CONTRACT DOCUMENTS

FOR

Bennett's Creek Recreation Center Renovation

IFB # 20083-AG

CITY OF SUFFOLK
PURCHASING DIVISION
442 W. WASHINGTON STREET
SUFFOLK, VA 23434-5237

PREPARED BY:

Wiley Wilson
127 Nationwide Drive
Lynchburg, VA 24502

May 20, 2020

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Section A

(Submit with Bid)

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INVITATION FOR BID

City of Suffolk
IFB #20083-AG
May 20, 2020
Purchasing Division
442 W. Washington Street, Room 1086
Suffolk, VA 23434-5237
Phone: (757) 514-7520/ Fax: (757) 514-7524

Bennett's Creek Recreation Center Renovation

Sealed bids subject to the conditions and instructions contained herein, will be received at the office of the Purchasing Agent listed above, until the time and date shown below (local prevailing time), for furnishing the items or services described in the bid.

SCOPE OF WORK – The City is seeking qualified firms to provide all plant, labor, superintendence, materials, tools, equipment, supplies, incidentals, and other ancillary items necessary, as identified in these Contract Documents, in order to complete the renovation of the Bennett's Creek Recreation Facility, to the limits shown on the drawings and in accordance with all specification, terms, conditions, and drawings herein.

Bid Due: 3:00 PM, July 9, 2020.

Mandatory Pre-Bid Meeting and Site Visit: June 16, 2019 at 10:00 AM

Contract Officer: Amy Gardner

Amy Gardner, CPPB, Senior Buyer, agardner@suffolkva.us

The Senior Buyer, Amy Gardner, is the Contract Officer for the City of Suffolk with respect to this IFB. All questions and/or comments should be directed to her at this email address: agardner@suffolkva.us. The respondents to this IFB shall not contact, either directly or indirectly, any other employee or agent of the City regarding this IFB. Any such unauthorized contact may disqualify the bidder from the procurement.

****AN ORIGINAL SECTION "A" IS REQUIRED AS SUBMITTAL****

Firm Name: _____

Address: _____

City / State / Zip: _____

Telephone: _____ FAX No.: _____

E-mail: _____

Print Name: _____ Title: _____

Signature: _____ Date: _____

In compliance with this Invitation for Bid, and subject to all the conditions thereof, the bidder will, if this bid is accepted within ninety (90) calendar days from the date of the opening, agree to furnish any or all of the items and/or services upon which prices are quoted, at the price set opposite each item, to be delivered at the time and place specified herein. The bidder signature certifies that the bidder has read, understands, and agrees to all terms, conditions, and requirements of this bid, and is authorized to contract on behalf of firm named on the previous page.

BID DOCUMENTS

Bid documents may be obtained in electronic .pdf format, at City of Suffolk, Bennett's Creek Recreation Center folder at https://www.wileywilson.com/bid-info/

Printed bid documents for the project may be obtained for a non-refundable fee of $225.00 from the office of Keith Fabry Reprographic Solutions. Drawings and Specifications MUST be ordered electronically at www.keithfabryplanroom.com. Click on "Public Jobs" from the menu heading on the left. Hardcopies MUST be purchased from the website. Partial sets of bidding documents WILL NOT be issued under any circumstances.

All orders that requires shipping will also be charge a $40.00 shipping fee for UPS Ground.

Bid documents may also be obtained in CD format from the City of Suffolk Purchasing Office for a non-refundable fee of $5.00. Payment will be accepted in the form of check made payable to "TREASURER, CITY OF SUFFOLK" only. Credit cards will not be accepted, nor will separate invoices be issued.

Firms requesting direct delivery of CD of Bid Documents via US Postal Service shall also include an additional payment for a non-refundable handling fee of $5.00 per CD.

Questions concerning this project must be in writing and addressed to the Contract Officer stated herein; and must be received no later than five (5) business days preceding the date that the bids are accepted.

All Addenda resulting from such inquiries or other changes in project scope will be posted on the City of Suffolk website in the bid folder as indicated above. Addenda will also be posted on the Wiley Wilson in the bid folder as indicated above. It is the responsibility of each plan holder to obtain all Addenda. No notice of Addenda will be sent to plan holders.

MANDATORY PRE-BID MEETING AND SITE VISIT

A MANDATORY Pre-Bid meeting and site visit will be held on June 16, 2020 at 10:00 am at the project site 1500 Bennett's Creek Parkway, Suffolk, Virginia 23435. A site tour will follow immediately after the meeting.

BID OPENING

Bids shall be publicly opened and read aloud on the date that the bids are accepted. Public opening will be held on July 9, 2020 at 3:00 PM (local prevailing time), in the City of Suffolk City Hall, Conference Room # 3, located at 442 W. Washington Street, Suffolk, VA 23434-5237.

LIQUIDATED DAMAGES

The contract resulting from this IFB will contain the following language:

If said work is not substantially complete within **365** calendar days as stated in the Notice to Proceed, the Contractor shall be liable and hereby agrees to pay to the Owner as liquidated damages, and not as a penalty, the amount of **five hundred dollars ($500.00)** per calendar day for each and every part of a day thereafter that said work remains substantially incomplete.

If said work is not fully complete within **30** calendar days after the date of Substantial Completion as stated in the Notice to Proceed, the Contractor shall be liable and hereby agrees to pay to the Owner as liquidated damages, and not as a penalty, the amount of **five hundred dollars ($500.00)** per calendar day for each and every part of a day thereafter that said work does not meet final completion.

The City reserves the right, at its sole discretion, to deduct liquidated damages from any outstanding amount due the Contractor.

IF YOU NEED ANY REASONABLE ACCOMMODATION FOR ANY TYPE OF DISABILITY IN ORDER TO PARTICIPATE IN THIS PROCUREMENT, PLEASE CONTACT THIS DIVISION AS SOON AS POSSIBLE.

Bidders are to submit entire Section "A" as their bid. Failure to do so may result in rejection of your bid.

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Revised: 6/6/2019

1. **Use of Form**: All bids shall be submitted on and in accordance with this form. If more space is required to furnish a description of the goods and/or services bid, or delivery terms, the bidder may attach a letter hereto that will be made a part of the bid. In case of conflict, the bid may be considered non-responsive. The City's published specifications for this Invitation for Bid shall supersede any additional writings submitted with the bid. Such writings shall be clearly marked and noted as an exception.

2. **Submittals**: All bids shall be submitted sealed, plainly marked showing the bid number, date and time. The entire solicitation document is to be returned when submitting a bid unless otherwise directed by the bid document. Failure to return all pages may result in a determination that the submittal is non-responsive.

3. **Late Bids**: Bids and amendments thereto, if received by the City's Purchasing Division ("Purchasing") after the date and time specified for bid opening, will not be considered. It will be the responsibility of the bidder to see that their bid is received by Purchasing as specified. There will be no exceptions. Date of postmark will not be considered. Telephone, facsimile, electronic and verbal bids will not be accepted. Prices or changes shown on the outside of an envelope will not be considered in determination of low bid.

4. **City Hall Closure**: If City Hall is closed for business at the time scheduled for the bid opening, for whatever reasons, sealed bids will be accepted and opened on the next business day of the City, at the original scheduled hour.

5. **Competition Intended:** It is the City's intent that the Invitation for Bid (IFB) permits competition. It shall be the bidder's responsibility to advise the Contract Officer in writing if any language requirement, specification, etc., or any combination thereof, inadvertently restricts or limits the requirements stated in the IFB to a single source. Such notifications must be received by the Contract Officer five (5) days prior to the date set for the bids to close.

6. **Contract Quantities**: The quantities specified in the Invitation for Bid are estimates only unless otherwise clearly noted, and are given for the information of bidders and for the purpose of bid evaluation. They do not indicate the actual quantity that will be required, since such volume will depend upon requirements that may develop during the contract period. Quantities shown shall not be construed to represent any amount which the City shall be obligated to purchase under the contract, or relieve the bidder of his obligation to fill all orders placed by the City, except as clearly noted.

7. **Delivery**: The time of delivery must be stated in definite terms. If time of delivery for different goods and/or services varies, the bidder shall so state.

8. **Faith-based Organizations**: The City of Suffolk does not discriminate against faith-based organizations.

9. **Bidder Qualifications**: Only bids from established bidders for work similar in scope to work herein shall be considered; the City reserves the right to request specific reference information prior to award. Bidder shall demonstrate that it has adequate and appropriate

manpower, tools and equipment to respond and perform in accordance with the provisions herein. The City may, at its option, disqualify a bidder and reject its bid for cause. Reasons deemed to be sufficient for this action shall include, but not be limited to, the following:

- Evidence of collusion among bidders.
- Receipt of more than one bid on any project from an individual, or from a corporation. This restriction does not apply to subcontractors.
- Default on any previous contract.
- For unreasonable failure to complete a previous contract within the specified time or for being in arrears on an existing contract without reasonable cause for being in arrears.
- Inability to perform as revealed by an investigation of the Bidder's financial statement, experience and/or plant and equipment.
- Bidder does not meet project-specific requirements, as identified in the contract documents

10. **Pricing to be F.O.B. Destination – Freight Allowed:** Pricing shall be F.O.B. destination-freight included for all competitive bids. F.O.B. Destination-Freight Included shall include all shipping costs to the City location(s) at the unit cost. No additional shipping charges shall be allowed.

11. **Samples**: Samples, when requested, must be furnished free of expense, and upon request, if not destroyed, will be returned at the bidder's risk and expense.

12. **Silence of Specifications**: The apparent silence of these specifications and any supplemental specifications as to any detail or the omission from the specifications of a detailed description concerning any point shall be regarded as meaning that only the best commercial practices are to prevail and correct type, size and design are to be used. All interpretations of these specifications shall be made on the basis of this statement.

13. **Capacity of Bidder**: All bids must be signed by a responsible officer or employee having the authority to bind the firm in contract. The bidder agrees that its contract performance shall be in strict conformance with the contract documents.

14. **Rights to Damages**: By signing this bid, the bidder assigns to the City any and all rights that it may have under the antitrust laws of the United States and the Commonwealth of Virginia in any way arising from or pertaining to this bid. This provision is remedial in nature and is to be liberally construed by any court in favor of the City.

15. **Anti-collusion**: The bidder certifies by signing this Invitation for Bid that this bid is made without prior understanding, agreement, or accord with any other person or firm submitting a bid for the same goods and/or services and that this bid is in all respects bona fide, fair, and not the result of any act of fraud or collusion with another person or firm engaged in the same line of business or commerce. Any false statement hereunder may constitute a felony and can result in a fine and imprisonment, as well as civil damages.

16. **Contact Prohibition**: Direct contact with City departments other than Purchasing, on the subject of this bid is expressly forbidden except with the foreknowledge and permission of the Contract Officer. Violation may result in a determination that your firm is ineligible for an award.

    All questions shall be in writing to the Contract Officer shown on the title page of the bid. The respondents to this IFB shall not contact, either directly or indirectly, any other

employee or agent of the City regarding this IFB. This prohibition shall also extend to the Suffolk City Council and locally elected officials. Any such unauthorized contact may disqualify the bidder from this procurement.

17. **Debarment Status**: By submitting a bid, bidders certify that they are not currently debarred by the Commonwealth of Virginia from submitting bids or proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

18. **Ethics in Procurement**: Contractors, offerors, bidders or consultants must provide written disclosure with their bid or proposal if one of its officers, directors, trustees, partners, employees or lenders is an employee or an immediate family member (as defined by §2.2-4368 of the Virginia Public Procurement Act) of the City who is involved personally or substantially participates in this procurement transaction or owns or controls an interest of more than three percent (3%) of the company or received more than $5,000 annually from the bidder, offeror, contractor, or consultant.

19. **Addenda**: If issued, addenda to this solicitation will be posted on the Purchasing website http://apps.suffolkva.us/bids/ It is the bidder's responsibility to check the website or contact Purchasing prior to the submittal deadline to ensure that the bidder has a complete, up-to-date package. Acknowledgement of all issued addenda shall be indicated on the bid form in the appropriate spaces. Failure to acknowledge all addenda will result in bid being non-responsive.

20. **Withdrawal of Bids**: Bidder has the right to request withdrawal of their bids from consideration due to error by giving notice not later than two business days after the bids are publicly opened. Work papers showing evidence of error(s) may be required.

    Bids may be withdrawn any time prior to the bid opening. Withdrawal of bids may be accomplished by submitting such request in writing on the issuing company's letterhead either in person, electronically, or by certified mail.

21. **Award**: Award will be made to the lowest responsive and responsible bidder based on the Total Bid price. The quality of the goods and/or services to be supplied, their conformity with the specifications, their suitability to the requirements, the delivery, qualifications and references will be taken into consideration in making the award. The City reserves the right to refuse all bids. Determination of low bid shall be determined by the audited figure shown on the pricing page titled 'Total Bid Price for IFB 19104-JS.' In case of error in the extension of prices, the unit price shall govern.

22. **Announcements**: Upon the award or the announcement of the decision to award a contract, the City will publicly post such notice on the bulletin board located outside of the Purchasing Division and on the City's web site: http://apps.suffolkva.us/bids/

23. **Offer/Acceptance**: Each bid is received with the understanding that the acceptance in writing by the City of the bidder to furnish any or all of the goods and/or services described therein, shall constitute a contract between the bidder and the City, which shall bind the bidder to furnish and deliver the goods and/or services quoted at the prices stated and in accordance with the conditions of the accepted bid; and the City on its part to order from such bidder, except for causes beyond reasonable control; and pay for, at the agreed prices, all goods and/or services specified and delivered.

24. **Acceptance of Bid**: Receipt of the bid by the City is not to be construed as an award or an order to ship.

25. **City's Rights**: The City reserves the right to reject any and all bids, and to waive any informality if it is determined to be in the best interest of the City.

26. **Appeals Procedure**: Upon bidder's request, administrative appeals information will be provided that shall be used for hearing protests of a decision to award, or an award, appeals from refusal to allow withdrawal of bids, appeals from disqualification, appeals for debarment or suspension, or determination of non-responsibility and appeals from decision or disputes arising during the performance of a contract. To be timely all appeals shall be made within the time periods set forth by the Virginia Public Procurement Act, §2.2-4357, et seq. Contact the Contract Officer at once for assistance.

27. **Additional Conditions**: The Conditions and Instructions in this solicitation are intended to apply to the resulting contract and shall supersede any conflicting terms offered. Any additional conditions a bidder intends be considered must be submitted with the bid and noted as an exception. Such exceptions may result in a finding that the submittal is 'non-responsive' to the bid, negating possibility of an award to that bidder. Contractual documents submitted by the successful firm after an award will not be accepted.

28. **Conflict**: In the event of a conflict between the contract documents, including these Conditions and Instructions, and the terms of a purchase order or related document issued by Purchasing, the contract documents shall control.

29. **Precedence of Documents**: In interpreting this Invitation for Bid (IFB) and resolving any ambiguities between the main body of the IFB (Sections A, B and C) and any supplemental documents or appendixes, Sections A, B, and C shall take precedence over any supplemental documents.

30. **Governing Document**: The solicitation document maintained by Purchasing, in the bid file, shall be considered the official copy. In the case of any inconsistency between bid documents submitted to the City, but not clearly listed as an exception, the language of the official copy shall prevail. Furthermore, any exception or change to the specifications made by the bidder may be cause to disqualify your bid.

31. **Negotiation**: Unless canceled or rejected, a responsive bid from the lowest responsible bidder shall be accepted as submitted; except that if the bid from the lowest responsible bidder exceeds available funds, the City may negotiate with the apparent low bidder to obtain a contract price within the available funds.

32. **Cooperative Agreements**: If authorized by the bidder(s), the resultant contract(s) may be extended to any jurisdiction within the Commonwealth of Virginia to purchase at the contract prices in accordance with the contract terms. Any jurisdiction using such contracts shall place its own order(s) directly with the successful bidder(s). The City of Suffolk acts only as the contracting agent and is not responsible for placement of orders, payment, or discrepancies of the participating jurisdictions. It is the bidder's responsibility to notify the jurisdictions of the availability of contract(s).

33. **Prices**: Prices shall be stated in units of quantity specified. No additional charges shall be passed on to the City, including any applicable taxes, delivery, or surcharges. Prices

quoted shall be the final cost to the City. In case of error in the extension of prices, the unit price shall govern.

34. **Corrections**: All prices and notations should be in ink or typewritten. Mistakes may be crossed out and corrections made in ink and must be initialed and dated by the person signing the bid.

35. **Brand Names**: The use of the name of a manufacturer, brand, make or catalog designation in specifying an item shall restrict bidders to the manufacturer, brand, make or catalog designation identified, unless qualified by the provision "or approved equal". If qualified by the provision "or approved equal" the Brand Names are used simply to indicate the character, quality and/or performance equivalence of the goods and/or services desired. The goods and/or services on which bids are submitted must be of such character, quality and/or performance equivalence that it will serve as that specified. In submitting bids on goods and/or services other than as specified, bidder shall furnish complete data and identification with respect to the alternate goods and/or services that they propose to furnish. It shall be in the City's sole judgment if a substitute product offered is an approved equal and acceptable.

36. **Standard Equipment**: Any equipment delivered must be standard, new and unused equipment, latest model, except as otherwise specifically stated in the bid. Where any part or the normal accessories of equipment is not described, it shall be understood that all the equipment and accessories that are usually provided in the manufacturer's stock model shall be furnished.

37. **Anti-Discrimination**: By submitting their bids, bidders certify to the City that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians with Disabilities Act, the Americans with Disabilities Act and 2.2-4311 of the Virginia Public Procurement Act (VPPA). If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (Code of Virginia 2.2.4343.1E).

    In every contract over $10,000 shall include the following provisions:

    1. During the performance of this contract, the bidder agrees as follows:

        a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, service disabled veterans or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements.

2. The Contractor will include the provisions of Section a, b, and c above in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

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CONTRACT TERMS AND CONDITIONS

1. **Alien Employment**: The Contractor certifies that he does not and shall not during the performance of the contract for goods and services in the Commonwealth, knowingly employ unauthorized aliens as defined in the federal Immigration Reform and Control Act of 1986, as amended.

2. **Assignment of Contract**: A contract shall not be assignable by the Contractor in whole or in part without the written consent of the City

3. **Availability of Funds**: A contract shall be deemed in force only to the extent of appropriations available to each department for the purchase of such goods and/or services. The City's extended obligations on those contracts that envision extended funding through successive fiscal periods shall be contingent upon actual appropriations for the following years.

4. **Changes and Additions**: It shall be the responsibility of the Contractor to notify the City, in writing, of any necessary modifications or additions in the scope of this contract Compensation for changes or additions in the scope of this contract will be negotiated and approved by the City, in writing.

   It is understood and agreed to by both the City and the Contractor that such modifications or additions to this Agreement shall be made only by the full execution of the City's standard Agreement change order form. Furthermore, it is understood and agreed by both parties that any work done by the Contractor on such modification or addition to this Agreement prior to the City's execution of its standard Agreement change order form shall be at the total risk of the Contractor and said work may not be compensated by the City.

5. **Contractor's Form**: In cases where the City may accept the Contractor's form contract, whereas certain standard clauses that may appear in the Contractor's form contract cannot be accepted by the City, and in consideration of the convenience of using that form, and this form, without the necessity of negotiating a separate contract document, the parties hereto specifically agree that, notwithstanding any provisions appearing in the Contractor's form contract, the City's contract addendum shall prevail over the terms of the Contractor's agreement in the event of a conflict.

6. **Conflicts of Interests**: Contractor shall not accept or receive commissions or other payments from third parties for soliciting, negotiating, procuring, or effecting insurance on behalf of the City.

7. **Contractor Failure to Perform**: Failure of the Contractor to perform the contract by reason of the City's non-acceptance of additional conditions submitted after the award shall result in termination of the contract by the City, and may result in debarment of the Contractor for a period of up to three (3) years. Termination and /or debarment of the Contractor shall not constitute a waiver by the City of any other rights or remedies available to the City by law or contract.

8. **Contractual Disputes:** Bidder, Offeror, Contractor or Consultant agree all contractual disputes will be conducted in accordance with provision §2.2-4363 of the Virginia Public Procurement Act.

9. **Default**: In event of default by the Contractor, the City reserves the right to procure the goods and/or services from other sources, and hold the Contractor liable for any excess cost occasioned thereby. Such actions taken by the City shall not release the Contractor from additional remedies that may be allowed by law.

10. **Drug-Free Workplace**: During the performance of this contract, the Contractor agrees to (1) provide a drug-free workplace for the Contractor's employees; (2) post in conspicuous place, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (3) state in all solicitation or advertisement for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (4) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

    For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

11. **Entire Agreement**: This contract and any additional or supplementary documents incorporated herein by reference contain all the terms and conditions agreed upon by the parties hereto, and no other agreements, oral or otherwise, regarding the subject matter of this contract or any part thereof shall have any validity or bind any of the parties hereto. This contract shall not be modified, altered, changed or amended unless in writing and signed by the parties hereto.

12. **Exemption from Taxes**: The City is exempt from state sales tax and federal excise tax. A tax exempt certificate indicating the City's tax exempt status will be furnished by the City upon request.

13. **Governing Law**: This Contract is made, entered into, and shall be performed in the City of Suffolk, Virginia, and shall be governed by the applicable laws of the Commonwealth of Virginia without regard to its conflict of law rules. In the event of litigation concerning this Contract, the parties agree to the exclusive jurisdiction and venue of the Circuit Court of the City of Suffolk, Virginia; however, in the event that the federal court has jurisdiction over the matter, then the parties agree to the exclusive jurisdiction and venue of the U.S. District Court for the Eastern District of Virginia, Norfolk Division.

    The Contractor shall not cause a delay in services because of the pending or during litigation proceedings, except with the express, written consent of the City or written instruction/order from the Court.

14. **Indemnification**: Contractor shall defend and indemnify the City, and the City's employees, agents, and volunteers, from and against any and all damage claim, liability, cost, or expense (including, without limitation, attorney's fees and court costs) of every kind and nature (including, without limitation, those arising from any injury or damage to any person, property or business) incurred by or claimed against the Contractor, its employees, agents, and volunteers, or incurred by or claimed against the City, the City's employees, agents, and volunteers, arising out of, or in connection with, the performance of all services hereunder by the Contractor. This indemnification includes, but is not limited to, any financial or other loss, including, but not limited to, any adverse regulatory, agency or administrative sanction or civil penalties, incurred by the City due to the negligent, fraudulent or criminal acts of the Contractor or any of the Contractor's officers, shareholders, employees, agents, consultants, sub-consultants, or any other person or entity acting on behalf of the Contractor. Unless otherwise provided by law, the Contractor indemnification obligations hereunder shall not be limited in any way by the amount or type of damages, compensation, or benefits payable by or for the Contractor under workers' compensation acts, disability benefit acts, other employee benefit acts, or benefits payable under any insurance policy. This paragraph shall survive the termination of the contract including any renewal or extension thereof.

15. **Copyright Protection**: The Contractor agrees to defend and save the City, its agents, officials, and employees, harmless from liability of any nature or kind, for use of any copyright, composition, secret process, patented or unpatented invention, articles or appliances furnished or used in the performance of the contract, or which the Contractor is not the patentee, assignee, or licensee, to the same extent as provided in the above paragraph.

16. **Independent Contractor**: The Contractor and any employees, agents, or other persons or entities acting on behalf of the Contractor shall act in an independent capacity and not as officers, employees, or agents of the City.

17. **Payment Terms**: Payment terms shall be 'Net 45' days, from the date of Contractor invoice approval by the City.

    Payment terms, if offered, shall not be considered in determining the low bidder.

    Discount period, if offered, shall be computed from the date of proper receipt of the Contractor's correct invoice, or from the date of acceptable receipt of the goods and/or services, whichever is latest.

The payment terms stated herein must appear on the Contractor's invoice. Failure to comply with this requirement shall result in the invoice being returned to the Contractor for correction.

Late payment charges shall not exceed the allowable rate specified by the Commonwealth of Virginia Prompt Payment Act. (1% per month)

Contractor shall submit invoices in duplicate, such statement to include detailed breakdown of all charges, and shall be based on completion of tasks or deliverables.

Individual Contractors shall provide their social security numbers, and proprietorships, partnerships, and corporations shall provide their federal employer identification number on their submittal.

The City prefers to make payment with the City's Purchasing Card. Typically this enables faster payments to the Contractor. Are you willing and able to accept this type of payment?

Yes____ No____

18. **Laws, Regulations**: The Contractor shall keep fully informed of all federal, state, and local laws, ordinances and regulations that in any manner affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances and regulations.

19. **Contractor's License**: If any of the services promulgated under this solicitation consist of construction work, it is required under Title 54.1, Chapter 11, Code of Virginia, for a Contractor who performs or manages construction, removal, repair, or improvement when the total value referred to in a single contract or project is:

    One hundred twenty thousand dollars ($120,000) or more, or the total value of all such construction, removal, repair or improvements undertaken by such person within any twelve-month period is seven hundred fifty thousand dollars ($ 750,000) or more shall show evidence of being licensed as a Class A Contractor.

    Ten thousand dollars ($10,000) or more, but less than one hundred twenty thousand dollars ($120,000) or the total value of all such construction, removal, repair, or improvement undertaken by such person within any twelve-month period is one hundred and fifty thousand dollars ($150,000) or more, but less than seven hundred fifty thousand dollars ($750,000) shall show evidence of being licensed as a Class B Contractor.

    Over one thousand ($1,000) but less than ten thousand ($10,000), or the total value of all such construction, removal, repair, or improvements undertaken by such person within any twelve-month period is one hundred and fifty thousand dollars ($150,000) shall show evidence of being licensed as a Class C Contractor.
    The City shall require master certification as a condition of licensure or certification of electrical, plumbing and heating, ventilation and air conditions Contractors.

    A valid business license from the City may be required. The contractor shall complete whichever of the following notations is appropriate:

"**Licensed Class A Virginia Contractor Number** _____."

"**Licensed Class B Virginia Contractor Number** _____."

"**Licensed Class C Virginia Contractor Number** _____."

20. **License Requirement**: All firms doing business in the City of Suffolk are required to be licensed in accordance with the City of Suffolk business license ordinance. Wholesale and retail merchants without a business location in the City of Suffolk are exempt from this requirement. Any questions concerning business licenses should be directed to the Commissioner of the Revenue's Office, (757) 514-4260 or email comrev@suffolkva.us

21. **Payments to Subcontractors:** Within seven (7) days after receipt of amounts paid by the City for work performed by a subcontractor under this contract, the Contractor shall either:

    a. Pay the Subcontractor for the proportionate share of the total payment received from the City attributable to the work performed by the subcontractor under this contract; or
    b. Notify the City and Subcontractor, in writing, of his intention to withhold all or a portion of the Subcontractor's payment and reason for non-payment.

    The Contractor shall pay interest to the Subcontractor on all amounts owed that remain unpaid beyond the seven (7) day period except for amounts withheld as allowed in Item b. above.

    Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent (1%) per month.

    The Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to include or otherwise be subject to the same payment and interest requirements as set forth above with respect to each lower-tier subcontractor.

    The Contractor's obligation to pay an interest charge to a subcontractor pursuant to the provision my not be construed to be an obligation to the City.

22. **Records and Inspection**: The Contractor shall maintain full and accurate records with respect to all matters covered under the contract, including, without limitation, accounting records, written policies, procedures, time records, telephone records, and any other supporting evidence used to memorialize, reflect, and substantiate charges or fees related to this contract. The Contractor's records shall be open to inspection and subject to audit and/or reproduction, during normal working hours, by the City and its employees, agents or authorized representatives after giving at least three (3) days' notice to the Contractor by the City. The City shall have access to such records from the effective date of this contract, for the duration of the contract, and for five (5) years after the date of final payment by the City to the Contractor pursuant to this contract or any renewal or extension of the contract. The City's employees, agents or authorized representatives shall have access to the Contractor's facilities, shall have access to all necessary records and shall be provided adequate and appropriate work space, in order to conduct audits.

23. **Responsibility of Contractor**: The Contractor shall, without additional costs or fee to the City, correct or revise any errors or deficiencies in his performance. Neither the City's review, approval, acceptance of, or payment for any of the services required under this Agreement shall be deemed a waiver of rights by the City, and the Contractor shall remain liable to the City for all costs which are incurred by the City as a result of the Contractor's negligent performance of any of the services furnished under this Agreement.

