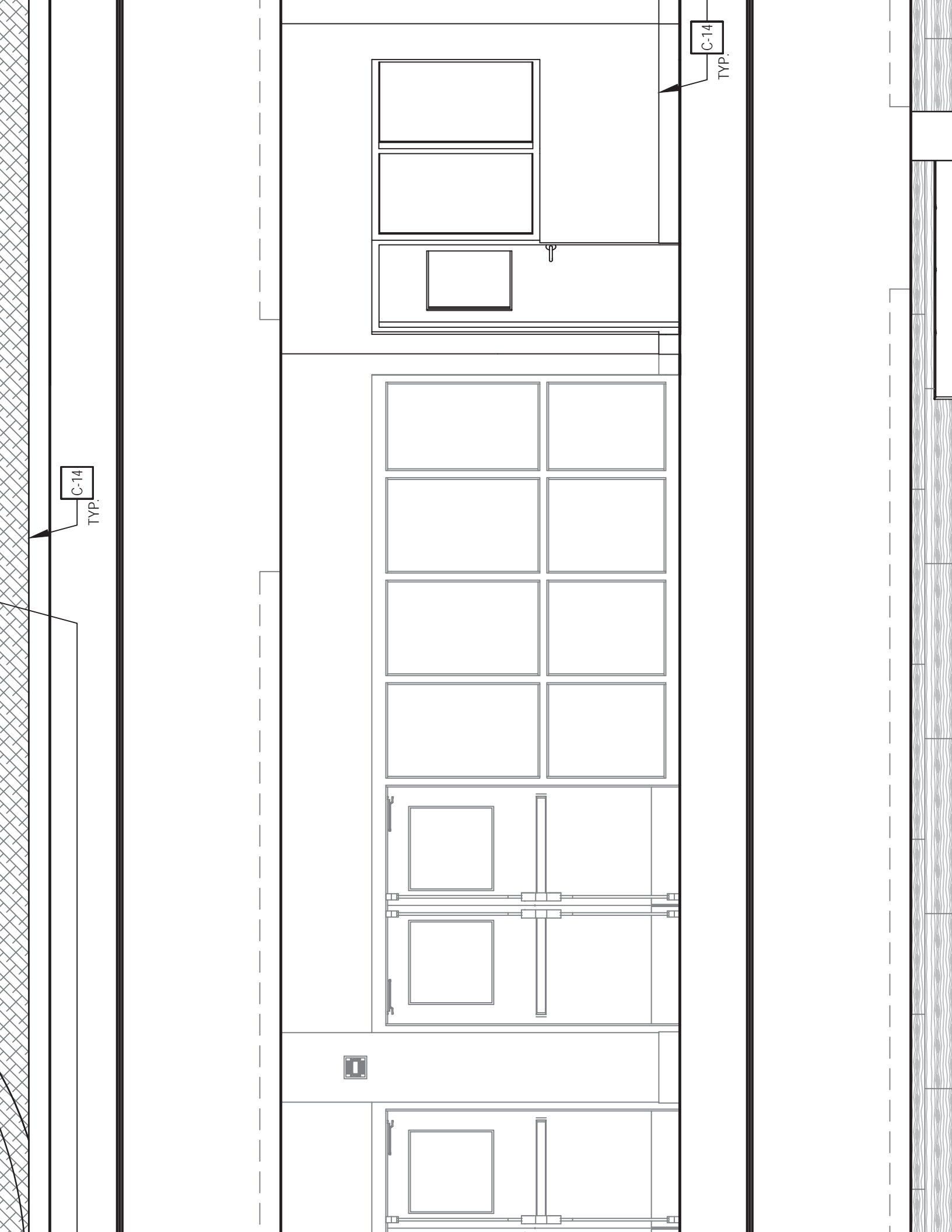












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# 3 CONSTRUCTION PERSPECTIVE - CAF

SCALE: N.T.S.

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A-202





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A-203

# CONSTRUCTION PERSPECTIVE - MEN

SCALE: N.T.S.