24. **Rights and Remedies Not Waived**: In no event shall the making by the City of any payment to the Contractor, or the waiver by the City of any provision under this contract including any obligation of the Contractor, constitute or be construed as a waiver by the City of any other provision, obligation, breach of covenant, or any default which may exist under this contract on the part of the Contractor, and the making of any such payment by the City while any such breach or default exists shall not impair or prejudice any right or remedies available to the City.

25. **Safety**: All Contractors and sub-contractors performing services for the City are required to and shall comply with all Occupational Safety and Health Administration (OSHA), State and City Safety and Occupational Health Standards and any other applicable rules and regulations. Also all Contractors and sub-contractors shall be held responsible for the safety of their employees and any unsafe acts or conditions that may cause injury or damage to persons or property within and around the work site area under this contract.

26. **Scheduling and Delays**: The parties to this contract acknowledge that all or part of the work to be performed hereunder may be delayed and extended at the option of the City. Such delays may be caused by delays, denials and modifications of the various state or federal permits, or for other reasons. The City shall not be required to pay any of the Contractor's direct or indirect costs, or claims for compensation, extended overhead, or other damage or consequential damages arising out of or related to any delays or interruptions required or ordered by the City. If the City delays the project for any reason for a continuous period of ninety (90) days or more, the City and Contractor will negotiate a mutually agreeable adjustment to the Contractor's award amount. Notwithstanding the above, in construction contracts, to the extent that an unreasonable delay is caused by the act or omissions of the City due to causes within the City's control, the above waiver or release shall not apply.

27. **Severability**: If any provision of this contract or the application thereof to any person or circumstances shall to any extent be invalid or unenforceable, the remainder of this contract, or the application of such provision to persons or circumstances other than those which it is invalid or unenforceable, shall not be affected hereby, and each provision of this contract shall be valid and enforced to the full extent permitted by law.

28. **Termination for Convenience**: The City may at any time, and for any reason, terminate this Contract by written notice to Contractor specifying the termination date, which shall be not less than thirty (30) days from the date such notice is mailed.

    Notice shall be given to Contractor by certified mail/return receipt requested at the address set forth in Contractor's Bid Proposal or as provided in this Contract. In the event of such termination, Contractor shall be paid such amount as shall compensate Contractor for the work satisfactorily completed, and accepted by the City, at the time of termination. If the City terminates this Contract, Contractor shall withdraw its personnel and equipment, cease performance of any further work under this Contract, and turn over to the City any work completed or in process for which payment has been made.

29. **Termination for Cause**: In the event that Contractor shall for any reason or through any cause be in default of the terms of this Contract, the City may give Contractor written notice of such default by certified mail/return receipt requested at the address set forth in Contractor's Bid or as provided in this Contract.

Unless otherwise provided, Contractor shall have ten (10) days from the date such notice is mailed in which to cure the default. Upon failure of Contractor to cure the default, the City may immediately cancel and terminate this Contract as of the mailing date of the default notice.

Upon termination, Contractor shall withdraw its personnel and equipment, cease performance of any further work under the Contract, and turn over to the City any work in process for which payment has been made. In the event of violations of law, safety or health standards and regulations, this Contract may be immediately cancelled and terminated by the City and provisions herein with respect to opportunity to cure default shall not be applicable.

BID FORM

TO: Purchasing Division
442 W. Washington Street
Room 1086
Suffolk, VA 23434-5237

BID: Bennett's Creek Recreation Center Renovation

IFB: 20083-AG

DUE: July 9, 2019

TIME: 3:00 PM, Local

_____ (Company) quotes firm price(s) below, to furnish all labor, materials, equipment, transportation, licenses, permits, taxes, and fees required to complete Bennett's Creek Recreation Center Renovation to the limits shown on the drawings in accordance with all specifications, terms, conditions, and drawings herein.

It is the intent of the City to award the bid in total. Should total costs exceed that budgeted for the projects, the City reserves the right to negotiate price with the lowest responsive and responsible bidder.

Bennett's Creek Recreation Center Renovation				
Bid Item Number	**Item**	**Unit**	**Quantity**	**Total Cost**
1	Base Bid	LS	1	$
TOTAL BASE BID AMOUNT		$		

Determination of low bidder shall be based on the TOTAL BASE BID AMOUNT

Bennett's Creek Recreation Center Renovation Alternate Bid Items				
Bid Item Number	**Item**	**Unit**	**Quantity**	**Total Cost**
1	Repairing and recoating of polyurethane foam/silicone roof system	LS	1	$
2	Asphalt walking trail	LS	1	$
3	Asphalt trail connector from Recreation center to Creekside Elementary School	LS	1	$

Alternate bid items will be awarded only as funding permits. Alternate bid items, if awarded, may be awarded in any order on an individual basis or combination thereof.

REFERENCES

Indicate below a listing of at least three (3) recent references for which you have provided similar services. Include the date that services were furnished and the name, address, and phone number of the person we have your permission to contact.

	Client/Address	Date	Contact Person	Phone No.
1)				
2)				
3)				

Bidder has included the following with his BID FORM (please check √):

_____ "Anti-collusion/Nondiscrimination/Drug Free Workplace" clause

_____ Proof of Authority to Transact Business in Virginia form

Company Name: _____

Address: _____

City / State / Zip: _____

Person Quoting: _____ Title: _____

Telephone: _____ FAX No.: _____

E-mail: _____ Cell No.: _____

Social Security Number or FIN Number: _____

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same equipment/materials/ service and is in all respects fair and without collusion or fraud. I understand that collusive bidding is a violation of State and Federal law and can result in fines, prison sentences and civil damage awards. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder.

Bidder agrees to begin the Work within ten (10) days of Notice to Proceed, and that Final Completion shall be on or before three hundred and ninety-five (395) consecutive calendar days after the Notice to Proceed date.

Bidder has examined copies of all the Bid Documents including the following Addenda:

Date	Number

I certify by my signature below that I have received the documents associated with this bid and understand that the review for completeness of these bid documents and the understanding and comprehension of the bid specifications is solely my responsibility; based on this, by my signature below I waive all rights to further claims against the City of Suffolk that the document were incomplete or not understandable.

I certify that the bidder represented herein is eligible to bid with respect to all applicable sections of State and Local Government Conflict of Interest Act, Code of Virginia, Section 2.2-3100 et. seq.

Signature: _____

Date: _____

(Person signing bid should show title or authority to bind the firm in a contract.)

ANTICOLLUSION / NONDISCRIMINATION / DRUG FREE WORKPLACE CLAUSES

ANTICOLLUSION CLAUSE:
IN THE PREPARATION AND SUBMISSION OF THIS BID, SAID BIDDER DID NOT EITHER DIRECTLY OR INDIRECTLY ENTER INTO ANY COMBINATION OR ARRANGEMENT WITH ANY PERSON, FIRM OR CORPORATION, OR ENTER INTO ANY AGREEMENT, PARTICIPATE IN ANY COLLUSION, OR OTHERWISE TAKE ANY ACTION IN THE RESTRAINT OF FREE, COMPETITIVE BIDDING IN VIOLATION OF THE SHERMAN ACT (15 U.S.C. SECTION 1), SECTIONS 59.1-9.1 THROUGH 59.1-9.17 OR SECTIONS 59.1-68.6 THROUGH 59.1-68.8 OF THE CODE OF VIRGINIA.

THE UNDERSIGNED BIDDER HEREBY CERTIFIES THAT THIS AGREEMENT, OR ANY CLAIMS RESULTING THEREFROM, IS NOT THE RESULT OF, OR AFFECTED BY, ANY ACT OF COLLUSION WITH, OR ANY ACT OF, ANOTHER PERSON OR PERSONS, FIRM OR CORPORATION ENGAGED IN THE SAME LINE OF BUSINESS OR COMMERCE; AND, THAT NO PERSON ACTING FOR, OR EMPLOYED BY, THE CITY OF SUFFOLK HAS AN INTEREST IN, OR IS CONCERNED WITH, THIS BID; AND, THAT NO PERSON OR PERSONS, FIRM OR CORPORATION OTHER THAN THE UNDERSIGNED, HAVE, OR ARE, INTERESTED IN THIS BID.

DRUG-FREE WORKPLACE:
DURING THE PERFORMANCE OF THIS CONTRACT, THE CONTRACTOR AGREES TO (I) PROVIDE A DRUG-FREE WORKPLACE FOR THE CONTRACTOR'S EMPLOYEES; (II) POST IN CONSPICUOUS PLACES, AVAILABLE TO EMPLOYEES AND APPLICANTS FOR EMPLOYMENT, A STATEMENT NOTIFYING EMPLOYEES THAT THE UNLAWFUL MANUFACTURE, SALE, DISTRIBUTION, DISPENSATION, POSSESSION, OR USE OF A CONTROLLED SUBSTANCE OR MARIJUANA IS PROHIBITED IN THE CONTRACTOR'S WORKPLACE AND SPECIFYING THE ACTIONS THAT WILL BE TAKEN AGAINST EMPLOYEES FOR VIOLATIONS OF SUCH PROHIBITION; (III) STATE IN ALL SOLICITATIONS OR ADVERTISEMENTS FOR EMPLOYEES PLACED BY OR ON BEHALF OF THE CONTRACTOR THAT THE CONTRACTOR MAINTAINS A DRUG-FREE WORKPLACE; AND (IV) INCLUDE THE PROVISIONS OF THE FOREGOING SECTIONS I, II, AND III IN EVERY SUBCONTRACT OR PURCHASE ORDER OF OVER $10,000, SO THAT THE PROVISIONS WILL BE BINDING UPON EACH SUBCONTRACTOR OR VENDOR.

FOR THE PURPOSE OF THIS SECTION, "DRUG-FREE WORKPLACE" MEANS A SITE FOR THE PERFORMANCE OR WORK DONE IN CONNECTION WITH A SPECIFIC CONTRACT AWARDED TO A CONTRACTOR IN ACCORDANCE WITH THIS CHAPTER, THE EMPLOYEES OF WHOM ARE PROHIBITED FROM ENGAGING IN THE UNLAWFUL MANUFACTURE, SALE, DISTRIBUTION, DISPENSATION, POSSESSION OR USE OF ANY CONTROLLED SUBSTANCE OR MARIJUANA DURING THE PERFORMANCE OF THE CONTRACT.

NONDISCRIMINATION CLAUSE:
1. EMPLOYMENT DISCRIMINATION BY BIDDER SHALL BE PROHIBITED.
2. DURING THE PERFORMANCE OF THIS CONTRACT, THE SUCCESSFUL BIDDER SHALL AGREE AS FOLLOWS:
   - A. THE BIDDER, WILL NOT DISCRIMINATE AGAINST ANY EMPLOYEE OR APPLICANT FOR EMPLOYMENT BECAUSE OF RACE, RELIGION, COLOR, SEX, NATIONAL ORIGIN, AGE, DISABILITY, OR ANY OTHER BASIS PROHIBITED BY STATE LAW RELATING TO DISCRIMINATION IN EMPLOYMENT, EXCEPT WHERE THERE IS A BONA FIDE OCCUPATIONAL QUALIFICATION/CONSIDERATION REASONABLY NECESSARY TO THE NORMAL OPERATION OF THE BIDDER. THE BIDDER AGREES TO POST IN CONSPICUOUS PLACES, AVAILABLE TO EMPLOYEES AND APPLICANTS FOR EMPLOYMENT, NOTICES SETTING FORTH THE PROVISIONS OF THIS NONDISCRIMINATION CLAUSE.
   - B. THE BIDDER, IN ALL SOLICITATIONS OR ADVERTISEMENTS FOR EMPLOYEES PLACED ON BEHALF OF THE BIDDER, WILL STATE THAT SUCH BIDDER IS AN EQUAL OPPORTUNITY EMPLOYER.
   - C. NOTICES, ADVERTISEMENTS, AND SOLICITATIONS PLACED IN ACCORDANCE WITH FEDERAL LAW, RULE OR REGULATION SHALL BE DEEMED SUFFICIENT FOR THE PURPOSE OF MEETING THE REQUIREMENTS OF THIS SECTION.
   - D. BIDDER WILL INCLUDE THE PROVISIONS OF THE FOREGOING SECTIONS A, B, AND C IN EVERY SUBCONTRACT OR PURCHASE ORDER OF OVER $10,000, SO THAT THE PROVISIONS WILL BE BINDING UPON EACH SUBCONTRACTOR OR VENDOR.

Name and Address of Bidder:	Date:
	By:
	Signature In Ink
	Printed Name
Telephone Number: ( )	
Fax Phone Number: ( )	Title
FIN/SSN#:	

Is your firm a "minority" business? ☐ Yes ☐ No If yes, please indicate the "minority" classification below:
☐ African American ☐ Hispanic American ☐ American Indian ☐ Eskimo ☐ Asian American ☐ Aleut
☐ Other; Please Explain:_____
Is your firm Woman Owned? ☐ Yes ☐ No Is your firm a Small Business? ☐ Yes ☐ No

PROOF OF AUTHORITY TO TRANSACT BUSINESS IN VIRGINIA

THIS FORM MUST BE SUBMITTED WITH YOUR PROPOSAL/BID, FAILURE TO INCLUDE THIS FORM MAY RESULT IN REJECTION OF YOUR PROPOSAL/BID

Pursuant to Virginia Code §2.2-4311.2 an Offeror/Bidder organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 of the Code of Virginia shall include in its proposal/bid the identification number issued to it by the State Corporation Commission ("SCC"). Any Offeror/Bidder that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law shall include in its proposal/bid a statement describing why the Offeror/Bidder is not required to be so authorized. Any Offeror/Bidder described herein that fails to provide the required information shall not receive an award unless a waiver of this requirement and the administrative policies and procedures establish to implement this section is granted by the City Manager, as applicable.

If this quote for goods or services is accepted by the City of Suffolk, Virginia the undersigned agrees that the requirements of the Code of Virginia Section §2.2-4311.2 have been met.

Please complete the following by checking the appropriate line that applies and providing the requested information.

A._____ Offeror/Bidder is a Virginia business entity organized and authorized to transact business in Virginia by the SCC and such vendor's Identification Number issued to it by the SCC is _____.

B._____Offeror/Bidder is an out-of-state (foreign) business entity that is authorized to transact business in Virginia by the SCC and such vendor's identification Number issued to it by the SCC is _____.

C._____Offeror/Bidder does not have an Identification Number issued to it by the SCC such vendor is not required to be authorized to transact business in Virginia by the SCC for the following reason(s):

Please attach additional sheets if you need to explain why such Offeror/Bidder is not required to be authorized to transact business in Virginia.

_____
Legal Name of Company (as listed on W-9)

_____
Legal Name of Offeror/Bidder

_____
Date

_____
Authorized Signature

_____
Print or Type Name and Title

RETURN THIS PAGE WITH COPIES OF DOCUMENTATION

EXCEPTION PAGE

EXCEPTIONS:
Provider must sign the appropriate statement below, as applicable:

( ) Provider understands and agrees to all terms, conditions, requirements, and specifications stated herein.

Firm: _____

Date: _____

( ) Provider takes exception to terms, conditions, requirements, or specifications stated herein (Provider must itemize all exceptions below, and return with this bid):

Firm: _____

Date: _____

Exceptions: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Providers should note that any exceptions taken from the stated terms and/or specifications may be cause for their submittal to be deemed "non-responsive", risking the rejection of their submittal.

NOTICE OF ESCROW OPTION

IF THIS IS A BID FOR CONSTRUCTION AS DEFINED IN VIRGINIA CODE SECTION 2.2-4334 IN THE AMOUNT OF $200,000.00, OR MORE, I/WE ELECT TO UTILIZE THE ESCROW ACCOUNT PROCEDURE DESCRIBED IN THE PROVISIONS OF THIS BID IF DETERMINED TO BE THE SUCCESSFUL LOW BIDDER(S) _____

(WRITE "YES" OR "NO")

INTEREST ON RETAINAGE

At the time the Contractor submits a bid, the Contractor shall have the option to use the escrow account procedure for utilization of City retained funds by so indicating in the space provided in the bid documents. In the event the Contractor elects to use the escrow account procedure, the "Escrow Agreement" form included in the Bid and Contract shall be executed and submitted to the City within 15 calendar days after notification of award of the bid. If the "Escrow Agreement" form is not submitted as noted herein before, the Contractor shall forfeit such rights to the use of the escrow account procedure. In order to have retained funds paid to an escrow agent, the Contractor, the escrow agent and the surety shall execute an "Escrow Agreement" form and submit same to the City for approval. The Contractor's escrow agent shall be a trust company, bank or savings and loan institution with its principal office located in the Commonwealth of Virginia. The "Escrow Agreement" form shall contain the complete address of the escrow agent and surety, and the executed "Escrow Agreement" will be authority for the City to make payment of retained funds to the escrow agent. After approving the agreement, the City will pay to the escrow agent the funds retained as provided herein except that funds retained for lack of progress or other deficiencies on the part of the Contractor will not be paid to the escrow agent. The escrow agent may, in accordance with the stipulations contained in the "Escrow Agreement", invest the funds paid into the escrow account and pay earnings on such investments to the Contractor or release the funds to the Contractor provided such funds are fully secured by approved securities.

Retained funds invested and securities held as collateral for retainage may be released only as and when directed by the City. When the final estimate is released for voucher, the City will direct the escrow agent to settle the escrow account by paying the Contractor or the City monies due them as determined by the City. The City reserves the right to recall retained funds and to release same to the surety upon receipt of written request from the Contractor or in the event of default.

This section shall be applicable only to contracts for $200,000.00, or more, for the construction of highways, roads, streets, bridges, parking lots, demolition, clearing, grading, excavating, paving, pile driving, miscellaneous drainage structures, and the installation of water, gas, sewer lines, and pumping stations.

This section shall not apply to contracts for construction for railroads, public transit systems, runways, dams, foundations, installation or maintenance of power systems for the generation and primary and secondary distribution of electric current ahead of the customer's meter, the installation or maintenance of telephone, telegraph, or signal systems for public utilities and the construction or maintenance of solid waste or recycling facilities and treatment plants.

If this contract includes payment of interest on retained funds, the contractor, exclusive of reasonable circumstances beyond the control of the contractor stated in the contract, shall pay the specified penalty for each day exceeding the completion date stated in the contract.

Any subcontract for such public project, which provides for similar progress payments shall be subject to the provisions of this section.

Bid Bond #_____

BID BOND

KNOW ALL MEN BY THOSE PRESENT: That we, the undersigned:

_____

_____as Principal, and _____

_____ as Surety, acknowledge ourselves held and firmly bound unto the City of Suffolk, Virginia, in the just and full sum of five percent (5%) of the maximum amount of accompanying bid for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

WHEREAS, the Principal has submitted a bid, dated _____, 20_____, for **Bennett's Creek Recreation Center Renovation, IFB #20083-AG.**

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a contract with the Obligee in accordance with such bid and give bond with good and sufficient surety for the faithful performance of such contract, or in the event of the failure of the Principal to enter into such contract and give such bond, if the Principal shall pay to the Obligee the difference, not to exceed the penalty hereof, between the amount specified in said bid and the amount for which the Obligee may legally contract with another party to perform the work covered by said bid, if the latter amount be in excess of the former, then this obligation shall be null and void, otherwise to remain in full force and effect. The General Conditions of the Contract Documents, Section C, Paragraph 11, Progress of Work, requires the Contract shall be executed within fifteen (15) calendar days from Notice of Award.

IN WITNESS WHEREOF, the parties hereto have caused their corporation names and seals, respectively, to be hereunto subscribed and affixed by their officers in that behalf duly authorized this _____ day of _____, 20_____.

_____

CONTRACTOR

BY _____

SEAL

ATTEST:

_____

_____

SURETY

BY_____

SEAL

ATTEST:

_____

_____

Resident Virginia Agent of Surety

Submit with Power of Attorney

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Section B

(To be filled out and returned by
the Successful Bidder after Notice of Award)

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INSURANCE REQUIREMENTS

The successful bidder shall procure, maintain, and provide proof of, insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the City by the bidder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall consist of all policies, endorsements, declaration pages, and certificates of insurance and shall be submitted fifteen (15) days prior to the commencement of work, and such coverage shall be maintained by the Offeror for the duration of the contract period; for occurrence policies. Claims made policies must be in force or that coverage purchased for three (3) years after delivery date.

a. General Liability

Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including Products/Completed Operations.

Minimum Limits:

$2,000,000 General Aggregate Limit
$2,000,000 Products & Completed Operations
$1,000,000 Personal and Advertising Injury
$1,000,000 Each Occurrence Limit
$50,000 Fire Damage Limit
$5,000 Medical Expense Limit

b. Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the offeror, his agents, representatives, employees or subcontractors.

Minimum Limits:

$1,000,000 Combined Single Limit
$1,000,000 Each Occurrence Limit
$5,000 Medical Expense Limit

c. Workers' Compensation

Limits as required by the Workers' Compensation Act of Virginia.
Employers Liability: $100,000 / $500,000 / $100,000

d. Umbrella/Excess Liability

$2,000,000 umbrella/excess liability coverage

e. Coverage Provisions

1. All deductibles or self-insured retention shall appear on the declaration pages, endorsements, and/or policies provided.

2. The City of Suffolk, its' officers/officials, employees, agents and volunteers shall be added as "additional insured" as their interests may appear. A copy of all endorsements, declaration pages, and policies that address additional insured shall be provided. This provision does not apply to Professional Liability or Workers' Compensation/Employers' Liability.

3. The bidder's insurance shall be primary over any applicable insurance or self-insurance maintained by the City.

4. Shall provide thirty (30) days written notice to the City before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.

5. All coverage for subcontractors of the Offeror shall be subject to all of the requirements stated herein.

6. Failure to comply with any reporting provisions of the policy(s) shall not affect coverage provided the City, its officers/officials, agents, employees and volunteers.

7. The insurer shall agree to waive all rights of subrogation against the City, its officers/officials, agents, employees or volunteers for any act, omission or condition of premises which the parties may be held liable by reason of negligence.

8. The Offeror shall furnish the City with all certificates of insurance, endorsements, declaration pages, and policies affecting coverage. All documents are to be signed by a person authorized by the insurance company(s) to bind coverage on its behalf, if executed by a broker, notarized copy of authorization to bind, or certify coverage must be attached.

9. All insurance shall be placed with insurers maintaining an A.M. Best rating of no less than an A:VII. If A.M. Best rating is less than A:VII, approval must be received from City's Risk Officer.

10. All coverage designated herein shall be as broad as the Insurance Services Office (ISO) forms filed for use with the Commonwealth of Virginia.

Performance Bond #_____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned _____ _____, as Principal, and _____, as Surety, acknowledge ourselves held and firmly bound unto the City of Suffolk, Virginia as Obligee, in the amount of _____ dollars, _____for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

WHEREAS, the said _____

did, on the _____ day of _____, 20_____, enter into a contract with the City of Suffolk, Virginia for the **Bennett's Creek Recreation Center Renovation, IFB # 20083-AG,** which said contract is by reference made a part hereof, is hereinafter referred to as the Contract.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall in all respects promptly and faithfully comply with and fulfill all the terms and conditions of said contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any change, alteration or addition to the terms of the Contract or extension of time made by the Owner.

Whenever principal shall be, and declared by Obligee to be in default under the Contract, the Surety may promptly remedy the default, or shall promptly

1. Complete the Contract in accordance with its terms and conditions, or
2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Obligee elects, upon determination by the Obligee and Surety jointly of the lowest

responsible bidder, arrange for a contract between such bidder and Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by the Obligee to principal under the Contract and any amendments thereto, less the amount properly paid by Obligee to principal.

It is hereby expressly further understood and agreed that this Bond is also given and made against defective material and workmanship in the said work covered by the said Contract, provided, however, that no suit, action or proceeding, by reason of any defect whatever, shall be brought upon this Bond after one (1) year following (i) completion of the contract, including the expiration of all warranties and guarantees, or (ii) discovery of the defect or breach of warranty, if the action be for such.

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

SIGNED AND SEALED this _____ day of _____, 20_____.

_____
CONTRACTOR

BY _____
Signature of Authorized
Owner, Partner or Officer

_____
SURETY

BY _____
Attorney In Fact

Attach Original Power of Attorney

Labor & Material Bond #_____

LABOR AND MATERIAL PAYMENT BOND

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

_____, as Principal, and

_____, as Surety,

acknowledge ourselves held and firmly bound unto the City of Suffolk, Virginia as Obligee in the amount of _____Dollars (_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

WHEREAS, the said _____ did, on the _____ day of _____, 20_____, enter into a contract with the City of Suffolk, Virginia, for the **Bennett's Creek Recreation Center Renovation, IFB #20083-AG,** which said contract is by reference made a part hereof, as fully and is hereinafter referred to as the Contract.

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

1. A claimant is defined as one having a direct contract with the Principal or with a subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to also include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above-named Principal and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond

for such sum or sums as may be justly due claimant, and have execution thereon. The City shall not be liable for the payment of any costs or expenses of any such suit.

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

A. Unless claimant, other than one having a direct contract with the Principal, shall have given written notice of the following: The Principal, the City, and the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or for whom the work or labor was done or performed.

Such notice shall be served by mailing the same by registered or certified mail, postage prepaid, in an envelope addressed to the Principal, City and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

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

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

4. The amount of this bond shall be reduced by and to the extent of any payment or payments

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

SIGNED AND SEALED this _____ day of _____, 20_____.

_____
Contractor

BY _____

ATTEST:

_____

_____
Surety

BY _____
ATTORNEY-IN-FACT

_____
Resident Virginia Agent of Surety
(if original agent is non-resident)

Submit with Power of Attorney

CITY OF SUFFOLK

CONSTRUCTION CONTRACT ESCROW AGREEMENT

THIS AGREEMENT, made and entered into this ____ day of _____, 20___, by, between and among the City of Suffolk (City), _____ _____(Contractor), _____ (Name of Bank), _____ _____ (Address of Bank), a trust company, bank, or savings and loan institution with its principal office located in the Commonwealth (hereinafter referred to collectively as "Bank") and _____ _____ ("Surety") provides:

I.

The City and the Contractor have entered into a contract with respect to: **Bennett's Creek Recreation Center Renovation, IFB # 20083-AG** ("**the CONTRACT**"). This Agreement is pursuant to, but in no way amends or modifies the contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.

II.

In order to assure full and satisfactory performance by the Contractor of its obligations under the contract, the City is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the City, elected to have these retained amounts held in escrow by the Bank. This agreement sets forth the terms of the escrow. The Bank shall not be deemed a party to, bound by, or required to inquire into the terms of, the contract or any other instrument or agreement between the City and the Contractor.

III.

The City shall from time to time pursuant to its contract pay to the Bank amounts retained by it under the contract. Except as to amounts actually withdrawn from escrow by the City, the Contractor shall look solely to the Bank for the payment of funds retained under the contract and paid by the City to the Bank.

The risk of loss by diminution of the principal of any funds invested under the terms of this contract shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge,

discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

IV.

Upon receipt of checks drawn by the City and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Bank invest the escrowed funds in any security not approved.

V.

The following securities, and none other, are approved securities for all purposes of this Agreement.

1. United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills,

2. Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,

3. Bonds or notes of the Commonwealth of Virginia,

4. Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A", and

5. Certificates of deposit issued by commercial banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates.

6. Any bonds, notes, or other evidences of indebtedness listed in Sections (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than $25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder which matures more than five years after the date of its purchase by the Bank or deposit by the Contractor.

VI.

The Contractor may from time to time withdraw the whole or any portion of the escrow funds by depositing with the Bank approved securities in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Bank. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the City Manager, Director of Finance, Director of Engineering, or Director of Public Utilities, the Bank shall pay the principal of the fund, or any specified amount thereof, to the City. Such payment shall be made in cash as soon as is practicable after receipt of the direction.

Upon receipt of a direction signed by the City Manager, Director of Finance, Director of Engineering, or Director of Public Utilities, the Bank shall pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

VII.

For its services hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

VIII.

The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Bank's fee or any other costs of administration such income shall be deemed a part of the principal of the fund.

IX.

The Surety undertakes no obligation hereby but joins in this Agreement for the sole purpose of acknowledging that its obligations as surety for the Contractor's performance of the contract are not affected hereby.

WITNESS the following signatures, all as of the day and year first above written.

CITY OF SUFFOLK

BY _____

CITY MANAGER

ATTEST:

_____

CITY CLERK

_____

CONTRACTOR

BY _____

OFFICER, PARTNER OR OWNER

_____

BANK

BY _____

PRESIDENT/VICE-PRESIDENT

_____

SURETY

BY _____

ATTORNEY-IN-FACT

CONTRACT

THIS AGREEMENT, made and entered into this, the _____ day of _____ , 20_____, by and between the City of Suffolk, Virginia, a Municipal Corporation, whose principal office is the Suffolk City Hall, 442 W. Washington Street, Suffolk, VA 23434, hereinafter called **"OWNER"**, party of the first part, and _____, with an office located at _____hereinafter referred to as **"CONTRACTOR"**, party of the second part.

The CONTRACTOR did on the _____ day of _____ , 20_____, submit a sealed bid to perform the services stipulated in accordance with specifications and conditions entitled **Bennnett's Creek Recreation Center Renovation, IFB #20083-AG,** hereinafter referred to as **"PROJECT"**, which by reference is made a part hereof.

It is mutually understood and agreed by the parties hereto that the Invitation to Bid inviting Contractors to bid as published; the Conditions of Contract (General, Special, Supplemental and other conditions as they may be titled); the General and Detailed Drawings and Specifications; the Bid; the Performance Bond; all addendums; the Labor and Materials Payment Bond; the Anti-collusion/Nondiscrimination/Drug Free Workplace Clauses; all of the proceedings by the governing body of the OWNER pertaining to the subject matter of this Contract; and all of which documents are hereinafter referred to as Contract Documents and are a part of this Contract by reference the same as if each had been fully set out and attached hereto.

In consideration of the following mutual agreements and covenants to be kept by each party:

A. The CONTRACTOR agrees to furnish and pay for all labor, tools, equipment, machinery, supplies, facilities, superintendence, insurance, taxes, utilities and services necessary to perform all items set forth in the Contract Documents for a sum of $_____ subject to adjustment as provided in said documents.

B. The CONTRACTOR shall commence and complete the work with adequate force and equipment as specified in the Notice to Proceed. The CONTRACTOR shall fully guarantee his/her workmanship and materials furnished for a period of one (1) year following the date of final acceptance of the work. The Performance and Payment Bonds shall remain in full force for this one (1) year period. As a condition of final acceptance, the CONTRACTOR, shall have executed, and submit to the OWNER, the "Certificate of Final Completion" form that have been attached to these Contract Documents.

C. If said work is not Substantially Complete within **365** calendar days as stated in the Notice to Proceed, the Contractor shall be liable and hereby agrees to pay to the Owner as liquidated damages, and not as a penalty, the amount of **five hundred dollars ($500.00)** per calendar day for each and every part of a day thereafter that said work is not Substantially Complete. If said work is not fully completed within **30** calendar days after the date of Substantial Completion as stated in the Notice to Proceed, the Contractor shall be liable and hereby agrees to pay to the Owner as liquidated damages, and not as a penalty, the amount of **five hundred fifty dollars ($500.00)** per calendar day for each and every part of a day thereafter that said work remains incomplete. The City reserves the right, at its sole discretion, to deduct liquidated damages from any outstanding amount due the Contractor.

D. Monthly payments for work completed under this contract shall be made in strict accordance with the project specifications and any special conditions attached thereto. The OWNER shall retain five (5) percent of the amount of each payment until final completion and acceptance of all work covered by the Contract Documents.

E. It is understood and agreed that all work shall be accomplished in strict compliance with the provisions of the Contract Documents. It is understood and agreed by both the City and the Contractor that any modifications or additions to this contract shall be made only by the full execution of the OWNER's standard Contract Change Order Form. Furthermore, it is understood and agreed by both parties that any work done by the CONTRACTOR on any such modification or addition to this contract prior to the OWNER's execution of its standard Contract Change Order form shall be at the total risk of the CONTRACTOR and said work shall not be compensated by the OWNER.

F. Any notice, demand, or request by or made pursuant to this CONTRACT shall be deemed properly made is personally delivered in writing or deposited in the United States mail, postage prepaid, to the representative specified below or as otherwise designated in writing and mutually agreed.

Owner: Jay Smigielski
Purchasing Agent
442 W. Washington Street, Room 1086
Suffolk, Virginia 23434

With a copy to: Mr. Patrick G. Roberts
City Manager
442 W. Washington Street
Suffolk, Virginia 23434

Contractor: <Name of Signatory>
<Title>
<Address>
<City, State, Zip>

The Owner's point of contact for this contract is <Name, Title, Telephone Number, Email> or as otherwise designated in writing.

The Consultant's point of contact for this contract is <Name, Title, Telephone Number, Email> or as otherwise designated in writing and accepted by the City in writing.

The contract number is 20083. The contract number should be referenced on all invoices, documents and correspondence.

Nothing contained in this paragraph shall be construed to restrict the transmission of routine communications between representatives of the Consultant and the City.

SIGNATURE PAGE FOLLOWS

IN WITNESS WHEREOF, the parties hereto have executed and sealed this AGREEMENT as of the day and year first above written.

CITY OF SUFFOLK, VA

BY: _____
Patrick Roberts
City Manager

ATTEST:

BY: _____
Erika S. Dawley
City Clerk

CONTRACTOR

BY: _____

ATTEST:

BY: _____

Print Name :_____

Title: _____

APPROVED AS TO FORM

BY: _____
Sean P. Dolan
Assistant City Attorney II

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Section C

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CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Name:			
Project No:	Other:		
Contract Completion Date:			
Contractor:			
Owner: **City of Suffolk, Virginia**			
This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:			
TO WIT: The Owner and Contractor are hereby advised that the Work to which this certificate applies has been inspected by authorized representatives of the Owner, Contractor, and Architect/engineer, and that all Work is hereby declared to be substantially complete in accordance with the Contract Documents on:			
Date of Substantial Completion			
A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all items of the Work in accordance with the Contract Documents. When this certificate applies to a specified part of the Work, the items in this tentative list shall be completed or corrected by the CONTRACTOR within _____ Calendar Days of the above date of substantial completion. **The date of substantial completion is the date which all guarantees and warranties begin**, except as follows:			
This certificate is issued, accepted, and acknowledged by:			
Architect/engineer	**By**	**Title**	**Date**
Contractor	**By**	**Title**	**Date**
City of Suffolk, VA			
Owner	**By**	**Title**	**Date**

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CERTIFICATE OF FINAL COMPLETION

Project Name:	
Project No:	Other:
Contract Completion Date:	
Contractor:	
Owner: **City of Suffolk, Virginia**	
This Certificate of Final Completion applies to all Work under the Contract Documents or to the following specified parts thereof:	
TO WIT: The Owner and Contractor are hereby advised that the Work to which this certificate applies has been inspected by authorized representatives of the Owner, Contractor, and Architect/engineer, and that all Work is hereby declared to be finally complete in accordance with the Contract Documents on:	
Date of Final Completion	
The date of Final completion is the date which all guarantees and warranties begin.	
This certificate is issued, accepted, and acknowledged by:	

Architect/engineer	**By**	**Title**	**Date**
Contractor	**By**	**Title**	**Date**
City of Suffolk, VA	**By**	**Title**	**Date**
Owner			

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GENERAL CONDITIONS

Rev: 12/12/2018

1. **DEFINITION OF TERMS**:

(A) THE "CONTRACT DOCUMENTS" SHALL CONSIST OF THE ITEMS IDENTIFIED IN SECTIONS A, B AND C HEREIN, ADDENDA, NOTICE OF AWARD, NOTICE TO PROCEED, INCLUDING ALL MODIFICATIONS THERETO INCORPORATED IN ANY OF THE DOCUMENTS BEFORE AND AFTER EXECUTION OF THE AGREEMENT.

(B) THE WORD "OWNER" IS USED TO DESIGNATE THE DULY CONSTITUTED MUNICIPAL GOVERNMENT OF THE CITY OF SUFFOLK, VIRGINIA, ACTING THROUGH THE PROPERLY AUTHORIZED REPRESENTATIVES.

(C) THE WORD "ARCHITECT/ENGINEER" SHALL MEAN THE ARCHITECT/ENGINEER DESIGNATED BY THE OWNER, WHETHER ACTING DIRECTLY OR THROUGH PROPERLY AUTHORIZED AGENTS, INSPECTORS OR REPRESENTATIVES OF THE ARCHITECT/ENGINEER, ACTING WITHIN THE SCOPE OF DUTIES ENTRUSTED TO THEM. IN THE EVENT THE OWNER SHOULD NOT REQUIRE THE SERVICES OF THE ARCHITECT/ENGINEER FOR CONTRACT ADMINISTRATION OR INSPECTIONS, THEN THE POWERS, DUTIES, AND RESPONSIBILITIES CONFERRED HEREIN TO THE ARCHITECT/ENGINEER SHALL BE CONSTRUED TO BE THOSE OF THE OWNER.

(D) THE WORD "BIDDER" SHALL BE USED TO DESIGNATE ANY PARTY OR PARTIES SUBMITTING IN PROPER FORM A BID TO PERFORM THE WORK HEREINAFTER SPECIFIED. THE SUCCESSFUL BIDDER, SELECTED BY THE OWNER TO PERFORM THE WORK SPECIFIED, WILL THEREAFTER BE KNOWN AS THE “BIDDER.”

(E) THE WORD "BIDDER" IS USED TO DESIGNATE THE PARTY OR PARTIES CONTRACTING TO PERFORM THE WORK OR HIS OR THEIR HEIRS, EXECUTORS, ADMINISTRATORS, SUCCESSORS, OR ASSIGNS.

(F) THE WORD "SUPERINTENDENT" SHALL BE USED TO DESIGNATE THE PERSON APPOINTED BY THE BIDDER, ACTING UNDER HIS INSTRUCTIONS AND IN DIRECT CHARGE OF THE WORK FOR THE BIDDER.

(G) THE TERM "SUBBIDDER" SHALL MEAN ANY INDIVIDUAL, FIRM OR CORPORATION HAVING A DIRECT CONTRACT, WITH THE BIDDER OR WITH ANY OTHER SUBBIDDER FOR PERFORMANCE OF ANY PART OF THE WORK.

(H) THE TERM "WORK" SHALL INCLUDE LABOR, MATERIALS, EQUIPMENT, TRANSPORTATION, SUPERVISION, OR OTHER FACILITIES, DUTIES, OR INCIDENTALS NECESSARY TO COMPLETE THE PROJECT IN COMPLIANCE WITH THE TERMS OF THE CONTRACT DOCUMENTS.

(I) THE WORD "PROJECT" SHALL MEAN THE ENTIRE CONSTRUCTION TO BE PERFORMED AS PROVIDED IN THE CONTRACT DOCUMENTS.

(J) "PROJECT AREA" SHALL MEAN THE AREA WHERE WORK IS BEING PERFORMED FOR THE CITY OF SUFFOLK, VIRGINIA.

(K) "WRITTEN NOTICE" SHALL BE DEEMED TO HAVE BEEN DULY SERVED IF DELIVERED IN PERSON TO THE INDIVIDUAL OR TO A MEMBER OF THE FIRM OR TO AN OFFICER OF THE CORPORATION FOR WHOM IT IS INTENDED, OR IF DELIVERED AT OR SENT BY REGISTERED MAIL TO THE LAST BUSINESS ADDRESS KNOWN TO HIM WHO GIVES THE NOTICE.

(L) THE WORDS "AS DIRECTED," "AS REQUIRED," "AS PERMITTED," "AS ALLOWED," OR PHRASES OF LIKE EFFECT OR IMPORT AS USED HEREIN SHALL MEAN THAT THE DIRECTION, REQUIREMENT, PERMISSION OR ALLOWANCE OF THE ARCHITECT/ENGINEER OR OWNER IS INTENDED, AND SIMILARLY THE WORDS "ACCEPTED," "APPROVED," "REASONABLE," "SUITABLE," "PROPERLY," "SATISFACTORY," OR WORDS OF LIKE EFFECT OR IMPORT, UNLESS OTHERWISE PARTICULARLY SPECIFIED HERE, SHALL MEAN ACCEPTABLE, APPROVED, REASONABLE, SUITABLE, PROPERLY OR SATISFACTORY IN THE JUDGMENT OF THE ARCHITECT/ENGINEER OR OWNER.

(M) THE WORD "ADDENDUM" SHALL MEAN A MODIFICATION OF THE CONTRACT DOCUMENTS ISSUED IN WRITING BY THE ARCHITECT/ENGINEER OR OWNER PRIOR TO THE OPENING OF THE BIDS.

(N) THE TERM "CHANGE ORDER" SHALL MEAN A MODIFICATION OF THE CONTRACT REQUIREMENTS ISSUED IN WRITING BY THE OWNER SUBSEQUENT TO THE FORMAL EXECUTION OF THE CONTRACT DOCUMENTS.

(O) ALL TIME LIMITS STATED IN THE CONTRACT DOCUMENTS ARE OF THE ESSENCE OF THE CONTRACT. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL "DAYS" SHALL BE CONSTRUED TO MEAN CALENDAR DAYS.

(P) THE WORDS "SUBSTANTIAL COMPLETION" SHALL MEAN THE WORK (OR A SPECIFIED PORTION THEREOF) HAS PROGRESSED TO THE POINT WHERE, IN THE OPINION OF THE ARCHITECT/ENGINEER, IT IS SUFFICIENTLY COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, SO THAT THE WORK CAN BE UTILIZED FOR THE PURPOSES FOR WHICH IT WAS INTENDED.

(Q) THE TERM "OR APPROVED EQUAL" PERTAINS TO THE USE OF MATERIALS CURRENTLY ACCEPTED BY THE DEPARTMENTS OF PUBLIC UTILITIES AND PUBLIC WORKS. ITEMS NOT CURRENTLY ACCEPTED MUST BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO INCORPORATION IN THE WORK.

(R) THE TERM "FORCE ACCOUNT" SHALL MEAN WORK NOT SHOWN ON THE PLANS OR REQUIRED BY THE CONTRACT DOCUMENTS THAT IS NECESSARY FOR THE COMPLETION OF THE CONTRACT, WHICH SHALL BE CONSIDERED ADDITIONAL WORK AND WILL BE PAID FOR IN THE MANNER SET FORTH HEREINAFTER.

(S) THE TERM "FIELD ORDER" SHALL MEAN A WRITTEN ORDER ISSUED BY ARCHITECT/ENGINEER WHICH ORDERS MINOR CHANGES IN THE WORK WHICH ARE COMPATIBLE WITH THE DESIGN CONCEPT OF THE COMPLETED PROJECT AS A FUNCTIONING WHOLE AS INDICATED BY THE CONTRACT DOCUMENTS BUT WHICH DOES NOT INVOLVE A CHANGE IN CONTRACT PRICE OR THE CONTRACT TIMES.

(T) THE TERM "SIGNIFICANT CHANGE" SHALL MEAN A CHANGE IN CONTRACT PRICE OR THE CONTRACT TIMES. WHEN THE CHARACTER OF THE WORK AS ALTERED DIFFERS MATERIALLY IN KIND OR NATURE FROM THAT INVOLVED OR INCLUDED IN THE ORIGINAL PROPOSED CONSTRUCTION.

(U) THE TERM “NOTICE TO PROCEED’ SHALL MEAN THE DATE THE BIDDER WILL BEGIN THE WORK. CONTRACT TIME WILL COMMENCE ON THE DATE OF THE NOTICE TO PROCEED.

2. **EXECUTION, CORRELATION, AND INTENT OF CONTRACT DOCUMENTS**: THE CONTRACT DOCUMENTS SHALL BE EXECUTED BY THE OWNER AND THE BIDDER IN SUCH NUMBERS AS REQUIRED BY THE OWNER.

THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS CALLED FOR BY ANY ONE SHALL BE AS BINDING AS IF CALLED FOR BY ALL. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS, EQUIPMENT, AND SUPPLIES NECESSARY FOR THE PROPER EXECUTION OF THE WORK. IT IS NOT INTENDED, HOWEVER, THAT MATERIALS OR WORK NOT COVERED BY OR PROPERLY INFERABLE FROM ANY HEADING, BRANCH, CLASS, OR TRADE OF THE SPECIFICATIONS SHALL BE SUPPLIED UNLESS DISTINCTLY SO NOTED ON THE DRAWINGS. MATERIALS OR WORK DESCRIBED IN WORDS WHICH SO APPLIED HAVE A WELL-KNOWN TECHNICAL OR TRADE MEANING SHALL BE HELD TO REFER TO SUCH RECOGNIZED STANDARDS. THE DESIGNATION "ARCHITECTURAL," STRUCTURAL," ELECTRICAL," AND THE LIKE, IN THE DRAWING TITLES ARE PROVIDED FOR CONVENIENCE ONLY, AND ARE NOT INTENDED TO DEFINE THE WORK TO BE DONE BY ANY TRADES OR SUBBIDDERS.

3. **BIDDER'S UNDERSTANDING**: IT IS UNDERSTOOD AND AGREED THAT THE BIDDER HAS, BY CAREFUL EXAMINATION, SATISFIED HIMSELF AS TO THE NATURE AND LOCATION OF THE WORK, THE CONFORMATION OF THE GROUND, THE CHARACTER, EQUIPMENT AND FACILITIES NEEDED PRELIMINARY TO AND DURING THE PROSECUTION OF THE WORK, THE GENERAL AND LOCAL CONDITIONS, AND ALL OTHER MATTERS WHICH CAN IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT. NO VERBAL AGREEMENT OR CONVERSATION WITH ANY OFFICER, AGENT OR EMPLOYEE OF THE OWNER, EITHER BEFORE OR AFTER THE EXECUTION OF THIS CONTRACT, SHALL AFFECT OR MODIFY ANY OF THE TERMS OR OBLIGATIONS HEREIN CONTAINED.

THE SUBMISSION OF A BID SHALL BE PRIMA FACIE EVIDENCE THAT THE BIDDER THOROUGHLY UNDERSTANDS THE DRAWINGS, TERMS OF THE SPECIFICATIONS, AND HAS MADE HIMSELF FAMILIAR WITH ALL FEDERAL AND STATE LAWS, LOCAL LAWS, ORDINANCES, AND REGULATIONS WHICH IN ANY MANNER AFFECT THE WORK OR ITS PROSECUTION.

4. **CONSTRUCTION STANDARDS**: THE BIDDER WILL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE BUILDING CODES AND STANDARDS AND ALL CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH ALL GENERALLY ACCEPTED INDUSTRY STANDARDS. CONSTRUCTION STANDARDS SHALL INCLUDE, BUT ARE NOT LIMITED TO THE LATEST EDITION, AND ALL REVISIONS THERETO, OF THE FOLLOWING: BASIC BUILDING CODE - BUILDING OFFICIALS AND CODE ADMINISTRATION (BOCA), VIRGINIA UNIFORM STATEWIDE BUILDING CODE, AND VIRGINIA DEPARTMENT OF TRANSPORTATION'S (VDOT) ROAD AND BRIDGE SPECIFICATIONS DATED 2016; ROAD AND BRIDGE STANDARDS DATED 2016; WORK AREA PROTECTION MANUAL DATED JANUARY, 2011; COMMONWEALTH OF VIRGINIA/STATE BOARD OF HEALTH – WATERWORKS REGULATIONS; AMERICAN WATER WORKS ASSOCIATION; CITY OF SUFFOLK, DEPARTMENT OF PUBLIC UTILITIES PUBLIC FACILITIES MANUAL. SHOULD CONFLICTS OCCUR WITH THE STANDARDS AND THE SPECIFICATIONS SET FORTH HEREIN, THE BIDDER SHALL NOTIFY THE ARCHITECT/ENGINEER AND THE OWNER SHALL DETERMINE WHICH SHALL BE APPLICABLE. GENERALLY THE MORE RESTRICTIVE SHALL APPLY AND WAIVER OF ANY REQUIREMENTS SET FORTH BY THE STANDARDS WILL BE AT THE DISCRETION OF THE OWNER.

5. **DETAILED DRAWINGS AND INSTRUCTIONS**: THE ARCHITECT/ENGINEER SHALL FURNISH WITH REASONABLE PROMPTNESS, ADDITIONAL INSTRUCTION, BY MEANS OF DRAWINGS OR OTHERWISE, NECESSARY FOR THE PROPER EXECUTION OF THE WORK. ALL SUCH DRAWINGS AND INSTRUCTIONS SHALL BE CONSISTENT WITH THE CONTRACT DOCUMENTS. WHERE SIZES ARE NOT MARKED PLAINLY ON THE DRAWINGS, THE SIZE OF CORRESPONDING PARTS MAY BE FOLLOWED, OR THE ARCHITECT/ENGINEER WILL DETERMINE THE SIZES WHEN DIMENSIONS ARE ENTIRELY OMITTED.

   THE BIDDER SHALL VERIFY ALL FIGURES ON THE PLANS AND WILL BE RESPONSIBLE FOR THE PROPER COORDINATION OF ALL DIMENSIONS AS WELL AS THE DIFFERENT PARTS OF THE WORK.

6. **SHOP DRAWINGS**:

   (A) THE TERM "SHOP DRAWINGS," AS USED HEREIN SHALL INCLUDE FABRICATION, ERECTION AND SETTING DRAWINGS, MANUFACTURERS' STANDARD DRAWINGS, SCHEDULES, DESCRIPTIVE LITERATURE, CATALOGS, BROCHURES, PERFORMANCE AND TEST DATA, WIRING AND CONTROL DIAGRAMS AND ALL OTHER DESCRIPTIVE DATA PERTAINING TO THE MATERIALS AND EQUIPMENT AS REQUIRED TO DEMONSTRATE COMPLIANCE WITH THE CONTRACT REQUIREMENTS.

   (B) THE BIDDER SHALL SUBMIT FOR THE APPROVAL OF THE ARCHITECT/ENGINEER ALL SHOP DRAWINGS REQUIRED BY THE SPECIFICATIONS OR REQUESTED BY THE ARCHITECT/ENGINEER. ALL SUCH SUBMISSIONS SHALL BE MADE WITH SUCH PROMPTNESS AS TO CAUSE NO DELAY IN THIS OR ANY OTHER BIDDER ON THE PROJECT, AND TO ALLOW REASONABLE TIME FOR REVIEW.

(C) UNLESS OTHERWISE DIRECTED, SHOP DRAWING SUBMITTALS MAY BE MADE TO THE ARCHITECT/ENGINEER VIA ELECTRONIC TRANSFER METHODS (SUCH AS E-MAIL OR FTP), IN LIEU OF PAPER COPIES. ELECTRONIC SUBMITTALS SHALL BE PROVIDED IN AN ADOBE® PDF FORMAT, BE OF LEGIBLE RESOLUTION AND CLARITY (600 DPI), AND SHALL CONFORM TO THE INFORMATIONAL REQUIREMENTS STATED HEREIN. SUBMITTALS MADE ELECTRONICALLY WILL REMAIN IN AN ELECTRONIC FORMAT, WITH NO HARD COPIES BEING PROVIDED, RETURNED OR REQUIRED. HARD COPY SHOP DRAWINGS SHALL BE SUBMITTED IN SUCH NUMBER OF COPIES THAT TWO (2) COPIES MAY BE RETAINED BY THE OWNER. EACH SUBMISSION SHALL BE ACCOMPANIED BY A LETTER OF TRANSMITTAL IN DUPLICATE, LISTING THE CONTENTS OF THE SUBMISSION AND IDENTIFYING EACH ITEM BY REFERENCE TO SPECIFICATION SECTION OR DRAWING. ALL SHOP DRAWINGS SHALL BE CLEARLY LABELED WITH THE NAME OF THE PROJECT AND OTHER NECESSARY INFORMATION. CATALOG PLATES AND OTHER SIMILAR MATERIAL THAT CANNOT BE SO LABELED CONVENIENTLY, SHALL BE BOUND IN SUITABLE COVERS BEARING THE IDENTIFYING DATA.

(D) SHOP DRAWINGS SHALL BE ACCOMPANIED BY ALL REQUIRED CERTIFICATIONS AND OTHER SUCH SUPPORTING MATERIAL, AND SHALL BE SUBMITTED IN SUCH SEQUENCE OR IN SUCH GROUPS THAT ALL RELATED ITEMS MAY BE REVIEWED TOGETHER. WHEN SHOP DRAWINGS CANNOT BE REVIEWED BECAUSE THE SUBMISSION IS NOT COMPLETE, OR BECAUSE SHOP DRAWINGS ON RELATED ITEMS HAVE NOT BEEN RECEIVED, THEN SUCH SHOP DRAWINGS WILL BE RETURNED WITHOUT ACTION OR WILL BE HELD, AND NOT REVIEWED, UNTIL THE LACKING MATERIAL IS RECEIVED.

(E) SHOP DRAWINGS SHALL HAVE BEEN CHECKED BY THE BIDDER AND COORDINATED WITH ALL OTHER RELATED OR AFFECTED WORK BEFORE THEY ARE SUBMITTED FOR APPROVAL, AND SHALL BEAR THE BIDDER'S CERTIFICATION THAT HE HAS CHECKED AND APPROVED THEM AS COMPLYING WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. SHOP DRAWINGS SUBMITTED WITHOUT SUCH CERTIFICATION AND COORDINATION WILL BE RETURNED TO THE BIDDER WITHOUT ACTION, AND WILL NOT BE CONSIDERED A FORMAL SUBMISSION.

(F) IF THE SHOP DRAWINGS SHOW VARIATIONS FROM THE DRAWINGS AND SPECIFICATIONS BECAUSE OF STANDARD SHOP PRACTICE OR OTHER REASONS, THE BIDDER SHALL MAKE SPECIFIC MENTION OF SUCH VARIATION IN HIS LETTER OF TRANSMITTAL IN ORDER THAT, IF ACCEPTABLE, SUITABLE ACTION MAY BE TAKEN FOR PROPER ADJUSTMENT; OTHERWISE, THE BIDDER WILL NOT BE RELIEVED OF THE RESPONSIBILITY FOR EXECUTING THE WORK IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS EVEN THOUGH SUCH SHOP DRAWINGS HAVE BEEN APPROVED.

(G) THE ARCHITECT/ENGINEER SHALL PASS ALONG THE SHOP DRAWINGS WITH REASONABLE PROMPTNESS. REVIEWING AND/OR APPROVAL OF SHOP DRAWINGS WILL BE GENERAL, FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS, AND WILL NOT INCLUDE QUANTITIES, DETAIL DIMENSIONS, NOR ADJUSTMENTS OF DIMENSIONS TO ACTUAL FIELD CONDITIONS. APPROVAL SHALL NOT BE CONSTRUED AS PERMITTING ANY DEPARTURE FROM CONTRACT REQUIREMENTS, AUTHORIZATION OF ANY INCREASE IN PRICE NOR AS RELIEVING THE BIDDER OF THE RESPONSIBILITY FOR ANY ERROR IN DETAILS, DIMENSIONS OR OTHERWISE THAT MAY EXIST.

7. **DISCREPANCIES**: ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SPECIFICATIONS AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN THE DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT/ENGINEER, IN WRITING, WHO SHALL PROMPTLY CORRECT SUCH INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE BIDDER AFTER HIS DISCOVERY OF SUCH DISCREPANCIES, INCONSISTENCIES OR AMBIGUITIES SHALL BE DONE AT THE BIDDER'S RISK.

   IF THE BIDDER, IN THE COURSE OF THE WORK, FINDS ANY DISCREPANCY BETWEEN THE DRAWINGS AND THE PHYSICAL CONDITIONS OF THE LOCALITY, OR ANY ERRORS, OR OMISSIONS IN DRAWINGS OR IN THE LAYOUT AS GIVEN BY POINTS AND INSTRUCTIONS, IT SHALL BE HIS DUTY TO IMMEDIATELY INFORM THE ARCHITECT/ENGINEER AND THE OWNER IN WRITING, AND THE ARCHITECT/ENGINEER AND OWNER SHALL PROMPTLY VERIFY THE SAME. ANY WORK DONE AFTER SUCH DISCOVERY, UNTIL AUTHORIZED, WILL BE DONE AT THE BIDDER'S RISK AND EXPENSE.

8. **COPIES OF DRAWINGS FURNISHED**: THE ARCHITECT/ENGINEER WILL FURNISH TO THE BIDDER, FREE OF CHARGE, FIVE (5) COPIES OF DRAWINGS AND PROJECT MANUAL NECESSARY FOR EXECUTION OF THE WORK. ADDITIONAL COPIES MAY BE PURCHASED BY THE BIDDER FROM THE ARCHITECT/ENGINEER FOR $225.00 PER SET.

9. **OWNERSHIP OF DRAWINGS**: ALL DRAWINGS AND SPECIFICATIONS FURNISHED BY THE ARCHITECT/ENGINEER ARE PROPERTY OF THE OWNER. THEY ARE NOT TO BE USED ON OTHER WORK AND, WITH THE EXCEPTION OF THE SIGNED CONTRACT SET, ARE TO BE RETURNED TO THE OWNER ON REQUEST, AT THE COMPLETION OF THE WORK. ALL MODELS ARE THE PROPERTY OF THE OWNER.

10. **DRAWINGS AND PROJECT MANUAL ON THE WORK**: THE BIDDER SHALL KEEP ONE (1) COPY OF ALL DRAWINGS AND THE PROJECT MANUAL AT THE JOB SITE, IN GOOD ORDER, AVAILABLE TO THE OWNER
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11. **PROGRESS OF THE WORK**: IT IS UNDERSTOOD AND AGREED THAT THE BIDDER WILL EXECUTE THE AGREEMENT WITHIN FIFTEEN (15) CALENDAR DAYS AFTER WRITTEN NOTICE OF AWARD. THE BIDDER SHALL PROVIDE AN ADEQUATE FORCE OF LABOR AND EQUIPMENT TO PROSECUTE THE WORK AT AS MANY DIFFERENT POINTS AS MAY BE NECESSARY TO INSURE THE COMPLETION OF SAME WITHIN THE TIME LIMIT FOR THE COMPLETION AS SET FORTH IN THIS AGREEMENT.

THE BIDDER SHALL FURNISH A PROGRESS SCHEDULE, BASED ON A MINIMUM OF EIGHT (8) HOURS PER DAY UNLESS OTHERWISE MUTUALLY AGREED UPON, FOR APPROVAL BY THE OWNER AND THE ARCHITECT/ENGINEER. IT SHALL BE INCUMBENT UPON THE BIDDER TO PROVIDE THE MANPOWER, EQUIPMENT, AND PROJECT MANAGEMENT TO MAINTAIN THIS SCHEDULE. IN THE EVENT PERIODIC ESTIMATES INDICATE THE SCHEDULE IS NOT BEING MET, THE BIDDER MAY BE REQUIRED TO FURNISH IN WRITING TO THE ARCHITECT/ENGINEER THE METHOD HE PROPOSES TO EMPLOY TO RETURN THE PROJECT TO THE ORIGINAL SCHEDULE. THE OWNER MAY WITHHOLD PAYMENTS IF THE WORK IS NOT PROCEEDING IN ACCORDANCE WITH TERMS OF THIS AGREEMENT. ALL WORK SHALL BE FAITHFULLY UNDERTAKEN, PERFORMED AND COMPLETED WITHIN THE TIME DESIGNATED IN THE CONTRACT, AS TIME IS UNDERSTOOD TO BE THE ESSENCE OF THE CONTRACT.

DELAYS IN WORK RESULTING FROM THE BIDDER'S FAILURE TO PROVIDE THE PROGRESS SCHEDULE WILL NOT BE CONSIDERED JUST CAUSE FOR EXTENSION OF THE CONTRACT TIME LIMIT OR FOR ADDITIONAL COMPENSATION.

12. **ORDER OF COMPLETION**: THE BIDDER SHALL SUBMIT AT SUCH TIME AS MAY BE REQUESTED BY THE OWNER, SCHEDULES WHICH SHALL SHOW THE ORDER IN WHICH THE BIDDER WILL START THE SEVERAL PARTS OF THE WORK AND ESTIMATED DATES OF COMPLETION OF THE SEVERAL PARTS. WHEN APPROVED, SUCH SCHEDULE SHALL GOVERN THE WORK. THE OWNER RESERVES THE RIGHT TO ESTABLISH AN ORDER OF PRECEDENCE FOR THE COMPLETION OF THE WORK.

13. **SUPERINTENDENCE, SUPERVISION**: THE BIDDER SHALL KEEP ON HIS WORK DURING ITS PROGRESS A COMPETENT SUPERINTENDENT AND ANY NECESSARY ASSISTANTS, ALL SATISFACTORY TO THE OWNER. THE SUPERINTENDENT SHALL NOT BE CHANGED EXCEPT WITH THE CONSENT OF THE OWNER, UNLESS THE SUPERINTENDENT PROVES TO BE UNSATISFACTORY TO THE BIDDER AND CEASES TO BE IN HIS EMPLOY. THE SUPERINTENDENT SHALL REPRESENT THE BIDDER IN HIS ABSENCE AND ALL DIRECTIONS GIVEN TO HIM SHALL BE AS BINDING AS IF GIVEN TO THE BIDDER. IMPORTANT DIRECTIONS SHALL BE CONFIRMED UPON WRITTEN REQUEST IN EACH CASE. THE BIDDER SHALL GIVE EFFICIENT SUPERVISION TO THE WORK, USING HIS BEST SKILL AND ATTENTION.

14. **MATERIALS, APPLIANCES, EMPLOYEES**: UNLESS OTHERWISE STIPULATED, THE BIDDER SHALL PROVIDE AND PAY FOR ALL MATERIALS, LABOR, WATER, TOOLS, EQUIPMENT, LIGHT, POWER TRANSPORTATION, SANITARY FACILITIES, AND OTHER FACILITIES NECESSARY FOR THE EXECUTION AND COMPLETION OF THE WORK.

    UNLESS OTHERWISE SPECIFIED, ALL MATERIALS SHALL BE NEW AND BOTH WORKMANSHIP AND MATERIALS SHALL BE OF GOOD QUALITY. THE BIDDER SHALL, IF REQUIRED, FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS.

    THE CHARACTER, CONDITIONS, ADAPTABILITY, AND QUANTITY OF EQUIPMENT USED BY THE BIDDER SHALL BE SUCH AS MAY BE NECESSARY FOR THE PROPER

EXECUTION OF THE WORK WITHIN THE SPECIFIED WORKING TIME. THE EQUIPMENT USED SHALL BE MAINTAINED IN GOOD CONDITION AND SHALL BE SUBJECT TO APPROVAL OF THE OWNER PRIOR TO AND DURING ITS USE IN CONNECTION WITH THE WORK TO BE PERFORMED UNDER THIS CONTRACT.

BIDDER SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR SAFETY OF ALL PERSONS AND PROPERTY ON THE JOB SITE CONTINUOUSLY DURING THE PROGRESS OF WORK. SPECIFIC ATTENTION SHALL BE PAID TO OVERHEAD WORK AND EQUIPMENT; EQUIPMENT AND PROCEDURES TO BE OF THE TYPE APPROVED BY DOMINION VIRGINIA POWER, VERIZON, CHARTER COMMUNICATIONS, OSHA, THE NATIONAL ELECTRIC SAFETY CODE, VDOT, AND THE CITY OF SUFFOLK.

THE BIDDER SHALL AT ALL TIMES ENFORCE STRICT DISCIPLINE AND GOOD ORDER AMONG HIS EMPLOYEES. NO PERSON UNDER THE AGE OF EIGHTEEN (18) YEARS, NO PERSON WHO, AT THE TIME, IS SERVING A SENTENCE IN A PENAL OR CORRECTIONAL INSTITUTION, AND NO PERSON WHO HAS BEEN CONVICTED OF COMMISSION OF FRAUD OR A CRIMINAL OFFENSE IN CONNECTION WITH OBTAINING, ATTEMPTING TO OBTAIN, OR PERFORMING A PUBLIC CONTRACT OR SUBCONTRACT, SHALL BE EMPLOYED ON THE WORK COVERED BY THIS CONTRACT.

NEITHER PARTY SHALL EMPLOY OR HIRE ANY EMPLOYEES OF THE OTHER PARTY WITHOUT HIS CONSENT. THE BIDDER SHALL AT ALL TIMES ENFORCE STRICT DISCIPLINE AND GOOD ORDER AMONG HIS EMPLOYEES. IF THE BIDDER OR ANY OF HIS EMPLOYEES AT ANY TIME IN ANY WAY ABUSES PHYSICALLY OR VERBALLY ANY CITY EMPLOYEE ENGAGED IN PERFORMANCE OF HIS DUTIES WITH REFERENCE TO SUPERVISION OR INSPECTION OF THE PROJECT OR PERFORMANCE OF ANY OTHER DUTIES RELATED TO THE CITY, THE BIDDER MAY BE ORDERED BY THE CITY TO REMOVE HIS PERSON AND/OR ANY OF HIS EMPLOYEES ENGAGING IN SUCH CONDUCT FROM THE JOB SITE FOR THE DURATION OF THE CONTRACT. SHOULD THE BIDDER REFUSE TO DO SO, THE CONTRACT MAY IMMEDIATELY AND WITHOUT ADVANCE NOTICE TO SURETIES BE TERMINATED BY THE CITY.

15. **ROYALTIES AND PATENTS**: THE BIDDER SHALL PAY ROYALTIES AND LICENSE FEES. HE SHALL DEFEND ALL SUITS OR CLAIMS FOR THE INFRINGEMENT OF ANY PATENT RIGHTS AND SHALL SAVE THE OWNER HARMLESS FROM LOSS ON ACCOUNT THEREOF, EXCEPT THAT THE OWNER SHALL BE RESPONSIBLE FOR ALL SUCH LOSS WHEN A PARTICULAR PROCESS OR THE PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS SPECIFIED, BUT IF THE BIDDER HAS INFORMATION THAT THE PROCESS OR ARTICLE SPECIFIED IS INFRINGEMENT OF A PATENT, HE SHALL BE RESPONSIBLE FOR SUCH LOSS UNLESS HE PROMPTLY GIVES SUCH INFORMATION IN WRITING TO THE ARCHITECT/ENGINEER AND OWNER.

16. **SURVEYS, PERMITS, AND REGULATIONS**: PERMITS AND LICENSES NECESSARY FOR THE PROSECUTION OF THE WORK SHALL BE SECURED AND PAID FOR BY THE BIDDER, UNLESS OTHERWISE SECURED AND PAID FOR BY THE OWNER. EASEMENTS AND RIGHT-OF-WAY FOR PERMANENT STRUCTURES OR

PERMANENT CHANGES IN EXISTING FACILITIES SHALL BE SECURED AND PAID FOR BY THE OWNER, UNLESS OTHERWISE SPECIFIED.

THE BIDDER WILL HAVE IN HAND, ON SITE, AN APPROVED TRAFFIC CONTROL PLAN AND AN APPROVED RIGHT OF WAY PERMIT PRIOR TO COMMENCEMENT OF CONSTRUCTION. NO CONSTRUCTION WILL BE PERFORMED UNTIL THESE REQUIREMENTS ARE MET.

THE BIDDER SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, AND REGULATIONS BEARING ON THE CONDUCT OF THE WORK AS DRAWN AND SPECIFIED. IF THE BIDDER OBSERVES THAT THE DRAWINGS AND SPECIFICATIONS ARE AT VARIANCE THEREWITH, HE SHALL PROMPTLY NOTIFY THE ARCHITECT/ENGINEER AND OWNER IN WRITING, AND ANY NECESSARY CHANGES SHALL BE ADJUSTED AS PROVIDED IN THE CONTRACT FOR CHANGES IN THE WORK. IF THE BIDDER PERFORMS ANY WORK KNOWING IT TO BE CONTRARY TO SUCH LAWS, ORDINANCES, RULES AND REGULATIONS AND WITHOUT SUCH NOTICE TO THE ARCHITECT/ENGINEER AND OWNER, HE AGREES TO BEAR ALL COSTS AND PENALTIES ARISING THEREFROM.

UNLESS OTHERWISE SPECIFIED, THE OWNER SHALL FURNISH ALL LAND SURVEYS AND ESTABLISH ALL BASE LINES FOR LOCATING THE PRINCIPAL COMPONENT PARTS OF THE WORK TOGETHER WITH A SUITABLE NUMBER OF BENCH MARKS ADJACENT TO THE WORK. FROM THE INFORMATION PROVIDED BY THE OWNER, THE BIDDER SHALL DEVELOP AND MAKE ALL DETAIL SURVEYS NEEDED FOR CONSTRUCTION.

17. **POINTS AND INSTRUCTIONS**: THE BIDDER SHALL PROVIDE REASONABLE AND NECESSARY OPPORTUNITIES AND FACILITIES FOR SETTING POINTS AND MAKING MEASUREMENTS. HE SHALL NOT PROCEED UNTIL HE HAS MADE TIMELY DEMAND UPON THE OWNER FOR, AND HAS RECEIVED FROM HIM, SUCH POINTS AND INSTRUCTIONS AS MAY BE NECESSARY AS THE WORK PROGRESSES. THE WORK SHALL BE DONE IN STRICT CONFORMITY WITH SUCH POINTS AND INSTRUCTIONS.

18. **EXISTING STRUCTURES**: THE LOCATION OF EXISTING SEWERS, WATER AND GAS PIPES, CONDUITS AND OTHER STRUCTURES ACROSS OR ALONG THE LINE OF THE PROPOSED WORK ARE NOT NECESSARILY SHOWN ON THE PLANS, AND IF SHOWN, THE LOCATION, DEPTH AND DIMENSION OF SUCH STRUCTURE ARE ONLY APPROXIMATELY CORRECT. THE BIDDER SHALL HAVE A WORKING PIPE LOCATOR ON THE JOB AT ALL TIMES.

THE BIDDER SHALL DIG THE NECESSARY TEST HOLES FOR THE PURPOSE OF LOCATING EXISTING UNDERGROUND STRUCTURES. SUCH EXCAVATION SHALL NOT BE UNDERTAKEN WITHOUT FORTY-EIGHT (48) HOURS PRIOR NOTICE TO THE OWNER.

NO CLAIMS FOR DAMAGES OR EXTRA COMPENSATION SHALL ACCRUE TO THE BIDDER FROM THE PRESENCE OF SUCH PIPE OR OTHER OBSTRUCTION OR FROM ANY DELAY DUE TO REMOVAL OR REARRANGEMENT OF SAME.

19. **CARE OF EXISTING STRUCTURES**: THE BIDDER SHALL BE LIABLE FOR ALL DAMAGE DONE TO ANY STRUCTURES OR PROPERTY ARISING THROUGH HIS NEGLIGENCE OR CARELESSNESS. HE SHALL TAKE CARE OF AND MAINTAIN ALL UNDERGROUND, OVERHEAD OR SURFACE UTILITIES ENCOUNTERED IN THE PERFORMANCE OF THE WORK. PRIOR TO COMMENCING WORK, BIDDER SHALL CONTACT THE UTILITY INFORMATION CENTER ("MISS UTILITY"), TELEPHONE 811 FOR ASSISTANCE IN LOCATING EXISTING UNDERGROUND UTILITIES.

THE BIDDER SHALL OBSERVE ALL PRECAUTIONS WITH RESPECT TO FIRE AND AVOID THE INDISCRIMINATE MUTILATION, OR CUTTING DOWN OF TREES, WITHIN AND OUTSIDE OF PROJECT WORK AREAS OR EASEMENTS. ANY DAMAGE TO PROPERTY OR EASEMENTS NOT IN THE WORK AREA ARISING FROM THE BIDDER'S NEGLIGENCE OR CARELESSNESS IN PERFORMANCE OF THE WORK WILL BE THE BIDDER'S RESPONSIBILITY.

THE BIDDER SHALL NOT USE PRIVATE PROPERTY IN CONNECTION WITH THE WORK UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE PROPERTY OWNER. A COPY OF THE WRITTEN PERMISSION SHALL BE FURNISHED TO THE DEPARTMENT OF PUBLIC UTILITIES. THE WRITTEN STATEMENT OF PERMISSION SHALL ALSO INDICATE THE NAME, ADDRESS, AND PHONE NUMBER OF THE PROPERTY OWNER. IT WILL BE THE RESPONSIBILITY OF THE BIDDER TO TAKE PHOTOGRAPHS OF THE PROPERTY PRIOR TO ITS USE IN CASE OF DISPUTES ARISING FROM THE USE OF THE PROPERTY. VERIFICATION OF OWNERSHIP SHALL BE THE RESPONSIBILITY OF THE BIDDER.

20. **PROTECTION OF WORK AND PROPERTY**: THE BIDDER SHALL PROVIDE AND MAINTAIN ALL NECESSARY WATCHMEN, BARRICADES, LIGHTS AND WARNING SIGNS, AND TAKE ALL NECESSARY PRECAUTIONS FOR THE PROTECTION AND SAFETY OF THE PUBLIC. HE SHALL CONTINUOUSLY MAINTAIN ADEQUATE PROTECTION OF ALL WORK FROM DAMAGE AND SHALL TAKE ALL REASONABLE PRECAUTIONS TO PROTECT THE OWNER'S PROPERTY FROM INJURY OR LOSS ARISING IN CONNECTION WITH THIS CONTRACT. HE SHALL MAKE GOOD ANY DAMAGE, INJURY OR LOSS TO HIS WORK AND TO THE PROPERTY OF THE OWNER RESULTING FROM LACK OF REASONABLE PROTECTIVE PRECAUTIONS, EXCEPT SUCH AS MAY BE DUE TO ERRORS IN THE CONTRACT DOCUMENTS, OR CAUSED BY AGENT OR EMPLOYEES OF THE OWNER. HE SHALL ADEQUATELY PROTECT ADJACENT PRIVATE AND PUBLIC PROPERTY, AS PROVIDED BY LAW AND THE CONTRACT DOCUMENTS.

IN AN EMERGENCY AFFECTING THE SAFETY OF LIFE OR LOSS OR DAMAGE TO THE WORK OR TO THE ADJOINING PROPERTY, THE BIDDER WITHOUT SPECIAL INSTRUCTION OR AUTHORIZATION FROM THE ARCHITECT/ENGINEER OR OWNER, IS HEREBY PERMITTED TO ACT, AT HIS DISCRETION, TO PREVENT SUCH THREATENED LOSS OR INJURY, AND HE SHALL SO ACT, WITHOUT APPEAL AS IF INSTRUCTED OR AUTHORIZED. THE BIDDER SHALL PROVIDE WRITTEN DOCUMENTATION CONCERNING THE CIRCUMSTANCES OF THE EMERGENCY TO THE OWNER AS SOON AS PRACTICAL. ANY COMPENSATION, CLAIMED BY THE BIDDER ON ACCOUNT OF EMERGENCY WORK, SHALL BE DETERMINED BY AGREEMENT OR LITIGATION. IN CASE OF EMERGENCY IN WHICH THE BIDDER IS NOT AVAILABLE TO TAKE CORRECTIVE ACTION, THE OWNER RESERVES THE RIGHT TO CORRECT PROBLEMS AND THE BIDDER SHALL BE RESPONSIBLE FOR

ANY ASSOCIATED COST FOR CORRECTIVE ACTION REASONABLY RELATED TO HIS RESPONSIBILITIES UNDER THE CONTRACT.

THE BIDDER SHALL CAREFULLY PRESERVE BENCH MARKS, REFERENCE POINTS AND STAKES, AND IN CASE OF WILLFUL OR CARELESS DESTRUCTION, HE SHALL BE CHARGED WITH THE RESULTING EXPENSE AND SHALL BE RESPONSIBLE FOR ANY MISTAKES THAT MAY BE CAUSED BY THEIR UNNECESSARY LOSS OR DISTURBANCE.

21. **PROJECT COORDINATION**: THE BIDDER SHALL COORDINATE HIS CONSTRUCTION PLAN WITH THE DEPARTMENT OF PUBLIC UTILITIES AND WILL OBTAIN THEIR APPROVALS TO DATE OF WORK, PERMITS, TYPE OF TEMPORARY PATCHING, TRAFFIC CONTROL, TYPE AND PLACEMENT OF TRAFFIC CONTROLS, SAFETY DEVICES, AND FLAGMEN.

ANY WORK ON RAILWAY RIGHT-OF-WAY SHALL BE SCHEDULED AND APPROVED AT LEAST 48 HOURS IN ADVANCE OF THE WORK. INSOFAR AS THE SAFETY OF RAILROAD OPERATIONS IS CONCERNED, BIDDER WILL BE GOVERNED BY RAILWAY REQUIREMENTS REGARDING THE METHOD AND MANNER OF PERFORMING SAID WORK. RAILWAY SHALL FURNISH SUCH FLAGMAN AND WATCHMAN SERVICES AS MAY BE REQUIRED TO PROTECT RAILWAY FACILITIES DURING THE PROSECUTION OF THE WORK; THE CITY WILL REIMBURSE THE RAILWAY IN FULL FOR SUCH COSTS.

EXISTING CITY WATER AND SEWER VALVES MAY ONLY BE OPENED AND CLOSED BY OR UNDER THE DIRECT SUPERVISION OF DEPARTMENT OF PUBLIC UTILITIES OPERATIONS AND/OR PUBLIC UTILITIES ENGINEERING PERSONNEL. THE ONLY EXCEPTION IS AN EMERGENCY SITUATION AFFECTING PUBLIC HEALTH OR SAFETY IN WHICH CASE THE BIDDER WOULD ACT IN ACCORDANCE WITH ARTICLE 20. ANY BIDDER FOUND VIOLATING THIS PROVISION MAY BE SUBJECT TO PROSECUTION UNDER THE CODE OF SUFFOLK FOR TAMPERING WITH CITY PROPERTY.

22. **INSPECTION OF SITE AND WORK**: THE OWNER AND HIS REPRESENTATIVES SHALL AT ALL TIMES HAVE ACCESS TO THE WORK WHEREVER AND WHENEVER IT IS, IN PREPARATION OR PROGRESS, AND THE BIDDER SHALL PROVIDE FOR SUCH ACCESS AND FOR INSPECTION.

THE OWNER WILL APPOINT SUCH PERSON OR PERSONS AS HE MAY DEEM NECESSARY TO PROPERLY INSPECT THE MATERIALS FURNISHED AND WORK DONE UNDER THE CONTRACT, AND TO SEE THAT THE SAME STRICTLY CORRESPONDS WITH THE DRAWINGS AND SPECIFICATIONS. WORK AND MATERIALS WILL BE INSPECTED PROMPTLY, BUT IF, FOR ANY REASON DELAY SHOULD OCCUR, THE BIDDER SHALL HAVE NO CLAIM FOR DAMAGES OR EXTRA COMPENSATION.

THE FAILURE OF THE INSPECTOR TO REJECT OR CONDEMN IMPROPER MATERIALS AND WORKMANSHIP SHALL NOT PREVENT THE OWNER FROM REJECTING MATERIALS AND WORKMANSHIP FOUND DEFECTIVE AT ANY TIME PRIOR TO THE FINAL ACCEPTANCE OF THE COMPLETED WORK, NOR SHALL IT BE CONSIDERED AS A WAIVER OF ANY DEFECTS WHICH MAY BE DISCOVERED LATER, OR AS PREVENTING THE CITY AT ANY TIME PRIOR TO THE EXPIRATION

OF THE GUARANTEE PERIOD FROM RECOVERING DAMAGES FOR WORK ACTUALLY DEFECTIVE.

IF THE SPECIFICATIONS, OWNER'S INSTRUCTIONS, LAWS, ORDINANCES, OR ANY PUBLIC AUTHORITY REQUIRE ANY WORK TO BE SPECIFICALLY TESTED OR APPROVED, THE BIDDER SHALL GIVE THE OWNER TIMELY NOTICE OF ITS READINESS FOR INSPECTION AND, IF THE INSPECTION IS BY ANOTHER AUTHORITY THAN THE OWNER, OF THE DATE FIXED FOR SUCH INSPECTION. INSPECTIONS BY THE OWNER SHALL BE PROMPTLY MADE, AND WHERE PRACTICABLE AT THE SOURCE OF SUPPLY. IF ANY WORK SHOULD BE COVERED UP WITHOUT APPROVAL OR CONSENT OF THE OWNER, IT MUST, IF REQUIRED BY THE OWNER, BE UNCOVERED FOR EXAMINATION.

REEXAMINATION OF QUESTIONED WORK MAY BE ORDERED BY THE OWNER AND IF SO ORDERED, THE WORK MUST BE UNCOVERED BY THE BIDDER. IF SUCH WORK BE FOUND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, THE OWNER SHALL PAY THE COST OF REEXAMINATION AND REPLACEMENT. IF SUCH WORK BE FOUND NOT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, THE BIDDER SHALL PAY SUCH COST, UNLESS HE SHALL SHOW THAT THE DEFECT IN THE WORK WAS CAUSED BY ANOTHER BIDDER, AND IN THAT EVENT THE OWNER SHALL SEEK CORRECTIVE ACTION FROM THE OTHER BIDDER. IF A CONTRACT INSPECTOR IS UTILIZED ON THIS JOB HE SHALL BE TREATED AND CONSIDERED TO BE A CITY EMPLOYEE IN ALL ASPECT AS REQUIRED BY THIS CONTRACT.

23. **ARCHITECT/ENGINEER'S/OWNER'S STATUS**: THE ARCHITECT/ENGINEER AND/OR OWNER SHALL MAKE PERIODIC VISITS TO THE JOB TO FAMILIARIZE HIMSELF GENERALLY WITH THE PROGRESS AND QUALITY OF THE WORK BEING CONSTRUCTED. HE WILL CARRY OUT REASONABLE INSPECTIONS OF THE WORK TO DETERMINE IF, IN GENERAL, THE BIDDER IS PROCEEDING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE OWNER MAY STOP THE PROCEEDING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE OWNER MAY STOP THE WORK WHENEVER SUCH STOPPAGE MAY BE NECESSARY TO INSURE THE PROPER EXECUTION OF THE CONTRACT. HE SHALL ALSO HAVE AUTHORITY TO REJECT ALL WORK AND MATERIALS WHICH DO NOT CONFORM TO THE CONTRACT, TO REQUIRE THE APPLICATION OF FORCES TO ANY PORTION OF THE WORK AS IN HIS JUDGEMENT IS NECESSARY, AND TO DECIDE QUESTIONS WHICH ARISE IN THE EXECUTION OF THE WORK.

24. **CORRECTION OF WORK BEFORE FINAL PAYMENT**: THE BIDDER SHALL PROMPTLY REMOVE FROM THE PREMISES ALL MATERIALS CONDEMNED BY THE OWNER AS FAILING TO CONFORM TO THE CONTRACT, WHETHER INCORPORATED IN THE WORK OR NOT, AND THE BIDDER SHALL PROMPTLY REPLACE AND RE-EXECUTE HIS OWN WORK IN ACCORDANCE WITH THE CONTRACT AND WITHOUT EXPENSE TO THE OWNER AND SHALL BEAR THE EXPENSE OF MAKING GOOD ALL WORK OF OTHERS DESTROYED OR DAMAGED BY SUCH REMOVAL OR REPLACEMENT.

IF THE BIDDER DOES NOT REMOVE SUCH CONDEMNED WORK AND MATERIALS WITHIN A REASONABLE TIME, FIXED BY WRITTEN NOTICE, THE OWNER MAY REMOVE AND THEN MAY STORE THE MATERIALS AT THE EXPENSE OF THE BIDDER. IF THE BIDDER DOES NOT PAY THE EXPENSE OF SUCH REMOVAL AND STORAGE WITHIN TEN (10) DAYS TIME THEREAFTER, THE OWNER MAY UPON

TEN (10) DAYS WRITTEN NOTICE, SELL SUCH MATERIALS AT AUCTION OR AT PRIVATE SALE AND SHALL ACCOUNT FOR THE NET PROCEEDS THEREOF AFTER DEDUCTING ALL THE COSTS AND EXPENSES THAT SHOULD HAVE BEEN BORNE BY THE BIDDER.

25. **SUSPENSION OF WORK**: THE OWNER MAY AT ANY TIME SUSPEND THE WORK, OR ANY PART THEREOF BY GIVING TEN (10) DAYS NOTICE TO THE BIDDER IN WRITING. THE WORK SHALL BE RESUMED BY THE BIDDER WITHIN TEN (10) DAYS AFTER THE DATE FIXED IN THE WRITTEN NOTICE FROM THE OWNER TO THE BIDDER TO DO SO.

    BUT IF THE WORK OR ANY PART THEREOF SHALL BE STOPPED BY THE NOTICE IN WRITING AFORESAID, AND IF THE OWNER DOES NOT GIVE NOTICE IN WRITING TO THE BIDDER TO RESUME WORK AT A DATE WITHIN NINETY (90) DAYS OF THE DATE FIXED IN THE WRITTEN NOTICE TO SUSPEND, HE WILL BE ENTITLED TO PAYMENT FOR ALL WORK COMPLETED UP TO THE DATE OF NOTICE TO SUSPEND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

26. **CHANGED CONDITIONS**: NOTWITHSTANDING ANY OTHER PROVISION OR CONDITION SET FORTH IN THE CONTRACT DOCUMENTS AS HEREIN DEFINED, IT IS UNDERSTOOD AND AGREED THAT SHOULD THE BIDDER ENCOUNTER OR THE OWNER DISCOVER, DURING THE PROGRESS OF THE WORK, SUBSURFACE AND/OR LATENT CONDITIONS AT THE SITE MATERIALLY DIFFERING FROM THOSE SHOWN ON THE DRAWINGS OR INDICATED IN THE PROJECT MANUAL, OR UNKNOWN CONDITIONS OF AN UNUSUAL NATURE DIFFERING MATERIALLY FROM THOSE ORDINARILY ENCOUNTERED AND GENERALLY RECOGNIZED AS INHERENT IN WORK OF THE CHARACTER PROVIDED FOR IN THE CONTRACT DOCUMENTS, THE BIDDER SHALL IMMEDIATELY INFORM THE ARCHITECT/ENGINEER VERBALLY AND SHALL THEN FOLLOW UP IN WRITING WITHIN TEN (10) DAYS OF THE FIRST OBSERVATION OF ANY SUCH CONDITION. IF THE BIDDER SHOULD FAIL TO NOTIFY THE ARCHITECT/ENGINEER AS REQUIRED ABOVE, THEN ANY WORK PERFORMED SHALL BE DONE AT THE BIDDER'S RISK AND EXPENSE. IF IT IS FOUND CONDITIONS DO MATERIALLY DIFFER, THE CONTRACT SHALL BE MODIFIED VIA WRITTEN CHANGE ORDER TO PROVIDE ANY INCREASE OR DECREASE OF COST AND/OR DIFFERENCE IN TIME RESULTING FROM SUCH CONDITION; THE OWNER MAY TERMINATE THE CONTRACT DUE TO CHANGED CONDITIONS BY DELIVERY OF WRITTEN NOTICE TO THE BIDDER AND THE BIDDER WILL BE ENTITLED ONLY TO PAYMENT FOR WORK COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AS OF THE RECEIPT OF SUCH NOTICE.

27. **CHANGE OF PLANS**: IT IS AGREED THAT THE ARCHITECT/ENGINEER, WITH THE APPROVAL OF THE OWNER, MAY MAKE ALTERATIONS FOR LINE, GRADE, PLAN POSITIONS, DIMENSIONS OR MATERIALS OF WORK HEREIN CONTEMPLATED OR ANY PART THEREOF, EITHER BEFORE OR AFTER COMMENCEMENT OF THE CONSTRUCTION UNDER THIS AGREEMENT SO LONG AS SUCH CHANGES DO NOT RENDER THE TERMS OF THE AGREEMENT INAPPLICABLE.

28. **ARCHITECT/ENGINEER'S/OWNER'S DECISIONS**: THE OWNER SHALL WITHIN FIFTEEN (15) DAYS TIME AFTER PRESENTATION TO HIM IN WRITING, RENDER

DECISIONS, IN WRITING, ON ALL CLAIMS OF THE BIDDER, OR OTHER MATTERS RELATING TO THE EXECUTION AND PROGRESS OF THE WORK.

QUESTIONS WHICH ARISE AND PERTAIN TO THE INTERPRETATION OF THE CONTRACT DOCUMENTS SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT/ENGINEER. THE ARCHITECT/ENGINEER SHALL WITHIN FIFTEEN (15) DAYS TIME RENDER A DECISION AS TO THE INTERPRETATION OF THE CONTRACT DOCUMENTS.

29. **CLEANING UP AND RESTORATION OF SITE**: THE BIDDER SHALL, DURING THE PROGRESS OF THE WORK AND AS DIRECTED BY THE OWNER, REMOVE FROM THE OWNER'S PROPERTY AND FROM ALL PUBLIC AND PRIVATE PROPERTY AND RIGHTS-OF-WAY, AT HIS OWN EXPENSE, ALL TEMPORARY STRUCTURES, RUBBISH, DEBRIS, PILES OF EARTH, FOREIGN MATTER, AND WASTE MATERIALS RESULTING FROM HIS OPERATIONS. THE SITE OF THE WORK SHALL BE RESTORED TO THE CONDITIONS EXISTING BEFORE THE WORK WAS STARTED, TO THE SATISFACTION OF THE OWNER. LAWNS, PAVEMENTS, SIDEWALKS, AND OTHER SURFACES SHALL BE PRESERVED WHERE PRACTICABLE BUT IF DAMAGED SHALL BE FULLY RESTORED. IF THE BIDDER FAILS TO PERFORM CLEANUP AND RESTORATION IN AN ORDERLY, CONTINUOUS, AND EXPEDITIOUS MANNER, THE OWNER MAY TAKE CORRECTIVE ACTION THREE (3) DAYS AFTER DELIVERY OF NOTICE TO DO SO TO THE BIDDER; ANY EXPENSE RESULTING FROM CORRECTIVE ACTION TAKEN BY THE OWNER FOR CLEANUP OR RESTORATION SHALL BE DEDUCTED FROM PAYMENTS DUE TO THE BIDDER.

30. **USE OF COMPLETED PORTIONS:** THE OWNER SHALL HAVE THE RIGHT TO TAKE POSSESSION OF AND USE ANY COMPLETED OR PARTIALLY COMPLETED PORTIONS OF THE WORK, NOTWITHSTANDING THAT THE TIME FOR COMPLETING THE ENTIRE WORK OR SUCH PORTIONS MAY NOT HAVE EXPIRED, BUT SUCH TAKING POSSESSION AND USE SHALL NOT BE DEEMED AN ACCEPTANCE OF ANY WORK NOT COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IF SUCH PRIOR USE INCREASES THE COST OF OR DELAYS THE WORK, THE BIDDER SHALL BE ENTITLED TO SUCH EXTRA COMPENSATION OR EXTENSION OF TIME OR BOTH AS THE OWNER AND THE BIDDER MAY AGREE**.**

31. **FINAL INSPECTION**: THE OWNER SHALL SCHEDULE A FINAL INSPECTION OF THE WORK INCLUDED IN THE CONTRACT WITHIN TEN (10) DAYS AFTER RECEIPT OF WRITTEN NOTIFICATION FROM THE BIDDER THAT THE WORK IS COMPLETED. IF THE WORK IS NOT ACCEPTABLE TO THE ARCHITECT/ENGINEER OR OWNER, THE BIDDER SHALL BE ADVISED AS TO THE PARTICULAR DEFECTS TO BE REMEDIED BEFORE FINAL ACCEPTANCE CAN BE MADE.

FAILURE OF THE OWNER TO MAKE THIS INSPECTION WITHIN THE TIME SPECIFIED IN NO WAY RELIEVES THE BIDDER OF ANY OF HIS OBLIGATIONS UNDER THE CONTRACT.

ONLY WRITTEN NOTIFICATION FROM THE OWNER WILL CONSTITUTE FINAL ACCEPTANCE OF ANY PART OF THE WORK UNDER THIS CONTRACT.

32. **GUARANTEE OF WORK**: BIDDER WARRANTS AND GUARANTEES TO THE OWNER AND TO THE ARCHITECT/ENGINEER THAT ALL WORK WILL BE IN ACCORDANCE

WITH THE CONTRACT DOCUMENTS AND WILL BE WITHOUT DEFECT. THE GUARANTEE PERIOD SHALL BE NOT LESS THAN ONE (1) YEAR AFTER THE DATE OF SUBSTANTIAL COMPLETION. SHOULD ANY MANUFACTURER'S WARRANTY BE GREATER THAN ONE (1) YEAR OR SHOULD ANY PERMIT, SPECIFICATION, OR REGULATORY WARRANTY REQUIREMENT BE GREATER THAN ONE (1) YEAR, THE BIDDER SHALL GUARANTEE THE WORK FOR THE LONGER PERIOD. IF DURING THE GUARANTEE PERIOD ANY WORK IS FOUND TO BE DEFECTIVE, BIDDER SHALL PROMPTLY, WITHOUT COST TO OWNER, AND IN ACCORDANCE WITH OWNER'S WRITTEN INSTRUCTION, EITHER CORRECT SUCH DEFECTIVE WORK OR REMOVE IT FROM THE SITE AND REPLACE IT WITH NON-DEFECTIVE WORK. IF BIDDER DOES NOT PROMPTLY COMPLY WITH THE TERM OF SUCH INSTRUCTION, OR IN AN EMERGENCY WHERE DELAY WOULD CAUSE SERIOUS RISK OF LOSS OR DAMAGE, OWNER MAY HAVE THE DEFECTIVE WORK CORRECTED OR THE REJECTED WORK REMOVED AND REPLACED, AND ALL DIRECT AND INDIRECT COSTS OF SUCH REMOVAL AND REPLACEMENT, INCLUDING COMPENSATION FOR ADDITIONAL PROFESSIONAL SERVICES, SHALL BE PAID BY BIDDER.

33. **STATUTE OF LIMITATIONS; WARRANTIES**: AS BETWEEN THE OWNER AND THE BIDDER:

(A) ANY APPLICABLE STATUTE OF LIMITATIONS SHALL COMMENCE TO RUN AND ANY ALLEGED CAUSE OF ACTION SHALL BE DEEMED TO HAVE ACCRUED IN ANY AND ALL EVENTS NO EARLIER THAN THE DATE OF FINAL PAYMENT.

(B) AS TO ACTS OR FAILURES TO ACT OCCURRING AFTER THE DATE OF FINAL PAYMENT, ANY APPLICABLE STATUTE OF LIMITATIONS SHALL COMMENCE TO RUN AND ANY ALLEGED CAUSE OF ACTION SHALL BE DEEMED TO HAVE ACCRUED IN ANY AND ALL EVENTS NO EARLIER THAN THE DATE OF ANY ACT OR FAILURE TO ACT BY THE BIDDER PURSUANT TO ANY REQUIRED OR OTHERWISE PROVIDED WARRANTY, THE DATE OF ANY CORRECTION OF THE WORK OR FAILURE TO CORRECT THE WORK BY THE BIDDER, OR THE DATE OF ACTUAL COMMISSION OF ANY OTHER ACT OR FAILURE TO PERFORM ANY DUTY OR OBLIGATION BY THE BIDDER OR OWNER, WHICHEVER OCCURS LAST.

34. **SUBMISSION OF DAILY PERFORMANCE RECORDS**: THE BIDDER SHALL AT THE START OF EACH WORK DAY PROVIDE THE PROJECT INSPECTOR A COPY OF HIS DAILY PERFORMANCE RECORD FOR WORK PERFORMED ON THE PRECEDING WORK DAY. THE PERFORMANCE RECORD SHALL BE SUBMITTED IN FORMAT AS PRESCRIBED BY THE DEPARTMENT OF PUBLIC WORKS.

A COPY OF THE PRESCRIBED FORMAT WILL BE PROVIDED TO THE BIDDER BY THE OWNER.

THE SUBMISSION OF THE DAILY RECORD DOES NOT PRECLUDE THE SUBMISSION OF ADDITIONAL DOCUMENTATION, REPORTS, OR INFORMATION WHEN REQUESTED BY THE OWNER; OR AS SPECIFICALLY PROVIDED FOR OR REQUIRED BY THE CONTRACT DOCUMENTS.

35. **RECORD DOCUMENTS**: THE BIDDER SHALL, AT THE END OF CONSTRUCTION, PROVIDE THE OWNER WITH ONE COMPLETE SET OF DRAWINGS RECORDING THE INSTALLATION OF THE PROJECT. DURING THE COURSE OF THE CONSTRUCTION THE AS-BUILTS SHALL BE UPDATED DAILY BY THE END OF EACH WORKING DAY. PARTIAL PAYMENTS MAY BE WITHHELD FOR FAILURE TO KEEP NEAT, ACCURATE AND COMPLETE AS BUILTS. THE OWNER MAY ELECT TO PREPARE THE AS-BUILTS AT THE EXPENSE OF THE BIDDER SHOULD THE BIDDER FAIL TO PERFORM UNDER THIS PROVISION OF THE CONTRACT.

AS-BUILT INFORMATION SHALL FOLLOW THE REQUIREMENTS IN THE PFM VOLUME II, LATEST EDITION.

THESE RECORDS ARE A SPECIFIC CONTRACT REQUIREMENT OF THE BIDDER. FINAL PAYMENT WILL NOT BE ISSUED UNTIL SAID DOCUMENTS HAVE BEEN SUBMITTED IN AN ACCEPTABLE FORM.

36. **PARTIAL PAYMENTS**:

(A) PARTIAL PAYMENTS WILL BE MADE EACH MONTH FOR THE QUANTITY OF WORK PERFORMED IN THE PRECEDING MONTH LESS FIVE PERCENT (5%) TO BE RETAINED UNTIL FINAL COMPLETION OF THE WORK.

REQUESTS FOR PAYMENTS SHALL BE SUBMITTED TO THE OWNER BY THE 10TH OF THE MONTH FOR PAYMENT BY MONTH END. REQUESTS FOR PAYMENTS SHALL BE SUBMITTED IN A FORMAT ACCEPTABLE TO THE DEPARTMENT OF PUBLIC UTILITIES AND SHALL INCLUDE:

1. BIDDER'S ESTIMATE AND INVOICE TRANSMITTALSHEET

2. STANDARD BIDDER'S ESTIMATE VOUCHER.

37. **METHOD OF MEASUREMENT**: EXCEPT WHEN STIPULATED OTHERWISE, ALL QUANTITIES OF WORK PERFORMED AND TO BE PAID FOR UNDER THIS CONTRACT SHALL BE CONSTRUED AS THOSE MEASURED IN PLACE BY THE OWNER.

38. **INCREASED OR DECREASED QUANTITIES AND METHOD OF PAYMENT - UNIT PRICES**: THE OWNER RESERVES THE RIGHT TO INCREASE OR DECREASE THE ESTIMATED VALUE OF THE CONTRACT IN AN AMOUNT NOT TO EXCEED TWENTY-FIVE PERCENT (25%). SUCH INCREASE OR DECREASE MAY BE BROUGHT ABOUT EITHER BY VARYING QUANTITIES WITHIN THE ORIGINAL UNITS OF THE CONTRACT OR BY AN EXTENSION OR REDUCTION IN THE ORIGINAL LIMITS OF THE PROJECT.

NO CLAIM FOR EXTRA COMPENSATION WILL BE ALLOWED FOR SUCH INCREASE OR DECREASE IN THE VALUE OF THE CONTRACT NOT EXCEEDING TWENTY-FIVE PERCENT (25%).

CHANGES IN THE ESTIMATED VALUE OF ANY MAJOR OR MINOR ITEM OF MORE THAN TWENTY-FIVE PERCENT (25%) NOT CONSISTENT WITH THE ABOVE, OR CHANGES IN EITHER TOTAL COST OR THE AMOUNT OF ANY ITEM MAJOR OR

MINOR WHICH ARE THE RESULTS OF MORE ACCURATE MEASUREMENTS AND ARE NOT DUE TO ANY CHANGE IN PLAN OR IN CHARACTER OF THE WORK SHALL NOT BE CONSIDERED A BASIS OF DEMAND FOR REVISION IN CONTRACT PRICE BY EITHER PARTY TO THE CONTRACT.

FOR ANY INCREASED OR DECREASED QUANTITIES, SETTLEMENT SHALL BE MADE FOR THE ACTUAL AMOUNT OF WORK PERFORMED AT THE UNIT PRICES SHOWN IN THE PROPOSAL FOR THE WORK UNDER CONSIDERATION.

39. **EXTRA WORK AND METHOD OF PAYMENT**: THE OWNER MAY AT ANY TIME BY A WRITTEN ORDER, AND WITHOUT NOTICE TO SURETIES, MAKE CHANGES IN DRAWINGS OR SPECIFICATIONS, WITHIN THE GENERAL SCOPE THEREOF. ANY EXTRA WORK DONE PRIOR TO THE EXECUTION OF THE CITY'S STANDARD CHANGE ORDER FORM BY THE CITY MANAGER IS DONE AT THE BIDDER'S TOTAL RISK AND WITH NO OBLIGATION ON THE PART OF THE CITY TO PAY FOR THE WORK.

THE BIDDER SHALL PERFORM UNFORESEEN WORK OR WORK WHICH MAY EXCEED THE TWENTY-FIVE PERCENT (25%) STATED IN ARTICLE 39 OR WORK FOR WHICH THERE IS NO PRICE INCLUDED IN THE CONTRACT, WHENEVER IT IS DEEMED NECESSARY OR DESIRABLE IN ORDER TO COMPLETE FULLY THE WORK AS CONTEMPLATED. SUCH WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS DIRECTED BY THE OWNER, AND WILL BE PAID FOR AS STIPULATED HEREINAFTER.

EXTRA WORK SHALL BE PAID FOR AT THE UNIT PRICES OR LUMP SUM AS AGREED TO BY THE BIDDER AND THE OWNER, OR IN LIEU OF SUCH AGREEMENT, THE OWNER MAY REQUIRE THE BIDDER TO DO SUCH WORK ON A FORCE ACCOUNT BASIS TO BE COMPENSATED FOR IN THE FOLLOWING MANNER.

(A) LABOR. FOR ALL LABOR AND FOREMEN IN DIRECT CHARGE OF THE SPECIFIC OPERATIONS, THE BIDDER SHALL RECEIVE THE RATE OF WAGE (OR SCALE) AS SET FORTH IN HIS MOST RECENT PAYROLL ON WHICH THE APPLICABLE CLASS OF LABOR AND FOREMEN WERE USED FOR EACH HOUR OF REGULAR TIMES AND 1- 1/2 TIMES SUCH RATES FOR OVERTIME WHEN SUCH OVERTIME WORK IS AUTHORIZED, THAT SAID LABOR AND FOREMEN ARE ACTUALLY ENGAGED IN SUCH WORK. IN THE EVENT THE CLASS OF LABOR NEEDED HAS NOT BEEN EMPLOYED ON THE PROJECT, MUTUALLY AGREED UPON RATES WILL BE ESTABLISHED, PROVIDED, HOWEVER, THAT THE RATES SHALL CONFORM TO PREDETERMINED RATES AUTHORIZED FOR THE PROJECT. AN AMOUNT EQUAL TO TEN PERCENT (10%) OF THE SUM THEREFORE SHALL BE ADDED TO THESE RATES.

(B) BOND, INSURANCE, AND TAX, FOR PROPERTY DAMAGE, LIABILITY, AND WORKMEN'S COMPENSATION INSURANCE PREMIUMS, UNEMPLOYMENT INSURANCE CONTRIBUTIONS AND SOCIAL SECURITY TAXES ON FORCE ACCOUNT WORK, THE BIDDER SHALL RECEIVE AN AMOUNT EQUAL TO TWENTY PERCENT (20%) THE BASE COST FOR LABOR.

(C) MATERIALS. FOR MATERIALS ACCEPTED BY THE OWNER AND USED, THE BIDDER SHALL RECEIVE THE ACTUAL COST OF SUCH MATERIALS DELIVERED ON THE WORK, INCLUDING TRANSPORTATION, AND HANDLING

CHARGES PAID BY HIM (EXCLUSIVE OF EQUIPMENT RENTALS AS HEREINAFTER SET FORTH), TO WHICH COST TEN PERCENT (10%) WILL BE ADDED.

(D) EQUIPMENT. FOR ANY MACHINERY OR SPECIAL EQUIPMENT (OTHER THAN SMALL TOOLS AND OPERATOR) INCLUDING FUEL, LUBRICANTS AND REPAIRS, THE BIDDER SHALL RECEIVE HOURLY RENTAL RATES WHICH SHALL NOT EXCEED THE RENTAL RATES BASED ON 1/40TH OF THE WEEKLY RATE OF THE CURRENT SCHEDULE PUBLISHED BY THE ASSOCIATED EQUIPMENT DISTRIBUTORS (AED) PLUS TRANSPORTATION COST FOR EQUIPMENT NOT ALREADY ON THE PROJECT. SUCH RATE WILL BE PAID FOR THE ACTUAL TIME THE EQUIPMENT IS IN OPERATION ON THE FORCE ACCOUNT WORK.

THE RATES FOR LICENSED TRUCKS AND SPECIAL EQUIPMENT NOT LISTED IN THE AED SCHEDULE USED ON THE FORCE ACCOUNT WORK SHALL NOT EXCEED THE HOURLY RATE BEING PAID FOR SUCH TRUCKS AND EQUIPMENT BY THE BIDDER AT THE TIME OF THE FORCE ACCOUNT AUTHORIZATION. IN THE ABSENCE OF SUCH RATES, THE PREVAILING RATES BEING PAID IN THE AREA WHERE THE WORK IS CONTEMPLATED SHALL BE USED.

(E) MISCELLANEOUS. NO ADDITIONAL ALLOWANCE WILL BE MADE FOR GENERAL SUPERINTENDENCE, THE USE OF SMALL TOOLS, OR OTHER COSTS FOR WHICH NO SPECIFIC ALLOWANCE IS HEREIN PROVIDED.

(F) COMPENSATION. THE COMPENSATION AS SET FORTH IN THIS SECTION SHALL BE ACCEPTED BY THE BIDDER AS PAYMENT IN FULL INCLUDING PROFIT FOR EXTRA WORK DONE ON A FORCE ACCOUNT BASIS. AT THE END OF EACH DAY THE BIDDER'S REPRESENTATIVE AND THE INSPECTOR SHALL COMPARE RECORDS OF THE COST OF WORK DONE AS ORDERED ON A FORCE ACCOUNT BASIS.

(G) STATEMENTS. NO PAYMENT WILL BE MADE FOR WORK PERFORMED ON A FORCE ACCOUNT BASIS UNTIL THE BIDDER HAS FURNISHED THE ARCHITECT/ENGINEER OR OWNER WITH DUPLICATE ITEMIZED STATEMENTS OF THE COST OF SUCH FORCE ACCOUNT WORK DETAILED AS FOLLOWS:

1. NAME, CLASSIFICATION, DATE, DAILY HOURS, TOTAL HOURS, RATE AND EXTENSION FOR EACH LABORER, AND FOREMAN

2. DESIGNATION, DATES, DAILY HOURS, TOTAL HOURS, RENTAL RATE, AND EXTENSION FOR EACH UNIT OF EQUIPMENT

3. QUANTITIES OF MATERIALS, PRICES AND EXTENSIONS

4. TRANSPORTATION OF MATERIAL

5. COST OF PROPERTY DAMAGE, LIABILITY AND WORKERS' COMPENSATION INSURANCE PREMIUMS, UNEMPLOYMENT INSURANCE CONTRIBUTIONS, AND SOCIAL SECURITY TAX STATEMENTS SHALL BE

ACCOMPANIED AND SUPPORTED BY RECEIPTED INVOICES FOR ALL MATERIALS USED AND TRANSPORTATION CHARGES. HOWEVER, IF MATERIALS USED ON THE FORCE ACCOUNT WORK ARE NOT SPECIFICALLY PURCHASED FOR SUCH WORK BUT ARE TAKEN FROM THE BIDDER'S STOCK THEN, IN LIEU OF THE INVOICES, THE BIDDER SHALL FURNISH AN AFFIDAVIT CERTIFYING THAT SUCH MATERIALS WERE TAKEN FROM HIS STOCK, THAT THE QUANTITY CLAIMED WAS ACTUALLY USED AND THAT THE PRICE AND TRANSPORTATION AND HANDLING CLAIMED REPRESENT THE ACTUAL COST TO THE BIDDER.

40. **WORK OUTSIDE REGULAR HOURS**: IF THE BIDDER DESIRES TO PERFORM WORK OUTSIDE THE REGULAR HOURS OR ON SATURDAY, HE SHALL REQUEST PERMISSION TO WORK FORTY-EIGHT (48) HOURS IN ADVANCE TO ALLOW ARRANGEMENTS TO BE MADE FOR PROPER INSPECTION. THE OWNER MAY REFUSE THE BIDDER PERMISSION TO WORK IF THE FORTY-EIGHT (48) HOUR NOTICE IS NOT GIVEN OR FOR OTHER JUST CAUSE. REASONABLE EFFORTS SHALL BE MADE BY THE BIDDER TO AVOID UNDUE NOISE DURING THE NIGHT AND ON SUNDAYS, IF IT IS NECESSARY TO WORK AT SUCH TIMES. UNDER NORMAL CIRCUMSTANCES THE BIDDER WILL NOT BE PERMITTED TO WORK ON SUNDAYS OR CITY HOLIDAYS.

    NORMAL WORKING HOURS ARE DEFINED AS 7:00 A.M. TO 4:00 P.M. MONDAY THROUGH FRIDAY, EXCLUDING CITY HOLIDAYS.

    THE OWNER RESERVES THE RIGHT TO SCHEDULE THE BIDDER TO WORK OUTSIDE NORMAL WORKING HOURS IN THE INTEREST OF PUBLIC SAFETY OR CONVENIENCE. NO CLAIM FOR ADDITIONAL COMPENSATION SHALL BE MADE BY THE BIDDER WHEN SUCH OCCASIONS OCCUR.

41. **DEDUCTIONS FOR UNCORRECTED WORK**: IF THE OWNER DEEMS IT INEXPEDIENT TO CORRECT WORK DAMAGED OR NOT DONE IN ACCORDANCE WITH THE CONTRACT, AN EQUITABLE DEDUCTION FROM THE CONTRACT PRICE SHALL BE MADE THEREFOR.

42. **DAMAGES**: ANY CLAIM FOR DAMAGE ARISING UNDER THIS CONTRACT SHALL BE MADE IN WRITING TO THE PARTY LIABLE WITHIN FIFTEEN (15) DAYS TIME OF THE FIRST OBSERVANCE OF SUCH DAMAGE AND NOT LATER THAN THE TIME OF FINAL PAYMENT EXCEPT AS EXPRESSLY STIPULATED OTHERWISE IN GUARANTEE OF WORK AS IN THE CASE OF THE DEFECTIVE WORK OR MATERIALS, AND SHALL BE ADJUSTED BY AGREEMENT OR LITIGATION.

43. **LIENS**: NEITHER THE FINAL PAYMENT NOR ANY PART OF THE RETAINED PERCENTAGE SHALL BECOME DUE UNTIL THE BIDDER, IF REQUIRED, SHALL DELIVER TO THE OWNER A COMPLETE RELEASE OF ALL LIENS ARISING OUT OF THIS CONTRACT, OR RECEIPTS IN FULL IN LIEU THEREOF, AND IF REQUIRED IN EITHER CASE AN AFFIDAVIT THAT SO FAR AS HE HAS KNOWLEDGE OR INFORMATION THE RELEASES AND RECEIPTS INCLUDE ALL THE LABOR AND MATERIAL FOR WHICH A LIEN COULD BE FILED; BUT THE BIDDER MAY IF ANY SUBBIDDER REFUSES TO FURNISH A RELEASE OR RECEIPT IN FULL, FURNISH A BOND SATISFACTORY TO THE OWNER TO INDEMNIFY THE OWNER AGAINST ANY LIEN. IF ANY LIEN REMAINS UNSATISFIED AFTER ALL PAYMENTS ARE MADE, THE BIDDER SHALL REFUND TO THE OWNER ALL MONIES THAT THE LATTER MAY BE

COMPELLED TO PAY IN DISCHARGING SUCH A LIEN, INCLUDING ALL COST AND A REASONABLE ATTORNEY'S FEE.

44. **PAYMENTS WITHHELD**: THE OWNER MAY WITHHOLD OR, ON ACCOUNT OF SUBSEQUENTLY DISCOVERED EVIDENCE, NULLIFY THE WHOLE OR PART OF ANY PAYMENT TO SUCH EXTENT AS MAY BE NECESSARY TO PROTECT HIMSELF FROM LOSS ON ACCOUNT OF:

(A) DEFECTIVE WORK NOT REMEDIED

(B) CLAIMS OR LIENS THAT HAVE BEEN FILED OR EVIDENCE INDICATING THAT THERE IS REASONABLE CAUSE TO BELIEVE SUCH MAY BE FILED

(C) FAILURE OF THE BIDDER TO PAY FOR LABOR OR MATERIALS, OR TO MAKE PAYMENTS PROPERLY TO SUBBIDDERS

(D) A REASONABLE DOUBT THAT THE CONTRACT CAN BE COMPLETED FOR THE BALANCE THEN UNPAID

(E) DAMAGE TO ANOTHER BIDDER

(F) THE OWNER HAVING BEEN REQUIRED TO CORRECT DEFECTIVE WORK, COMPLETE ANY WORK, PERFORM EMERGENCY WORK, OR PERFORM OTHER WORK

(G) UNSATISFACTORY PROSECUTION OF THE WORK, INCLUDING FAILURE TO FURNISH ACCEPTABLE SUBMITTALS, FAILURE TO MAKE ADEQUATE PROGRESS TOWARDS COMPLETING THE WORK WITHIN THE CONTRACT TIME OR FAILURE TO MAINTAIN THE WORK SITE AT ALL TIMES IN A NEAT, ORDERLY, AND WORKMAN- LIKE APPEARANCE.

(H) FAILURE TO KEEP NEAT, ACCURATE, AND COMPLETE SET OF "ASBUILTS" UPDATED ON A DAILY BASIS

(I) FAILURE TO SUBMIT A DAILY PERFORMANCE RECORD IN SUITABLE FORMAT.

WHEN THE ABOVE GROUNDS ARE REMOVED, PAYMENT SHALL BE MADE FOR AMOUNTS WITHHELD BECAUSE OF THEM.

45. **THE OWNER'S RIGHT TO DO WORK**: IF THE BIDDER SHOULD FAIL TO PROSECUTE THE WORK OR FAITHFULLY PERFORM ANY PROVISIONS OF THIS CONTRACT, IT SHALL BE CONSTRUED AS GROUNDS FOR THE OWNER'S RIGHT TO PERFORM WORK. THE OWNER, HAVING DULY SERVED WRITTEN NOTICE TO THE BIDDER OF HIS INTENT TO PERFORM WORK, MAY REMEDY SUCH DEFICIENCIES AFTER THREE (3) DAYS FROM DELIVERY OF SAID NOTICE TO THE BIDDER. THE COSTS INCURRED BY THE OWNER IN CORRECTING THE DEFICIENCY SHALL BE PAID FOR BY THE BIDDER.

46. **REMOVAL OF MATERIALS AND EQUIPMENT**: IN THE CASE OF ANNULMENT OF THIS CONTRACT BEFORE COMPLETION FROM ANY CAUSE WHATEVER OR IN THE CASE OF ACCEPTANCE OF THE WORK AFTER COMPLETION, THE BIDDER WHEN

NOTIFIED BY THE OWNER IN WRITING, SHALL WITHIN FIVE (5) DAYS AFTER RECEIPT OF NOTIFICATION REMOVE ALL OR ANY PORTION AS DIRECTED OF HIS EQUIPMENT AND MATERIALS FROM THE PROPERTY OF THE OWNER: SHOULD THE BIDDER BE UNABLE OR UNWILLING TO COMPLY WITH THE OWNER'S REQUEST, THEN THE OWNER RESERVES THE RIGHT TO REMOVE AND/OR STORE SUCH EQUIPMENT AND MATERIALS AT THE BIDDER'S EXPENSE.

47. **RIGHTS OF VARIOUS INTEREST**: WHEREVER WORK BEING DONE BY THE OWNER'S FORCES OR OTHER BIDDERS IS CONTIGUOUS TO WORK COVERED BY THIS CONTRACT, THE RESPECTIVE RIGHTS OF THE VARIOUS INTERESTS INVOLVED SHALL BE ESTABLISHED BY THE OWNER, TO SECURE THE COMPLETION OF THE VARIOUS PORTIONS OF THE WORK IN GENERAL HARMONY.

48. **SEPARATE CONTRACT**: THE OWNER RESERVES THE RIGHT TO LET OTHER CONTRACTS IN CONNECTION WITH THIS WORK. THE BIDDER SHALL AFFORD OTHER BIDDERS REASONABLE OPPORTUNITY FOR THE INTRODUCTION AND STORAGE OF THEIR MATERIALS AND THE EXECUTION OF THEIR WORK, AND SHALL PROPERLY CONNECT AND COORDINATE HIS WORK WITH THEIRS.

IF ANY PART OF THE BIDDER'S WORK DEPENDS FOR PROPER EXECUTION OR RESULTS UPON THE WORK OF ANY OTHER BIDDER, THE BIDDER SHALL INSPECT AND PROMPTLY REPORT TO THE OWNER ANY DEFECTS IN SUCH WORK THAT RENDER IT UNSUITABLE FOR SUCH PROPER EXECUTION AND RESULTS. HIS FAILURE SO TO INSPECT AND REPORT SHALL CONSTITUTE AN ACCEPTANCE OF THE OTHER BIDDER'S WORK, AS FIT AND PROPER FOR THE RECEPTION OF HIS WORK, EXCEPT AS TO DEFECTS WHICH MAY DEVELOP IN THE OTHER BIDDER'S WORK AFTER THE EXECUTION OF HIS WORK.

TO INSURE THE PROPER EXECUTION OF HIS SUBSEQUENT WORK, THE BIDDER SHALL MEASURE WORK ALREADY IN PLACE AND SHALL AT ONCE REPORT IN WRITING TO THE OWNER ANY DISCREPANCY BETWEEN THE EXECUTED WORK AND THE DRAWINGS.

49. **SUBCONTRACTS**: THE BIDDER SHALL, WITHIN TEN (10) DAYS AFTER THE SIGNATURE OF THE CONTRACT, NOTIFY THE OWNER IN WRITING OF THE NAMES OF SUBBIDDERS PROPOSED FOR THE WORK AND SHALL NOT EMPLOY ANY THAT THE OWNER MAY WITHIN TEN (10) DAYS AFTER RECEIPT OF NOTIFICATION OBJECT TO AS INCOMPETENT OR UNFIT OR ANY THAT APPEAR ON THE HUD AREA OFFICE CONSOLIDATED LIST OF DEBARRED, SUSPENDED, AND INELIGIBLE BIDDERS.

THE BIDDER AGREES THAT HE IS AS FULLY RESPONSIBLE TO THE OWNER FOR THE ACTS AND OMISSIONS OF HIS SUBBIDDERS AND PERSONS EITHER DIRECTLY OR INDIRECTLY EMPLOYED BY THEM AS HE IS FOR THE ACTS OR OMISSIONS OF PERSONS DIRECTLY EMPLOYED BY HIM.

WITH THE EXCEPTION OF SUBCONTRACTS FOR LESS THAN TEN THOUSAND DOLLARS ($10,000) EACH, AND SUBCONTRACTS WITH A MANUFACTURER OR A FABRICATOR, ANY AGREEMENT BETWEEN THE BIDDER AND ANY SUBBIDDER SHALL REQUIRE OF THE SUBBIDDER A PAYMENT BOND WITH SURETY THEREON IN THE AMOUNT OF ONE HUNDRED PERCENT (100%) OF THE WORK SUBLET TO THE SUBBIDDER, WHICH SHALL BE CONDITIONED UPON THE PAYMENT TO ALL PERSONS WHO HAVE AND FULFILL, CONTRACTS WHICH ARE DIRECTLY WITH THE SUBBIDDER FOR PERFORMING LABOR AND/OR FURNISHING MATERIALS IN THE PROSECUTION OF THE WORK PROVIDED FOR IN THE SUBCONTRACT, AND TO PAY THOSE PERSONS WHO FURNISH LABOR AND/OR MATERIALS AS AFORESAID. IN THE EVENT THE BIDDER FAILS TO REQUIRE SAID BOND, ANY PERSON WHO HAS AND FULFILLS A CONTRACT DIRECTLY WITH SUCH SUBBIDDER IN PERFORMING LABOR AND/OR FURNISHING MATERIALS IN THE PROSECUTION OF THE WORK PROVIDED FOR IN THE SUBCONTRACT SHALL HAVE A DIRECT RIGHT OF ACTION AGAINST THE OBLIGORS AND SURETIES ON THE PAYMENT BOND REQUIRED OF THE BIDDER.

PAYMENTS TO SUBBIDDER(S) SHALL BE MADE IN ACCORDANCE WITH § 2.2-4354 OF CODE OF VIRGINIA (1950), AS AMENDED. UNLESS OTHERWISE SPECIFIED IN THIS CONTRACT, INTEREST SHALL ACCRUE AT THE RATE OF ONE PERCENT (1%) PER MONTH.

NOTHING CONTAINED IN THE CONTRACT DOCUMENTS SHALL CREATE ANY CONTRACTUAL RELATION BETWEEN ANY SUBBIDDER AND THE OWNER.

50. **AGREEMENT CONSTRUED UNDER VIRGINIA LAWS**: THE AGREEMENT AND BOND GIVEN TO SECURE IT ARE TO BE EXECUTED AND PERFORMED IN THE COMMONWEALTH OF VIRGINIA AND SHALL BE CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE COMMONWEALTH OF VIRGINIA.

51. **NONDISCRIMINATION OF BIDDERS**: A BIDDER, OFFEROR, OR SUBCONTRACTOR SHALL NOT BE DISCRIMINATED AGAINST IN THE SOLICITATION OR AWARD OF THIS CONTRACT BECAUSE OF RACE, RELIGION, COLOR, SEX NATIONAL ORIGIN, AGE OR DISABILITY OR AGAINST FAITH-BASED ORGANIZATIONS. IF THE AWARD OF THIS CONTRACT IS MADE TO A FAITH-BASED ORGANIZATION AND AN INDIVIDUAL, WHO APPLIES FOR OR RECEIVES GOODS, SERVICES, OR DISBURSEMENT PROVIDED PURSUANT TO THIS CONTRACT OBJECT TO THE RELIGIOUS CHARACTER OF THE FAITH-BASED ORGAINIZATION FROM WHICH THE INDIVIDUAL RECEIVES OR WOULD RECEIVE THE GOODS, SERVICES, OR DISBURSEMENTS, THE PUBLIC BODY SHALL OFFER THE INDIVIDUAL, WITHIN A REASONABLE PERIOD OF TIME AFTER THE DATE OF HIS OBJECTION, ACCESS TO EQUIVALENT GOODS, SERVICES, OR DISBURSEMENTS FROM AN ALTERNATIVE PROVIDER.

52. **EXECUTIVE ORDERS:** BIDDER AND ALL SUBBIDDERS WITH CONTRACTS IN EXCESS OF $10,000 SHALL ABIDE BY THE REQUIREMENTS UNDER EXECUTIVE ORDERS NO. 11246 AND 11375, AS SUPPLEMENTED IN DEPARTMENT OF LABOR REGULATIONS (41 CFR CHAPTER 60), INCLUDING SPECIFICALLY THE PROVISIONS OF EQUAL OPPORTUNITY CLAUSE AND SUBMITTAL OF WRITTEN AFFIRMATIVE ACTION PROGRAM. THE BIDDER MUST CERTIFY THAT SEGREGATED FACILITIES ARE NOT PROVIDED OR MAINTAINED.

53. **COPELAND "ANTI-KICKBACK" ACT**: BIDDER AND ALL SUBBIDDERS SHALL COMPLY WITH THE COPELAND "ANTI-KICKBACK" ACT (18 U.S.C. 874) AS SUPPLEMENTED IN DEPARTMENT OF LABOR REGULATIONS (29 CFR PART 3).

54. **BIDDERS WORK HOURS AND SAFETY STANDARDS:** BIDDER AND ALL SUBBIDDERS WITH CONTRACTS IN EXCESS OF $2,000 SHALL COMPLY WITH SECTIONS 103 AND 107 OF THE BIDDERS WORK HOURS AND SAFETY STANDARDS ACT (40 U.S.C. 327-330) AS SUPPLEMENTED BY DEPARTMENT OF LABOR REGULATIONS (29 CFR PART 5).

55. **CLEAN AIR ACT:** BIDDER AND ALL SUBBIDDERS WITH CONTRACTS IN EXCESS OF $100,000 SHALL COMPLY WITH APPLICABLE STANDARDS, ORDERS, PROVISIONS OR REQUIREMENTS ISSUED UNDER SECTION 306 OF THE CLEAN AIR ACT, SECTION 508 OF THE CLEAN WATER ACT, EXECUTIVE ORDER 11738, AND ENVIRONMENTAL PROTECTION AGENCY REGULATIONS (40 CFR PART 15) OR IN ACCORDANCE WITH SUCH APPLICABLE SUCCESSOR PROVISIONS TO THE ABOVE.

56. **ENERGY EFFICIENCY:** BIDDER SHALL COMPLY WITH ALL MANDATORY STANDARDS AND POLICIES RELATING TO ENERGY EFFICIENCY WHICH ARE CONTAINED IN THE STATE ENERGY CONSERVATION PLAN ISSUED IN COMPLIANCE WITH THE ENERGY POLICY AND CONSERVATION ACT (PUB. L. 94-163).

57. **NOTICE TO PROCEED:** AFTER NOTIFICATION OF AWARD THE BIDDER WILL ATTEND A PRE-CONSTRUCTION CONFERENCE SCHEDULED BY THE CITY TO DISCUSS AND SELECT THE NOTICE TO PROCEED DATE. THE CITY RETAINS FINAL AUTHORITY TO SELECT THE NOTICE TO PROCEED DATE.

58. **LIQUIDATED DAMAGES:** TIME IS OF THE ESSENCE ON THIS CONTRACT. FAILURE OF THE BIDDER TO COMPLETE THE WORK WITHIN THE TIME ALLOWED WILL RESULT IN DAMAGES BEING SUSTAINED BY THE CITY. SUCH DAMAGES ARE, AND WILL CONTINUE TO BE, IMPRACTICABLE AND EXTREMELY DIFFICULT TO DETERMINE. FOR EACH CONSECUTIVE CALENDAR DAY IN EXCESS OF THE TIME SPECIFIED FOR COMPLETION OF THE WORK, THE BIDDER SHALL PAY TO THE CITY, OR HAVE WITHHELD FROM MONIES DUE IT, THE SUM PER CALENDAR DAY AS STIPULATED IN THE CONTRACT.

    EXECUTION OF THE CONTRACT UNDER THESE SPECIFICATIONS SHALL CONSTITUTE AGREEMENT BY THE CITY AND BIDDER THAT THIS AMOUNT PER DAY IS THE MINIMUM VALUE OF THE COSTS AND ACTUAL DAMAGE CAUSED BY FAILURE OF THE BIDDER TO COMPLETE THE WORK WITHIN THE ALLOTTED TIME, THAT SUCH SUM IS LIQUIDATED DAMAGES AND SHALL NOT BE CONSTRUED AS A PENALTY, AND THAT SUCH SUM MAY BE DEDUCTED FROM PAYMENTS DUE THE BIDDER IF SUCH DELAY OCCURS.

    PERMITTING THE BIDDER TO CONTINUE AND FINISH THE WORK OR ANY PART THEREOF AFTER THE CONTRACT TIME OR ADJUSTED CONTRACT TIME, AS PERTINENT, HAS EXPIRED SHALL IN NO WAY OPERATE AS A WAIVER ON THE PART OF THE CITY OR ANY OF ITS RIGHTS UNDER THE CONTRACT.

PAYMENT OF LIQUIDATED DAMAGES SHALL NOT RELEASE THE BIDDER FROM OBLIGATIONS IN RESPECT TO THE FULFILLMENT OF THE ENTIRE CONTRACT, NOR SHALL THE PAYMENT OF SUCH LIQUIDATED DAMAGES CONSTITUTE A WAIVER OF THE CITY'S RIGHT TO COLLECT ANY ADDITIONAL DAMAGES WHICH MAY BE SUSTAINED BY FAILURE OF THE BIDDER TO CARRY OUT THE TERMS OF THE CONTRACT, IT BEING THE INTENT OF THE PARTIES THAT SAID LIQUIDATED DAMAGES BE FULL AND COMPLETE PAYMENT ONLY FOR FAILURE OF THE BIDDER TO COMPLETE THE WORK ON TIME.

Application for Work within the

Right-of-Way Permit (Form)

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CITY OF SUFFOLK

Application for Work Within the Right of Way Permit

Date:_____ Permit No._____
Date Received: _____ Request Approved / Request Denied
By:_____

To: Director of Public Works, Suffolk, Virginia

Application is hereby made by _____
(Applicant Co. Name)
for permission to excavate and/or alter conditions within the City's right of way at_____.
The attached sketch shows street alignment and references all proposed work with a distance from the gutter line and nearest intersection, it also shows the length and width of opening. The purpose of such work is to _____.
It is estimated that _____ft. of _____will be excavated, altered, or disturbed.
A bond as required by the City Code (is attached hereto) (is on file with the City in the _____ Department).
Work for which permit is requested will commence on _____and will be completed on_____.
Person, firm, or corporation other than applicant performing the work is:
_____, address _____, telephone _____.

_____ Company Name	_____ Phone Number
_____ Applicant Name	_____ Title
_____ Applicant Street Address	_____ Applicant City & ZIP
_____ Signature	_____ Email Address
	_____ D/L # or SSN (For billing purposes only)

The applicant hereby agrees that:
-A fee will be charged for each permit issued.
-Application must be submitted 7 days in advance of work start date.
-All work will be performed in accordance with the Laws, Zoning Ordinances, City Code of the City of Suffolk, Virginia, the attached detailed plan and as directed by the City Manager or designated representative.
-The work shall be carried out in accordance with Chapter 74 of the Suffolk City Code, entitled "Streets and Sidewalks." Failure to have in possession a copy of this document does not relieve the permittee from the responsibility of having knowledge of and adhering to the requirements described therein.
-Applicants to whom permits are issued at all times indemnify and save harmless the City of Suffolk from responsibility from damage to, or liability arising from, the exercise of privileges granted in such permit either during construction or at any time in the future.
-Permits are issued for street openings at specified locations. If additional openings are necessary to complete the work at this site, the permittee must notify the City Manager or designated representative immediately.
-Limitations of working hours may be stipulated when necessary.
-Traffic is not to be rerouted without special permission of the City Manager or designated representative.
-Traffic is to be protected by adequate lights, barricades, and construction signs at all times in accordance with MUTCD standards.
-All backfilling of trenches is to be made in layers not to exceed six inches loose depth and compacted to a density rate 95%.
-Compaction by water will not be permitted.
-Where entrances are disturbed, they must be restored to their original condition or to a condition satisfactory to the City Manager or designated representative.
-The absence of an inspector does not in any way relieve the permittee of his responsibility to perform the work in accordance with the provisions of this permit.
-The Permittee is responsible for ensuring that all utility markings are removed within twenty (20) days after the completion of work. If the utility marks are not removed by the time specified herein, the City will consider the marks as graffiti. The City, in accordance with existing City ordinances, may remove graffiti, and the costs associated with such removal will be the responsibility of the contractor or Permittee. The City shall have the right to suspend further permits to contractor or Permittee until the utility marks removed.
-The Permittee, its agents, employees, officers, and assignees assume all responsibility and liability for any injury to persons or damage to public or private property caused directly or indirectly by the performance of work performed under this permit.
-This permit shall expire six months from the date of approval.
-The City of Suffolk reserves full municipal control over the subject of this permit.
-Permittee agrees to notify the Department of Public Works when the work herein referred to is completed.
-A copy of this permit must be maintained on the site at all times.

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Section D

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Suffolk Bennett's Creek Rec Ctr.

Specifications
Volume 1 of 2

Commission Number: 215021

December 18, 2019

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Suffolk Bennett's Creek Rec Ctr.

Specifications
Volume 1 of 2

Commission Number: 215021

December 18, 2019

Contact:
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Senior Architect
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434.947.1659 .fax
rvaughan@wileywilson.com

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END OF LIST OF DRAWINGS

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Access to site.
5. Work restrictions.
6. Specification and drawing conventions.

B. Related Section:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: City of Suffolk, Bennett's Creek Recreation Center Renovation.

1. Project Location: 1500 Bennetts Creek Park Road, Suffolk, Virginia 23435.

B. Owner: Goochland County.

1. Owner's Representative: Michael J. Kelly, Principal Planner, 134 S 6th Street Suffolk, VA 23434

C. Architect: Randal S. Vaughan AIA, Vice President, Wiley|Wilson, 127 Nationwide Drive, Lynchburg, VA 24502; 434.947.1901.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

1. The renovation of a single-story existing Army Reserve Center facility which is approximately 15,500 net square feet and is a masonry and steel building that was constructed in the early 1980's on approximately 10 acres. The building is currently

located in a residential area locally sited near a school, library, and park entrance. This project will renovate the existing facility to become a recreation center containing a fitness space, game room, multi-purpose room, commercial kitchen, offices and support spaces. A small addition will be added to the front of the building to accommodate a new vestibule and lobby, thus bringing the total square footage to approximately 16,600 square feet. All construction with be noncombustible (Type 2B). This project will replace all HVAC and Plumbing fixtures. While the building has been solar oriented (North/South), the Southern facing windows do not provide any means to control the direct sunlight. This project will provide perforated metal panels to diffuse the harsh direct sunlight.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or Work by Owner. Coordinate the Work of this Contract with Work performed by Owner.

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

1. Information Technology/Cabling

2. Security/Access Control

1.6 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under specific conditions and then only after providing temporary utility services:

1. Notify Owner not less than 2 days in advance of proposed utility interruptions.

C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.

D. Controlled Substances: Use of controlled substances on the Project site is not permitted.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

E. Order of Acceptance: The contract will be awarded to the lowest responsible bid derived from the combination of the base bid and the executed alternates.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Bid Alternate One: Repairing and recoating of polyurethane foam/silicone roof system.

1. Base Bid: Include the repair and recoating of existing roof system only as needed to install new mechanical equipment as noted on roof details and as noted on the roof plan sheet A-121.
2. Alternate:
    a. Perform a moisture survey to identify wet/deteriorated foam.
    b. Powerwash existing polyurethane foam roof areas to remove all loose dirt, debris and non-embedded granules
    c. Repair mechanical damage, foam blisters, exposed foam, cracks and bird damage with polyurethane foam and/or silicone sealant.
    d. Reseal around new mechanical equipment, curbs, penetrations, flashing and where mechanical equipment curbs and penetrations have been removed as part of demolition.
    e. Spray and/or roll apply silicone coating over polyurethane foam in two separate coats. Total minimum thickness to be 15 dry mils. Embed white ceramic roof granules into top coat.

B. Bid Alternate Two: Asphalt walking trail.

1. Base Bid: Do not include asphalt walking trail.
2. Alternate:
    a. Provide asphalt walking trail to the extent indicated on sheets C-109 and C-110 and as detailed on sheet C-301.

C. Bid Alternate Three: Asphalt trail connector from Recreation center to Creekside Elementary School.

1. Base Bid: Do not include asphalt connector trail.
2. Alternate:
    a. Provide asphalt connector trail to the extent indicated on sheet C-109 and as detailed on sheet C-301.

END OF SECTION 012300

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract sum or the Contract time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract sum or the Contract time. If necessary, the description will include supplemental or revised drawings and specifications.

1. Proposal requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 7 days after receipt of Proposal request, submit a quotation estimating cost adjustments to the Contract sum and the Contract time necessary to execute the change.
    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities. Refer to 00811 SUPPLEMENTAL CONDITIONS, Section 7.1.4 for Contractor Allowances.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract sum and the Contract time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract time.

C. Proposal Request Form: Use AIA Document G709 for Proposal requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Work Change Directive: Architect may issue a Work Change Directive on AIA Document G714. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the contract sum or the Contract time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process applications for payment.

B. Related Sections include the following:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract sum to various portions of the Work and used as the basis for reviewing Contractor's applications for payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:

a. Application for payment forms with continuation sheets.
b. Submittals schedule.
c. Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date but no later than 7 days before the date scheduled for submittal of initial applications for payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each specification section.

1. Identification: Include the following project identification on the schedule of values:

a. Project name and location.

b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Submit draft of AIA Document G703 continuation sheets.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related specification section or division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change orders (numbers) that affect value.
    g. Dollar value.

        1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of applications for payment and progress reports. Coordinate with the project manual table of contents. Provide several line items for principal subcontract amounts. Where appropriate, include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, project record documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where applications for payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the schedule of values and applications for payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next applications for payment when change orders or construction change directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each application for payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial application for payment, application for payment at time of substantial completion, and final application for payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each application for payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 continuation sheets as form for applications for payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts of change orders and construction change directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each application for payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each application for payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final application for payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first application for payment include the following:

1. List of subcontractors.
2. Schedule of values.

3. Contractor's construction schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices.
6. Submittals schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing the certificate of substantial completion, submit an application for payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect certificates of partial substantial completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final application for payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of substantial completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012900

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
3. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
4. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
5. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
6. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for

review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Construction Manager.
5. Name of Contractor.
6. Name of firm or entity that prepared submittal.
7. Names of subcontractor, manufacturer, and supplier.
8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
9. Category and type of submittal.
10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.

15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architects on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

    a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
4. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. 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.

H. Test and Research Reports:

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

C. Related sections include the following:

1. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not samples

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 SUBMITTALS

A. Delegated-Design Submittal: In addition to shop drawings, product data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee

payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling Work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional Engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain Sections of the specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.

1. Contractor responsibilities include the following:

a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
d. When testing is complete, remove assemblies; do not reuse materials on project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect provide a mock up that incorporates each major exterior building component (i.e. Brick, window framing system, glazing sealants, and trim) into one panel.
2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by change order.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies, whether engaged by the Owner or Contractor, in writing at least 48 hours in advance of time when Work that requires testing or inspecting will be performed. If notice is not given as indicated above and alternative test methods must be employed to verify work, then Contractor will be charged the difference in cost between the two test methods, and the Contract Sum will be adjusted by change order.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

1. Testing agency will notify Architect, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect, with copy to Contractor and to authorities having jurisdiction.
3. Testing agency will submit a final report of special tests and inspections at substantial completion, which includes a list of unresolved deficiencies.
4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
5. Testing agency will retest and reinspect corrected Work.
6. The list of special tests and inspections attached to this Section shall be performed on this project.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents. Contractor shall bear all costs of retesting and reinspecting whether by Contractor's or Owner's testing agency.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the notice to proceed.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700

ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(405) 780-7372

APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA EWS	APA - The Engineered Wood Association; Engineered Wood Systems (See APA - The Engineered Wood Association)	
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (Now WCSC)	
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636

AWPA	American Wood-Preservers' Association www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137

CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	Canadian Standards Association	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Cast Stone Institute www.caststone.org	(717) 272-3744
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040

ESD	ESD Association www.esda.org	(315) 339-6937
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM Approvals	FM Approvals www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FMRC	Factory Mutual Research (Now FM Global)	
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Now GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute www.gamanet.org	(908) 464-8200

HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (Now CSA International)	
IBF	International Badminton Federation www.internationalbadminton.org	(6-03) 9283-7155
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150

ITS	Intertek Testing Service NA www.intertek.com	(972) 238-5591
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926

NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association	(866) 342-5642

	www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.com	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWWDA	National Wood Window and Door Association (Now WDMA)	
OPL	Omega Point Laboratories, Inc. (Now ITS)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929

PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America) www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980

SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800

UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 297-2109
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WIC	Woodwork Institute of California (Now WI)	
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names,

telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	
UBC	Uniform Building Code (See ICC)	

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration	(866) 835-5322

	www.faa.gov	
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
	Available from Defense Standardization Program www.dps.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include, but are not limited to, the following:

1. Water service and distribution.
2. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
3. Heating and cooling facilities.
4. Ventilation.
5. Electric power service.
6. Lighting.
7. Telephone service.

C. Support facilities include, but are not limited to, the following:

1. Temporary roads and paving.
2. Dewatering facilities and drains.
3. Project identification and temporary signs.
4. Waste disposal facilities.
5. Field offices.
6. Storage and fabrication sheds.
7. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Stormwater control.
3. Pest control.
4. Security enclosure and lockup.
5. Barricades, warning signs, and lights.
6. Fire protection.

E. Related Sections include the following:

1. Section 013300 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
2. Divisions 2 through 33 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's construction forces.
2. Occupants of Project.
3. Architect.
4. Testing agencies.
5. Personnel of authorities having jurisdiction.

B. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project Site.

1.5 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA'S "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect and City. Provide materials suitable for use intended.

B. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch od line posts and 2-7/8-inch od corner and pull posts, with 1-5/8-inch od top rails, with galvanized barbed-wire top strand.

C. Portable Chain-Link Fencing: Minimum 2-inch 9-gauge, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch od line posts and 2-7/8-inch od corner and pull posts, with 1-5/8-inch od top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.

D. Lumber and Plywood: Comply with requirements in Section 061053 "Miscellaneous Rough Carpentry."

E. Roofing: Standard-weight, mineral-surfaced, asphalt shingles or asphalt-impregnated and coated, mineral-surfaced, roll-roofing sheet.

F. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.

G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.

H. Paint: Comply with requirements in Division 09 Painting Sections.

I. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

J. Water: Potable.

2.2 EQUIPMENT

A. General: Provide equipment suitable for use intended.

1. Field Offices: Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.

B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.

1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degrees F.

E. Heating Equipment: Unless owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.

F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-v plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-v ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.

B. Sewers and Drainage: If sewers are not available, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
2. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
3. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

C. Water Service: Contractor may utilize the existing on-site water system for construction activities only. Temporary provisions from the water source to the construction area will be the responsibility of the Contractor. Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.
3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.

    a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.

    a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degrees F.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 degrees F in permanently enclosed portions of building for normal construction activities, and 65 degrees F for finishing activities and areas where finished Work has been installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a

harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

1. Install power distribution wiring overhead and rise vertically where least exposed to damage.

H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.

1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
2. Provide warning signs at power outlets other than 110 to 120 v.
3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
4. Provide metal conduit enclosures or boxes for wiring devices.
5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-v ac, 20-A circuit for each outlet.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Provide one 100-w incandescent lamp per 500 SF, uniformly distributed, for general lighting, or equivalent illumination.
3. Provide one 100-w incandescent lamp every 50 feet in traffic areas.
4. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the work is being performed.

J. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.

1. Provide additional telephone lines for the following:

a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.

c. Contractor's home office.
d. Architect/Engineer's office.
e. Owner's office.
f. Principal subcontractors' field and home offices.

3. Provide an answering machine on superintendent's telephone.
4. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
3. Maintain support facilities until near substantial completion. Remove before substantial completion. Personnel remaining after substantial completion will be permitted to use permanent facilities, under conditions acceptable to owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas as depicted on the Civil drawings.
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before substantial completion. Repair hot-mix asphalt base-course pavement before installation of final course.

C. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "stop" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding project or adjoining properties nor endanger permanent work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Project Identification and Temporary Signs: Prepare project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to project. Do not permit installation of unauthorized signs.

1. Engage an experienced sign painter to apply graphics for project identification signs. Comply with details indicated.
2. Prepare temporary signs to provide directional information to construction personnel and visitors.
3. Construct signs of exterior-type grade b-b high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
5. Sign to include the project name, name of the Owner, name and address of the Contractor, and name and address of the Architect/Engineer.

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

G. Common-Use Field Office: Provide an insulated, weathertight, air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project Site. Keep office clean and orderly.

1. Furnish and equip offices as follows:

    a. Desk and four chairs, four-drawer file cabinet, a plan table, a plan rack, and bookcase.
    b. Water cooler and private toilet complete with water closet, lavatory, and medicine cabinet with mirror.
    c. Provide a room of not less than 240 SF for project meetings. Furnish room with conference table, 12 folding chairs, and 4-foot-square tack board.

2. Provide an electric heater with thermostat capable of maintaining a uniform indoor temperature of 68 degrees F. Provide an air-conditioning unit capable of maintaining an indoor temperature of 72 degrees F.
3. Provide fluorescent light fixtures capable of maintaining average illumination of 20 fc at desk height. Provide 110- to 120-v duplex outlets spaced at not more than 12-foot intervals, 1 per wall in each room.

H. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.

1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near project site.

B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

C. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so project will be free of pests and their residues at substantial completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

E. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

1. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.

F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Vertical Openings: Close openings of 25 SF or less with plywood or similar materials.

3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
5. Where temporary wood or plywood enclosure exceeds 100 SF in area, use fire-retardant-treated material for framing and main sheathing.

G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.

   a. Field Offices: Class A stored-pressure water-type extinguishers.
   b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
   c. Locate fire extinguishers where convenient and effective for their intended purpose.

2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, temporary fire-protection facilities, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
5. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until substantial completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than substantial completion. Complete or, if necessary, restore permanent construction that may

have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At substantial completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
5. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. The Architect will perform one reinspection. If additional reinspections are required, the Contractor will reimburse the Owner, who in turn will reimburse the Architect for such inspections. Reimbursement will be based on the Architect's standard hourly rates for the staff required for the inspections times the hours spent at the inspection as well as traveling to and from the inspection and preparing the inspection report. Reimbursement will also include expenses related to travel by the Architect and other justifiable cost that the Owner incurs.
3. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. The Architect will perform one reinspection. If additional reinspections are required, the Contractor will reimburse the Owner, who in turn will reimburse the Architect for such inspections. Reimbursement will be based on the Architect's standard hourly rates for the staff required for the inspections times the hours spent at the inspection as well as traveling to and from the inspection. Reimbursement will also include expenses related to travel by the Architect and other justifiable cost that the Owner incurs.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit one copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or

installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical, electrical, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to unusual operating conditions.

o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

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SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, finishes, and systems and equipment.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit two draft copies of each manual at least 10 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit one paper copy and one electronic file (PDF) format of each manual in final form at least 10 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit one copy of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2 by 11 inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.

9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints along with one copy of electronic scans of drawings in PDF format to the Owner.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications to the Owner.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Work Change Directive.
k. Changes made following Architect's written orders.
l. Field records for variable and concealed conditions.
m. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Record Drawings for construction purposes. Maintain Record Drawings in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Drawings for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

B. Related Sections include the following:

1. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one paper and one electronic file (PDF) format of complete training manual(s) for Owner's use.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Motorized doors, including overhead coiling grilles and automatic entrance doors.
2. Equipment, including projection screens.
3. Fire-protection systems, including fire alarm and fire-extinguishing systems.
4. Intrusion detection systems.
5. Refrigeration systems, including evaporative coolers, condensers, pumps, and distribution piping.
6. HVAC systems, including air-handling equipment, air distribution systems, and terminal equipment and devices.
7. HVAC instrumentation and controls.
8. Electrical service and distribution, including transformers, switchboards, panelboards, and motor controls.
9. Packaged engine generators, including transfer switches.
10. Lighting equipment and controls.
11. Communication systems, including intercommunication, voice and data, and equipment.
12. Building security systems including access control closed circuit TV, duress alarm, and intrusion detection.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.

b. Performance and design criteria if Contractor is delegated design responsibility.
c. Operating standards.
d. Regulatory requirements.
e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:

a. Operations manuals.
b. Maintenance manuals.
c. Project Record Documents.
d. Identification systems.
e. Warranties and bonds.
f. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least 7 days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

END OF SECTION 017900

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 1.1 RELATED DOCUMENTS

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

B. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. B. Related Sections:

1. Section 230800 "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.

1.3 DEFINITIONS

A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. CxA: Commissioning Authority.

D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractors: Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to,

representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and each Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and each Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 EACH CONTRACTOR'S RESPONSIBILITIES

A. Each Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Attend commissioning team meetings held on a variable basis. Meeting schedules will be set after the construction contract is under way.
4. Integrate and coordinate commissioning process activities with construction schedule.
5. Review and accept construction checklists provided by the CxA.
6. Complete paper construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
8. Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan.

C. Convene commissioning team meetings.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

F. Prepare and maintain the Issues Log.

G. Prepare and maintain completed construction checklist log.

H. Witness systems, assemblies, equipment, and component startup.

I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 019113

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 015000 "Temporary Facilities and Controls."

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.

D. Predemolition Photographs: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

G. Shoring Design: Provide drawings and details of shoring that is proposed for temporary structural support where it is needed to maintain the existing structure in a safe condition during construction.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies and notify owner prior to the shut off.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least four hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements acceptable to authorities having jurisdiction.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Initially saw-cut perimeter of area to be demolished to neat lines to a minimum depth of two-inches, and then break through the perimeter with no greater than 30-pound air hammers. Then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 074113.16 and 075700 for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them per authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Remove: All items not classified below.

B. Existing to Remain: As noted on the drawings.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.6 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1.

1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301 (ACI 301M).
2. ACI 117 (ACI 117M).

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag; Type IP, portland-pozzolan; Type IL, portland-limestone; or Type IT, ternary blended cement.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: ASTM C 94/C 94M.

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: Multi-layer plastic extrusion sheet made from polyolefin resins, complying with ASTM E 1745 (Standard Specification for water vapor retarders – Class "A"), ASTM D 1709 (Test methods for impact resistance of plastic film – 3006 grams) and ASTM E 1745 (Test method for tensile properties of thin plastic sheets – 50 lbf/in.), sheets are not to be less than 10 mils thick.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).

B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as an option, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a w/c ratio below 0.50.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Normal-Weight Concrete Footings:

1. Minimum Compressive Strength: 3000 psi (31 MPa) at 28 days.
2. Maximum W/C Ratio: 0.47.
3. Slump Limit: 5 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content for Concrete Exposed to Weather: **5.5** percent, plus or minus 1.5 percent at point of delivery.
5. Concrete Protected from Exposure to Weather: Do not allow air content exceed 3 percent.

B. Normal-Weight Concrete Interior Slabs:

1. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
2. Maximum W/C Ratio: 0.47.
3. Slump Limit: 4 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

C. Normal-Weight Exterior Concrete (Concrete Exposed to the Weather):

1. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
2. Maximum W/C Ratio: 0.47.
3. Slump Limit: 4 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content for Concrete Exposed to Weather: **5.5** percent, plus or minus 1.5 percent at point of delivery.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to the indicated concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to interior building floor surfaces.
2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm).

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

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SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification and Certification Material for fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.
5. Nonshrink grout.

F. Survey of existing conditions.

G. Source quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.

4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using details indicated and AISC 360.
2. Use either Load and Resistance Factor Design; data are given at factored-load level or Allowable Stress Design; data are given at service-load level.

B. Moment Connections: Type FR, fully restrained.

C. Construction: Combined system of moment frame and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M or ASTM A 572/A 572M, Grade 50 (345).

B. Channels, Angles: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade C, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

1. Weight Class: as indicated
2. Finish: Black except where indicated to be galvanized.

F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.

B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain or Mechanically deposited zinc coating depending on exposure.

D. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: as indicated.
2. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
5. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C depending on exposure.

E. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C depending on exposure.

2.4 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."

F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.

2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to Section 099113 "Exterior Painting" for the exterior paint system and with fabricator's standard primer for interior steel.

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according indicated to ASTM A 123/A 123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2. Galvanize exterior steel and its attachments.

2.10 SOURCE QUALITY CONTROL

A. Fabricators certified according to this specification are qualified to be responsible for source quality control.

B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at fabricator's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where exposed in the completed construction, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

B. Touchup Painting for Interior Steel: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Priming for Exterior Steel: Cleaning and touchup priming are specified in Section 099113 "Exterior Painting".

END OF SECTION 051200

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SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Dovetail slotted roof deck.
2. Dovetail slotted acoustical roof deck.

B. Related Sections include the following:

1. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
2. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
3. Division 09 painting Sections for repair painting of primed deck.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Welding certificates.

E. Field quality-control test and inspection reports.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Power-actuated mechanical fasteners.
2. Acoustical roof deck.

G. Research/Evaluation Reports: For steel deck.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

C. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

D. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 45 percent.

E. Noise reduction coefficients for acoustical deck shall be verified by the result of sound absorption tests conducted in accordance with ASTM C423 and E795.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

1.6 COORDINATION

A. Coordinate installation of sound-absorbing insulation strips in topside ribs of acoustical deck with roofing installation specified in Division 07 to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Deck:

a. Consolidated Systems, Inc.
b. DACS, Inc.
c. Epic Metals Corporation.
d. Marlyn Steel Decks, Inc.
e. New Millennium Building Systems, LLC.
f. Nucor Corp.; Vulcraft Division.
g. Verco Manufacturing Co.
h. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Type ER1.5R-22 gauge roof deck as manufactured by Epic Metals Corporation or approved equal Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating.
2. Deck Profile: B-Type
3. Profile Depth: 1-1/2 inches.
4. Design Uncoated-Steel Thickness: 0.0298 inch. The minimum uncoated thickness of the steel furnished shall not be less than 95 percent of the design thickness.
5. Span Condition: Triple span or more where possible.
6. Side Laps: Overlapped

2.3 ACOUSTICAL ROOF DECK

A. Acoustical Steel Roof Deck: Type ER5A-20 gauge acoustical roof deck as manufactured by Epic Metals Corporation or approved equal. Fabricate panels, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
   a. Color: Manufacturer's standard.
2. Deck Profile: Composite/continuous with dovetail shaped ribs.
3. Profile Depth: 5 inches.
4. Design Uncoated-Steel Thickness: 0.0358 inch. The minimum uncoated thickness of the steel furnished shall not be less than 95 percent of the design thickness.
5. Span Condition: Single span.
6. Side Laps: Overlapped.
7. Acoustical Perforations: Deck units with manufacturer's standard perforated bottoms.
8. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber.
9. Acoustical Performance: NRC 0.90, tested according to ASTM C 423.

2.4 SUN SCREEN

A. Acoustical Steel Deck:Type EST4-20 gauge acoustical deck as manufactured by Epic Metals Corporation or approved equal. Fabricate panels, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard.

2. Deck Profile: Dovetail shaped ribs.
3. Profile Depth: 4 inches.
4. Design Uncoated-Steel Thickness: 0.0358 inch. The minimum uncoated thickness of the steel furnished shall not be less than 95 percent of the design thickness.
5. Span Condition: Single span.
6. Side Laps: Overlapped.
7. Perforations: Deck units with manufacturer's standard perforated bottoms.

2.5 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Wedge Nut hanging devices shall be installable and relocatable along the length of the interior ribs of the roof deck. The manufacturer's product data shall be consulted for minimum spacing, load capacities, and proper installation procedure of the Wedge Nut hanging devices.

G. Acoustic elements shall be provided for installation above the perforations in the bottom flat area between the dovetail shaped ribs. To facilitate field painting of the perforated surfaces, the sound absorbing elements shall be supported above the surface by spacers. Sound absorbing elements and spacers shall be furnished under this specification section for installation by the roofing contractor.

H. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

I. Galvanizing Repair Paint: ASTM A 780.

J. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Locate deck bundles to prevent overloading of supporting members.

C. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

D. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

E. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

F. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

G. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

H. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

1. Weld Diameter: 3/4 inch, nominal.
2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18-inches, and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Butted or lapped.

D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

F. Sound-Absorbing Insulation: Install into topside ribs of deck per manufacturer's instructions, and coordinate the installation of deck panels with roof construction.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 09."

C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 09."

D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

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SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Load-bearing exterior wall framing.

2. Non load-bearing exterior wall framing.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for masonry shelf angles and connections.
2. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated Design Submittal: For cold formed steel framing.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.
   1. Expansion anchors.
   2. Power-actuated anchors.
   3. Mechanical fasteners.
   4. Vertical deflection clips.
   5. Horizontal drift deflection clips
   6. Miscellaneous structural clips and accessories.

D. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:

   1. AllSteel & Gypsum Products, Inc.
   2. California Expanded Metal Products Company.
   3. ClarkWestern Building Systems, Inc.
   4. Consolidated Fabricators Corp.; Building Products Division.
   5. Craco Mfg., Inc.
   6. Custom Stud Inc.
   7. Design Shapes in Steel.
   8. Dietrich Metal Framing; a Worthington Industries Company.
   9. Formetal Co. Inc. (The).
   10. MarinoWARE.
   11. Nuconsteel; a Nucor Company.
   12. Olmar Supply, Inc.
   13. Quail Run Building Materials, Inc.
   14. SCAFCO Corporation.
   15. Southeastern Stud & Components, Inc.

16. State Building Products, Inc.
17. Steel Construction Systems.
18. Steel Network, Inc. (The).
19. Steel Structural Systems.
20. Steeler, Inc.
21. Super Stud Building Products, Inc.
22. Telling Industries, LLC.
23. United Metal Products, Inc.
24. United Steel Manufacturing.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer as defined in Section 014000 "Quality Requirements," to design cold formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

    a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/600 of the wall height.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 90 deg F.

4. Design framing system to maintain clearances at openings and to allow for construction tolerances.

C. Cold-Formed Steel Framing Design Standards:

1. Wall Studs: AISI S211.
2. Headers: AISI S212.
3. Lateral Design: AISI S213.

D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275) or equivalent.

2.4 EXTERIOR LOAD-BEARING AND NON LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Minimum Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Minimum Flange Width: 1-1/4 inches.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.8 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR LOAD-BEARING AND NON LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as indicated.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: As required by design. .

C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically as indicated on Shop Drawings. Fasten at each stud intersection.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds and other connections will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes where applicable:

1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Metal bollards.
4. Metal downspout boots.
5. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels and beams.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 051200 "Structural Steel Framing."

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Paint products.
2. Grout.

B. Sustainable Design Submittals:

1. Product Data: For low VOC content.

C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for mechanical and electrical equipment.
2. Metal bollards.
3. Metal downspout boots.
4. Loose steel lintels.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

F. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in

concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

G. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting." and Section 099123 Interior Painting."

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

I. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with zinc-rich primer where indicated for galvanized steel.

2.6 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize and prime exterior miscellaneous steel trim.

D. Prime exterior miscellaneous steel trim with zinc-rich primer.

2.7 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

1. Cap bollards with 1/4-inch- thick steel plate.
2. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
3. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

B. Fabricate bollards with 3/8-inch- thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.

D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4-inch steel machine bolt.

E. Prime bollards with zinc-rich primer.

2.8 METAL DOWNSPOUT BOOTS

A. Provide downspout boots where indicated made from cast iron in heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.

1. Outlet: Vertical, to discharge into pipe.

B. Prime cast-iron downspout boots with zinc-rich primer.

2.9 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

C. Prime plates with zinc-rich primer.

2.10 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.11 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.12 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

1. Do not fill removable bollards with concrete.

B. Anchor bollards to existing construction with expansion anchors, anchor bolts or through bolts. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches in concrete.

C. Anchor bollards in concrete in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

D. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

E. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

3.4 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting." Or Section 099123 "Interior Painting." Where applicable.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking and nailers.
3. Wood furring.
4. Plywood backing panels.

B. Related Requirements:

1. Section 061600 "Sheathing" for sheathing.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all miscellaneous carpentry unless otherwise indicated:

1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood blocking, furring or and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat all miscellaneous carpentry unless otherwise indicated:
1. Concealed blocking.
2. Roof blocking.
3. Wood nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
4. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Other Framing: No. 2 grade of the following species:

1. Hem-fir (north); NLGA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA.
4. Southern pine or mixed southern pine; SPIB.
5. Spruce-pine-fir; NLGA.
6. Douglas fir-south; WWPA.
7. Hem-fir; WCLIB or WWPA.
8. Douglas fir-larch (north); NLGA.
9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.

B. Dimension Lumber Items: No. 2 grade lumber of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Western woods; WCLIB or WWPA.
7. Northern species; NLGA.
8. Eastern softwoods; NeLMA.

C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.

2. Hem-fir or hem-fir (north), No. 2 grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, No. 2 grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, No. 2 grade; WCLIB or WWPA.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Screws for Fastening to Metal Framing: ASTM C 1002 or ASTM C 954, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.8 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. KC Metals Products, Inc.
2. Phoenix Metal Products, Inc.
3. Simpson Strong-Tie Co., Inc.
4. USP Structural Connectors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

2.9 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Plywood Panels

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for plywood backing panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

B. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing use in roof or on roof framing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings, and the following:

1. Roof sheathing.
2. Blocking.

F. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. CertainTeed Corporation.
    b. Georgia-Pacific Building Products.
    c. National Gypsum Company.

2. Type and Thickness: Type X, 5/8 inch thick or as indicated.
3. Size: 48 by 96 inches or 48 by 120 inches for vertical installation.

2.5 SHEATHING

A. Plywood Sheathing: Exterior sheathing.

1. Span Rating: Not less than 16/0.
2. Nominal Thickness: Not less than 3/4 inch.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel as recommended by manufacturer for application indicated.

B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Screws for Fastening Sheathing to Metal Framing: ASTM C 1002.

D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Sheathing:

a. Screw to cold-formed metal framing.
b. Space panels 1/8 inch apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.

D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.

2. Solid Surface counter-tops
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

2. Finishes Data Sheets.

B. Shop Drawings: For plastic-laminate-faced architectural cabinets.

1. Include plans, elevations, sections, and attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets and solid surface counter-tops.
5. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches for each type, color, pattern, and surface finish required.

a. Provide one sample applied to core material with specified edge material applied to one edge.

2. Thermoset Decorative Panels: 8 by 10 inches for each color, pattern, and surface finish.

3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

4. Solid Surface counter-tops (2" x 2")

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. High-pressure decorative laminate.
3. Adhesives.

C. Quality Standard Compliance Certificates: AWI Quality Certification Program.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Shop Certification: AWI's Quality Certification Program accredited participant.

B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET FABRICATORS

A. Fabricators: Subject to compliance with requirements, provide products by the following:

2.2 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Grade: Premium.

C. Sustainability:

1. VOC content.

D. Type of Construction: Frameless.

E. Door and Drawer-Front Style: Flush overlay or as indicated.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Formica Corporation.
b. Pionite; a Panolam Industries International, Inc. brand.
c. Wilsonart.

G. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS.
4. Edges: Grade VGS.
5. Pattern Direction: As indicated.

H. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.

a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

I. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

J. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

K. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

L. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated by laminate manufacturer's designations.
2. Match Architect's sample.
3. As selected by Architect from laminate manufacturer's full range colors.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified.

C. Sustainability:

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
2. Particleboard: ANSI A208.1, Grade M-2.

3. Softwood Plywood: DOC PS 1.
4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.4 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are required use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

2.5 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid 4 inches long, 5/16 inch in diameter.

E. Catches: Magnetic catches, BHMA A156.9, B03141.

F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.

G. Shelf Rests: BHMA A156.9, B04013; metal.

H. Drawer Slides: BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted.

    a. Type: Full extension.
    b. Material: Zinc-plated steel with polymer rollers.

2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full extension type; zinc-plated-steel ball-bearing slides.
3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
4. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.
5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.

I. Grommets for Cable Passage: 1-1/4-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Color: Black.

J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.

K. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.7 ACRYLIC SOLID SURFACE COUNTER-TOP

A. Composition: Acrylic resins, fire-retardant mineral fillers, and coloring agents. Through-the-body color for full thickness of sheet material.

B. Thickness: 1/2" (nominal)

C. Color, Pattern and Finish: As selected from manufacturer's full range products.

D. Physical Characteristics:

1. Tensile Strength: 3400 psi; ASTM D 638.
2. Flexural Strength: 6,800 psi; ASTM D 790.
3. Impact Resistance: 69 in. drop with no fracture; NEMA LD-3, Method 3.8.
4. Stain Resistance: ANSI Z 124.3.
5. Weight: 4.2 lb./ft2.
6. Surface Burning Characteristics: Class I and Class A; ASTM E 84.

E. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Avonite, by Aristech Surfaces
b. Corian, by DuPont
c. Wilsonart.

2.8 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for

shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 EXECUTION

A. Fabricate components in shop, to greatest extent practicable, in sizes and shapes indicated according to approved shop drawings.

B. Form joint seams between solid surfacing components with manufacture's recommended seam adhesive. Completed joints inconspicuous in appearance and without voids. Provide joint reinforced if required by manufacturer for particular installation conditions.

C. Install solid surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Provide minimum 1/2 inch radius for countertop inside corners.

D. Rout sink cutouts to manufacturer's template. Adhere solid surface cast sink units to countertops with specified adhesive. Install backsplashes and end-splashes where indicated. Adhere to countertops with specified construction adhesive.

E. Clean solid surfacing components according to manufacturer's published maintenance instructions. Completely remove excess adhesives and sealants from finished surfaces.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

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SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for sheet vapor retarders under slabs-on-grade.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.3 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. BASF Corporation; Construction Systems.
2. Henry Company.
3. W. R. Meadows, Inc.

B. Trowel Coats: ASTM D 1227, Type II, Class 1.

C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.

D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.4 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Asphalt-Coated Glass Fabric: ASTM D 1668/D 1668M, Type I.

D. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.

E. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

1. Thickness: Nominal 1/8 inch.
2. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer for protection course type.

F. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type X, 1/2 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.

B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.

D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections**.**

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.

1. Apply dampproofing to provide continuous plane of protection.
2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations and Parged Masonry Foundation Walls: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1.5 gal./100 sq. ft. for second coat or one trowel coat at not less than 4 gal./100 sq. ft.

3.5 PROTECTION COURSE INSTALLATION

A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
2. Install protection course on same day of dampproofing installation (while coating is tacky) to ensure adhesion.

3.6 PROTECTION

A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where panels are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

B. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

END OF SECTION 071113

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Polyisocyanurate foam-plastic board.
3. Glass-fiber blanket.

B. Related Requirements:

1. Section 074113.16 "Standing Seam Metal Roof Panels" for insulation specified as part of roofing construction.
2. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Recycle Content.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.

2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyisocyanurate Board, Glass-Fiber-Mat Faced: ASTM C 1289, glass-fiber-mat faced, Type II, Class 2.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Atlas Roofing Corporation.
b. Carlisle Coatings & Waterproofing Inc.
c. Firestone Building Products.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.3 GLASS-FIBER BLANKET

A. Sustainability: 25% Recycle Content.

B. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. CertainTeed Corporation.
    b. Johns Manville; a Berkshire Hathaway company.
    c. Owens Corning.

C. Sustainability: 25% Recycle Content.

D. Glass-Fiber Blanket, Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. CertainTeed Corporation.
    b. Johns Manville; a Berkshire Hathaway company.
    c. Owens Corning.

2.4 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. AGM Industries, Inc.
    b. Gemco.

2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 2 inches between face of insulation and substrate to which anchor is attached.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. AGM Industries, Inc.
b. Gemco.

2.5 ACCESSORIES

A. Insulation for Miscellaneous Voids:
1. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
2. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. EIFS-clad drainage-wall assemblies that are field applied over substrate.
2. Water-resistive barrier coatings.

B. Related Requirements:

1. Section 072500 "Weather Barriers" for water-resistant building paper or building wrap and flexible flashings installed over sheathing behind mechanically fastened EIFS.
2. Section 072726 "Fluid-Applied Membrane Air Barriers" for fluid-applied, synthetic polymer air barriers applied over sheathing behind EIFS-clad wall assemblies provided by the EIFS Manufacturer.

1.3 DEFINITIONS

A. Definitions in ASTM E 2110 apply to Work of this Section.

B. EIFS: Exterior insulation and finish system(s).

C. IBC: International Building Code.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory**,** including water-resistive barrier coatings.

B. Shop Drawings:

1. Include details for EIFS buildouts.
2. Include details for parapet cap flashing.

C. Samples: For each exposed product and for each color and texture specified, 8 inches square in size.

D. Samples for Initial Selection: For each type of finish-coat color and texture indicated.

1. Include similar Samples of exposed accessories involving color selection.

E. Samples for Verification: 12-inch- square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work, including custom trim, each profile, and an aesthetic reveal.

1. Include exposed trim and accessory Samples to verify color selected.
2. Include a typical control joint filled with sealant of color selected, as specified in Section 079200 "Joint Sealants."

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Manufacturer Certificates: Signed by EIFS manufacturer, certifying the following:

1. EIFS complies with requirements.
2. Substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer.
3. Accessory products installed with EIFS, including joint sealants, flashing, water-resistive barrier coatings, and trim whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

C. Product Certificates: For cementitious materials and aggregates and for insulation and joint sealant, from manufacturer.

D. Product Test Reports: For each EIFS assembly and component, and for water-resistive barrier coatings, for tests performed by a qualified testing agency.

E. Field quality-control reports.

F. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For EIFS to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by AWCI International as qualified to install Class PB EIFS using trained workers.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1. Stack insulation board flat and off the ground.
2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1. Proceed with installation of adhesives or coatings only when ambient temperatures have remained, or are forecast to remain, above 40 deg F (4.4 deg C) for a minimum of 24 hours before, during, and after application. Do not apply EIFS adhesives or coatings during rainfall.

1.11 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Bond integrity and weathertightness.
b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.

2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:

a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
b. Insulation installed as part of EIFS including foam buildouts.
c. Insulation adhesive and mechanical fasteners.
d. EIFS accessories, including trim components and flashing.
e. Water-resistive barrier coatings.
f. EIFS drainage components.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. BASF Corporation; Wall Systems.
2. Dryvit Systems, Inc.
3. Sto Corp.

B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. System Fire Performance: Fire-resistance rating of wall assembly.
3. Structural Performance of Assembly and Components:

a. Wind Loads: Uniform pressure of acting inward or outward as indicated on drawings.
b. Wind Loads: Uniform pressure as indicated on Drawings.

4. Impact Performance: ASTM E 2568, High impact resistance unless otherwise indicated.
5. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested according to ASTM D 968, Method A.
6. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate; cured for 28 days and shows no growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274.
7. Drainage Efficiency: 90 percent average minimum when tested according to ASTM E 2273.

2.3 EIFS MATERIALS

A. Water-Resistive Barrier Coating: EIFS manufacturer's standard formulation and accessories for use as water-resistive barrier coating; compatible with substrate.

1. Water-Resistance: Comply with physical and performance criteria of ASTM E 2570/E 2570M.

B. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt, and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

C. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; compatible with substrate; and complying with the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150/C 150M, Type I, and polymer-based adhesive specified for base coat.
2. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
3. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.

D. Drainage: EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer, with manufacturer's standard corrosion-resistant mechanical fasteners suitable for intended substrate.

E. Molded, (Expanded) Rigid Cellular Polystyrene Board Insulation: Comply with ASTM E 2430/E 2430M, unless otherwise noted, and the following:

1. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to ASTM E 84.
2. Dimensions: Provide insulation boards of not more than 24 by 48 inches, with thickness indicated on Drawings.

3. Channeled Board Insulation: EIFS manufacturer's standard factory-fabricated profile with linear, vertical-drainage channels, slots, or waves on the back side of board.
4. Foam Buildouts: Provide with profiles and dimensions indicated on Drawings.

F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. according to ASTM E 2098/E 2098M and the following:

1. Reinforcing Mesh for EIFS, General: Not less than weight required to comply with impact-performance level specified in "Performance Requirements" Article.
2. Strip-Reinforcing Mesh: As recommended by EIFS manufacturer.
3. Detail-Reinforcing Mesh: As recommended by EIFS manufacturer.
4. Corner-Reinforcing Mesh: As recommended by EIFS manufacturer.

G. Base Coat: EIFS manufacturer's standard mixture complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150/ C 150M, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
3. Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
4. Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

H. Water-Resistant Base Coat: EIFS manufacturer's standard water-resistant formulation complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150/C 150M, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.

I. Mechanical Fasteners: EIFS manufacturer's standard corrosion-resistant fasteners, consisting of thermal cap, standard washer and shaft attachments, and fastener indicated below; designed to resist Project's design loads; capable of pulling fastener head below surface of insulation board; and complying with the following:

1. For attachment to steel studs from 0.033 to 0.112 inch in thickness, provide steel drill screws complying with ASTM C 954.
2. For attachment to light-gage steel framing members not less than 0.0179 inch in thickness, provide steel drill screws complying with ASTM C 1002.
3. For attachment to wood framing members and plywood sheathing, provide steel drill screws complying with ASTM C 1002, Type W.
4. For attachment to masonry and concrete substrates, provide sheathing dowel in form of a plastic wing-tipped fastener with thermal cap, sized to fit insulation thickness indicated and to penetrate substrate to depth required to secure anchorage.

J. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

K. Finish Coat: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following:

1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
2. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, and fillers used with stone particles for embedding in finish coat to produce an applied-aggregate finish.

3. Colors: Match Architect's sample or as selected by Architect from manufacturer's full range.
4. Textures: Match Architect's sample or as selected by Architect from manufacturer's full range.

L. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.

M. Water: Potable.

N. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard cell class for use intended, and ASTM C 1063.

1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
3. Weep Screed/Track: Prefabricated, one-piece type for attachment behind insulation with perforated face leg extended to form a drip and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.
4. Expansion Joint: Closed-cell polyethylene backer rod and elastomeric sealant 3/4-inch-minimum.
5. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.
6. Parapet Cap Flashing: Type for both flashing and covering parapet top, with design complying with ASTM C 1397.

2.4 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials, except as recommended by EIFS manufacturer.

Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

PART 3 - EXECUTION

3.1 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. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Begin coating application only after surfaces are dry.
2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

1. Concrete Substrates: Provide clean, dry, neutral-pH substrate for insulation installation. Verify suitability of substrate by performing bond and moisture tests recommended by EIFS manufacturer.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Water-Resistive Barrier Coating: Apply over sheathing or masonry surfaces to provide a water-resistive barrier.

1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.

B. Flexible-Membrane Flashing: Install over water-resistive barrier coating, applied and lapped to shed water; seal at openings, penetrations, and terminations. Prime substrates with flashing primer if required and install flashing.

3.5 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at windowsills and openings, and elsewhere as indicated. Coordinate with installation of insulation.

1. Weep Screed/Track: Use at bottom termination edges, at window and door heads, and at floor line expansion joints of water-drainage EIFS unless otherwise indicated.
2. Windowsill Flashing: Use at windows unless otherwise indicated.
3. Expansion Joint: Use where indicated on Drawings.
4. Casing Bead: Use at other locations.
5. Cap Flashing: Use where indicated on Drawings.

3.6 DRAINAGE MAT INSTALLATION

A. Drainage Mat: Apply wrinkle free, continuously, with edges butted and mechanically secured with fasteners over water-resistive barrier coating.

3.7 INSULATION INSTALLATION

A. Board Insulation: Adhesively and mechanically attach insulation to substrate in compliance with ASTM C 1397 and the following:

1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of drainage mat with adhesive once insulation is adhered to drainage mat.
3. Apply adhesive to ridges on back of channeled insulation by notched-trowel method in a manner that results in full adhesive contact over the entire surface of ridges, leaving channels free of adhesive once insulation is adhered to substrate.
4. Press and slide insulation into place. Apply pressure over entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
5. Allow adhered insulation to remain undisturbed for not less than 24 hours, before installing mechanical fasteners, beginning rasping and sanding insulation or applying base coat and reinforcing mesh.
6. Mechanically attach insulation to substrate. Install top surface of fastener heads flush with plane of insulation. Install fasteners into or through substrates with the following minimum penetration:

a. Steel Framing: 5/16 inch.
b. Wood Framing: 1 inch.
c. Concrete and Masonry: 1 inch.

7. Apply insulation over substrates in courses with long edges of boards oriented horizontally.
8. Begin first course of insulation from a level base line and work upward.
9. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
10. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints, so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings and not less than 4 inches from aesthetic reveals.

    a. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4 inches from vertical joints in sheathing.
    b. Mechanical Attachment: Offset joints of insulation from horizontal joints in sheathing.

11. Apply channeled insulation, with drainage channels aligned vertically.
12. Interlock ends at internal and external corners.
13. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
14. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
15. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation raspings or sandings.
16. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch.
17. Install foam buildouts and attach to structural substrate by adhesive and mechanical fastening.
18. Interrupt insulation for expansion joints where indicated.
19. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
20. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.
21. Before installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings.
22. Treat exposed edges of insulation as follows:

a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.

23. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier coating.

B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. At expansion joints in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
3. Where wall height or building shape changes.
4. Where EIFS manufacturer requires joints in long continuous elevations.

3.8 BASE-COAT APPLICATION

A. Water-Resistant Base Coat: Apply full-thickness coverage to exposed insulation and to exposed surfaces of sloped shapes, window sills, and foam build-outs and to other surfaces indicated on Drawings.

B. Base Coat: Apply full coverage to exposed insulation and foam build-outs with not less than 1/16-inch dry-coat thickness.

C. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

D. Double-Layer Reinforcing-Mesh Application: Where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 in same manner as first application. Do not apply until first base coat has cured.

E. Additional Reinforcing Mesh: Apply strip-reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip-reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch- wide, strip-reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.

1. At aesthetic reveals, apply strip-reinforcing mesh not less than 8 inches wide.
2. Embed strip-reinforcing mesh in base coat before applying first layer of reinforcing mesh.

F. Foam Buildouts: Fully embed reinforcing mesh in base coat.

G. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

3.9 FINISH-COAT APPLICATION

A. Primer: Apply over dry base coat.

B. Finish Coat: Apply full-thickness coverage over dry primed base coat, maintaining a wet edge at all times for uniform appearance, to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

1. Embed aggregate in finish coat to produce a uniform applied-aggregate finish of color and texture matching approved sample.

C. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Water-resistive barrier coatings applied over sheathing or masonry.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: According to ASTM E 2359/E 2359M.

D. EIFS will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.11 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072419

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Flexible flashing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For building flashing, include data on air and water-vapor permeance based on testing according to referenced standards.

B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. DuPont Building Innovations: E. I. du Pont de Nemours and Company.
b. GCP Applied Technologies Inc. (formerly Grace Construction Products).

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

B. Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Carlisle Coatings & Waterproofing Inc.
b. GCP Applied Technologies Inc. (formerly Grace Construction Products).

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

C. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

D. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

E. Coordinate flashing compatibility with air barrier material specified elsewhere in the project manual and specifications.

PART 3 - EXECUTION

3.1 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 072500

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR-WATER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Vapor-retarding, fluid-applied air barriers.

B. Related Requirements:

1. Section 061600 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.
2. Section 072500 "Weather Barriers" for weather barriers, including flexible flashing.

1.3 DEFINITIONS

A. Air-Water Barrier Assembly: The collection of air and water barrier materials and accessories by the EIFS manufacturer applied to an opaque wall, including joints and junctions to abutting construction, to control air and water movement through the wall.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-water barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-water barrier protection, and work scheduling that covers air and water barriers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; water resistance; and tested physical and performance properties of products.

B. Shop Drawings: For air-water barrier assemblies.

1. Show locations and extent of air-water barrier materials, accessories, and assemblies specific to Project conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of the air-water barrier.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.

B. Product Certificates: From manufacturer, certifying compatibility of air and water barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

D. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

B. Mockups: Build mockups to set quality standards for materials and execution**.**

1. Build integrated mockups of exterior wall assembly 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-water barrier assembly.

    a. Coordinate construction of mockups to permit inspection and testing of air-water barrier before external insulation and cladding are installed.
    b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
    c. If Architect and/or owner determines mockups do not comply with requirements, reconstruct mockups and apply air-water barrier until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Apply air-water barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-water barrier performance.
2. Do not apply air-water barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-water barrier materials and air-barrier accessories from single source from single manufacturer approved by the EIFS manufacturer.

B. Source Limitations: Primary air-water barrier materials provided by the EIFS manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Water Barrier Performance: Air-water barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air and water barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration to the interstitial drainage space. Air-water barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier: Air Leakage: Maximum 0.004 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

C. Water Barrier: Water Resistance tested in accordance with ASTM D 2247.

2.3 AIR-WATER BARRIERS

A. High-Build, Vapor-Retarding Air Barrier: Polyurethane or synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, or thicker over smooth, void-free substrates.

1. Physical and Performance Properties:

a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
b. Water Resistance: No water penetration as tested in accordance with ASTM D 2247.
c. UV Resistance: Can be exposed to sunlight for 180 days minimum according to manufacturer's written instructions.
d. As recommended by EIFS manufacturer.

2.4 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Primer: Liquid primer recommended for substrate by air-water barrier material as recommended by the EIFS manufacturer.

C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, .0250 inch thick, and Series 300 stainless-steel fasteners where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that substrates have cured and aged for minimum time recommended in writing by air-water barrier manufacturer.
3. Verify that substrates are visibly dry and free of moisture.
4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-water barrier application.

B. Mask off adjoining surfaces not covered by air and water barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints or expansion joints; discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions/details.

3.3 ACCESSORIES INSTALLATION

A. Install accessory materials according to air-water barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air-water barrier with installation of roofing membrane and base flashing to ensure continuity of air-water barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-water barrier material on same day. Re-prime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-water barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air-water barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-water barrier material with foam sealant.

G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H. Seal top of through-wall flashings to air and water barrier with an additional 6-inch- wide, transition strip.

I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-WATER BARRIER MATERIAL INSTALLATION

A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous a barrier according to air-water barrier manufacturer's written instructions and details. Apply air-water barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B. Air-water Barriers: Apply continuous unbroken air-barrier material to substrates according to the recommended thickness. Apply air-water barrier material in full contact around protrusions such as masonry ties.

C. Do not cover air-water barrier until it has been tested and inspected by testing agency.

D. Correct deficiencies in or remove air-water barrier that does not comply with requirements; repair substrates and reapply air-water barrier components.

3.5 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-water barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Air-water barrier dry film thickness.
3. Continuous structural support of air-water barrier system has been provided.
4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
5. Site conditions for application temperature and dryness of substrates have been maintained.
6. Maximum exposure time of materials to UV deterioration has not been exceeded.
7. Surfaces have been primed, if applicable.
8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
9. Termination mastic has been applied on cut edges.
10. Strips and transition strips have been firmly adhered to substrate.
11. Compatible materials have been used.
12. Transitions at changes in direction and structural support at gaps have been provided.
13. Connections between assemblies (air-water barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
14. All penetrations have been sealed.

D. Tests: As determined by testing agency from among the following tests:

1. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783 or ASTM E 2357.

E. Air and water barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-water barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

F. Repair damage to air-water barriers caused by testing; follow manufacturer's written instructions.

G. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Protect air-water barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air-water barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
2. Protect air-water barrier from contact with incompatible materials and sealants not approved by air-water barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 072726

SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes standing-seam metal roof panels.

B. Related Requirements:

1. Section 076200 "Sheet Metal Flashing and Trim" for gutters and downspouts.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review structural loading limitations of deck during and after roofing.
6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
8. Review temporary protection requirements for metal panel systems during and after installation.
9. Review procedures for repair of metal panels damaged after installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Sustainable Design Submittals:

1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.

b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content: Provide product data on postconsumer recycled content plus one-half of preconsumer recycled content.

B. Energy Performance: Provide roof panels that are listed on the EPA/DOE's ENERGY STAR "Roof Product List" for Low-slope roof products.

C. Energy Performance: Provide roof panels according to one of the following when tested according to CRRC-1:

1. Solar reflectance Index of 29 according to ASTM E 1980.
2. Solar Reflectance of not less than 70 and emissivity of not less than 0.75.when calculated according to CRRC-1.

D. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

E. Air Infiltration: Air leakage of not more than 0.03 cfm/sq. ft. when tested according to ASTM E 1680 at the following test-pressure difference:

1. Test-Pressure Difference: 4.00 lbf/sq. ft.

F. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:

1. Test-Pressure Difference: 6.4 lbf/sq. ft.

G. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

H. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: As indicated on drawings.

I. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-150 or as required for local conditions.
2. Hail Resistance: SH.

J. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Advanced Architectural Products.
b. Architectural Metal Systems.

c. CENTRIA Architectural Systems.
d. Dimensional Metals, Inc.
e. Everlast Metals.
f. MBCI; a division of NCI Group, Inc.

2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Nominal Thickness: 0.034 inch.
b. Exterior Finish: Three-coat fluoropolymer.
c. Color: Match Architect's samples or as selected by Architect from manufacturer's full range.

3. Clips: One-piece fixed to accommodate thermal movement.

a. Material: 0.064-inch nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.

4. Panel Coverage: 18 inches (or match existing).
5. Panel Height: 3.00 inches maximum (or match existing).

2.3 UNDERLAYMENT MATERIALS

A. Vapor Permeable Underlayment Air Barrier: Provide self-adhering continuous applied, sheet underlayment applied over roof insulation, a minimum of 20 mil thick, consisting of slip-resistant, with the top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing, and have minimum vapor permeance of 10 perms. is Provide primer when recommended by underlayment manufacturer.

1. Vapor Permeance in accordance with ASTM E 96.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
3. Air Permeance in accordance with ASTM E 2178.

4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Carlisle Residential; a division of Carlisle Construction Materials.
b. GCP Applied Technologies Inc. (formerly Grace Construction Products).
c. Henry Company.
d. Owens Corning.

B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:

1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

    a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.

B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
4. Watertight Installation:

    a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

SECTION 075700 - COATED FOAMED ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Spray-applied, coated, polyurethane foam roofing.
2. Walkways.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking, curbs, cants, and nailers.
2. Section 076200 "Sheet Metal Flashing and Trim" for foam stops, roof penetration flashings, and counterflashings.
3. Section 079200 "Joint Sealants" for joint sealants, fillers, and preparation.

1.3 DEFINITIONS

A. Applicator: A qualified person employed to apply spray-applied, coated, polyurethane foam roofing.

B. Installer: A qualified firm contracted to install spray-applied, coated, polyurethane foam roofing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to coated foamed roofing, including, but not limited to, the following:

a. Load limitations on in-place roofing.
b. Construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
c. Surface preparation specified in other Sections.
d. Minimum curing period.
e. Forecasted weather conditions.

f. Special details and sheet flashings.
g. Repairs.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties.

B. Samples for Initial Selection: For each type of exposed product, finish, and color.

1. Include Samples of auxiliary materials and accessories involving color and finish selection.

C. Samples for Verification: For coated foamed roofing, prepared on Samples of size indicated below:

1. Samples, 24 by 24 inches, on rigid backing, showing polyurethane foam of thickness required and stepped coatings in colors required to illustrate buildup of coated foamed roofing.
2. Include Samples of auxiliary materials and accessories to verify color and finish selected.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For SPFA-qualified Installer and applicators.

B. Product Certificates: For each type of coated foam roofing.

C. Evaluation Reports: For coated foamed roofing, from ICC-ES.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coated foamed roofing to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A qualified coated-foamed-roofing installer who is approved, authorized, or licensed by coating manufacturer for installation of coating manufacturer's product over polyurethane foam.

1. Engage an installer who participates in and who has fulfilled requirements of the SPFA program for company accreditation as "SPFA PCP Accredited Company Roofing," with individual applicator certification for personnel assigned to work on Project.

B. Comply with recommendations in SPFA AY-104.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup of typical roof area as shown on Drawings.

a. Size: 8 feet by 8 feet.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion and approved by the manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.

B. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by manufacturer.

C. Remove and replace material that cannot be applied within its stated shelf life.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing work to be performed according to manufacturer's written instructions and warranty requirements.

1. Apply materials within the range of ambient and substrate temperatures recommended in writing by material manufacturers, but not below 50 deg F.
2. Apply materials within range of relative humidity recommended in writing by manufacturer of each component, but not when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
3. Do not apply materials to damp or wet surfaces.
4. Do not apply primers, polyurethane foam, or coatings in snow, rain, fog, or mist, or when such weather conditions are imminent during the application and curing period.
5. Do not apply polyurethane foam when wind conditions result in surface finish textures not complying with requirements.
6. Do not apply coatings when wind conditions prevent uniform coating application.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace coated foamed roofing that does not comply with requirements or that does not remain watertight within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Coated Foamed Roofing System: Obtain coating and polyurethane foam from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Coated foamed roofing shall withstand exposure to weather without failure due to defective manufacture, installation, or other defects in construction. Membrane roofing shall remain watertight.

1. Material Compatibility: Provide polyurethane foam, coatings, substrate board, and auxiliary materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Fire-Test-Response Characteristics: Provide coated foamed roofing with the fire-test-response characteristics indicated, as determined by testing identical systems according to test methods below for deck type and slopes indicated by a qualified testing and inspecting agency that is acceptable to authorities having jurisdiction.

1. Class A roof covering according to ASTM E 108.
2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 75 or less.

3. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Wind-Uplift Resistance: Design roofing system to resist the following wind-uplift pressures when tested according to FM 4474, UL 580, or UL 1897:

1. Wind Uplift: As indicated on drawings:

D. FM Approvals Listing: Provide roofing system and component materials that comply with requirements in FM Approvals Standard 4450 for steel roof decks and FM Approvals Standard 4470 for roof covers as part of a foamed roofing system and that are listed in FM

Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-105
2. Hail-Resistance Classification: MH.

E. Energy Performance: Provide coated foam roofing that is listed on the EPA/DOE's "ENERGY STAR Roof Product List" for low-slope roof products.

F. Energy Performance: Provide coated foamed roofing certified and labeled according to one of the following when tested according to CRRC-1:

1. Three-year, aged solar reflectance of not less than 0.55 and emissivity of not less than 0.75.
2. Three-year, aged Solar Reflectance Index of not less than 64 when calculated according to ASTM E 1980.

2.3 POLYURETHANE FOAM

A. Polyurethane Foam: Rigid, closed cell polyurethane; complying with ASTM C 1029, spray applied, with fire retardants as required, and acceptable to coating manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. BASF Corporation; SPF.
b. National Coatings Corporation.
c. SWD Urethane Company.

2. In-Place Density: 2.7 to 3.2 lb/cu. ft.; ASTM D 1622/D 1622M.

2.4 URETHANE COATINGS

A. Urethane Coating: Liquid urethane elastomeric coating system specifically formulated for coating spray-applied polyurethane foam roofing. One-component urethanes shall comply with ASTM D 6947/D 6947M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. BASF Corporation; SPF.
b. GAF.
c. Volatile Free, Inc.

2. Base Coat: One component urethane.
3. Topcoat: One-component urethane.

a. Color: White unless indicated otherwise.
b. Color at Walkways (where shown): Gray.

4. Tensile Strength: 350 psi minimum according to ASTM D 412.
5. Elongation: 200 percent minimum according to ASTM D 412 after 1000 hours accelerated weathering according to ASTM D 4798/D 4798M.
6. Water Absorption: 3 percent maximum by weight according to ASTM D 471.
7. Fungal Resistance: Zero rating according to ASTM G 21.
8. Tear Resistance: 100 lbf/inch minimum according to ASTM D 624.
9. Low-Temperature Flexibility: Pass 0.5-inch mandrel at minus 15 deg F according to ASTM D 522/D 522M.
10. Vapor Permeance: Minimum 3.3 perm at 20 mils thick according to ASTM E 96/E 96M, Desiccant Method, Procedure A.

2.5 SUBSTRATE BOARD

A. Thermal Barrier: Board product tested according to and meeting the requirements of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

B. Thermal Barrier: Water-resistant gypsum board with fiberglass mat laminated to both sides, ASTM C 1177/C 1177M, 1/2 inch.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. CertainTeed Corporation.
b. Georgia-Pacific Building Products.
c. National Gypsum Company.
d. USG Corporation.

C. Recover Board and Fasteners: As recommended in writing by polyurethane foam manufacturer.

D. Thermal-Barrier Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals Standard 4470, and designed and sized for fastening thermal barrier to substrate.

2.6 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended in writing by roofing manufacturer for intended use.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Primer: Polyurethane-foam manufacturer's standard factory-formulated primer.

C. Mineral Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained by No. 40 sieve.

1. Color: Buff white.
2. Size of granules: match existing foam roofing.

D. Reinforcement: Flexible polyester or fiberglass mat of weight, type, and composition recommended in writing by coating manufacturer for embedment in liquid coating.

E. Walkway Pads: Factory formed of nonwoven PVC strands, porous, UV stabilized, of 5/16-inch nominal thickness, and approved by coating manufacturer. Provide pad sizes indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Sika Greenstreak.

2. Color: Gray.

F. Sealant: ASTM C 920, Class 25, Use NT, Grade NS, Type S, one-component, neutral- or acid-curing silicone, and as recommended in writing by coated foamed roofing manufacturer for substrate and joint conditions and for compatibility with roofing materials.

G. Sheet Flashing and Accessories: Types recommended in writing by coated foamed roofing manufacturer, provided at locations indicated and as recommended.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that related work is complete. Do not install coated foamed roofing until roof openings, curbs, and parapets, if any, are complete and roof drains, vents, and other roof penetrations are in place.

B. Examine substrates, areas, and conditions under which coated foamed roofing will be applied, with Installer present, for compliance with requirements.

C. Proceed with installation only after unsatisfactory conditions have been corrected and substrates are dry.

D. Proceed with installation only after minimum concrete curing and drying period recommended in writing by coated foamed roofing manufacturer.

3.2 SUBSTRATE BOARD

A. General: Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

B. Thermal Barrier: Fasten to top flanges of steel deck according to recommendations in FM Global's "Approval Guide" and its FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

C. Thermal Barrier: Fasten to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to coated foamed roofing manufacturer's written instructions.

3.3 SURFACE PREPARATION

A. General: Clean and prepare substrate according to coated foamed roofing manufacturer's written instructions. Provide clean, dust-free, dew-free, and dry substrate for coated foamed roofing application.

B. Remove grease, oil, form-release agents, curing compounds, and other contaminants from substrate.

C. Cover and mask adjoining surfaces not receiving coated foamed roofing to prevent overspray or spillage affecting other construction. Temporarily close off roof drains, removing roof-drain plugs when not doing coated foamed roofing work or when rain is forecast.

1. Remove masking after polyurethane foam application; cover and re-mask adjoining surfaces before coating polyurethane foam.

D. Prime substrate as recommended in writing by coated foamed roofing manufacturer.

E. Fill, cover, or tape joints and cracks in substrate that exceed a width of 1/4 inch. Remove dust and dirt from narrower joints and cracks before applying polyurethane foam.

3.4 POLYURETHANE FOAM APPLICATION

A. General: Mix and apply polyurethane foam according to ASTM D 5469/D 5469M and coated foamed roofing manufacturer's written instructions.

1. Fill irregularities and depressions to prevent ponding water.
2. Apply the required full thickness of polyurethane foam in any specific area on same day.
3. Apply only the area of polyurethane foam that can be covered with required base coating on same day or within 24 hours.
4. Apply polyurethane foam to avoid overspray beyond immediate area of work.

B. Apply polyurethane foam in lift thicknesses of not less than 1/2 inch and not more than 1-1/2 inches.

C. Uniformly apply total thickness of polyurethane foam indicated, but not less than 1 inch, to a surface tolerance of plus 1/4 inch and no minus.

1. Slope to Drain: Vary thickness uniformly and fill low spots to achieve minimum 1/4-inch-per-foot slope to drain unless otherwise indicated.

D. Apply polyurethane foam to roof penetrations, terminations, and vertical surfaces as indicated. Unless otherwise indicated, extend polyurethane foam at least 4 inches above elevation of adjacent roof field.

E. Surface Finish: Provide finished surface of polyurethane foam within the following range of surface textures as defined by ASTM D 5469/D 5469M:

1. Texture: Smooth to orange peel to match existing texture.

F. Remove and replace polyurethane foam not complying with surface-texture limitations. Remove defective thickness and prepare and reapply polyurethane foam with acceptable, uniform results.

3.5 COATING APPLICATION

A. Allow polyurethane foam substrate to cure for a minimum of two hours before coating, and apply coating system to polyurethane foam no later than 24 hours after applying the foam. Remove dust, dirt, water, and other contaminants before applying coating system.

B. Apply coating system to polyurethane foam by spray, roller, or other suitable application method according to coating manufacturer's written instructions.

C. Apply base coat and one or more topcoats to obtain a uniform, seamless membrane free of blisters and pinholes. Apply each coat at right angles to preceding coat, using contrasting color tints for successive coats.

1. Apply topcoat(s) after removing dust, dirt, water, and other contaminants from base coat.
2. Urethane Coating: Apply coating system to a minimum dry film thickness recommended in writing by coated foamed roofing manufacturer of 25 mils.

D. Height at Terminations: Apply coating system at wall terminations and other vertical surfaces to extend vertically beyond polyurethane foam by a minimum of 4 inches.

E. Mineral Granules: Apply mineral granules over wet topcoat, using pressure equipment at the rate of 0.5 lb/sq. ft. Remove excess granules after topcoat has cured.

F. Sealant: Apply sealant to perimeter and other terminations where indicated on Drawings or required by coated foamed roofing manufacturer.

G. Walkways: Install roof walkways in pattern and locations indicated and as follows:

1. Preformed Walkway-Pad Walkways: Adhere walkway pads to substrate with compatible adhesive according to coated foamed roofing manufacturer's written instructions.

H. Aggregate: Apply aggregate uniformly over coated polyurethane foam at coated foamed roofing manufacturer's recommended rate, but not less than 6 lb/sq. ft. and a minimum thickness of 3/4 inch. Spread with care to prevent puncturing coating and to minimize damage to substrate foam.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Testing agency will identify, seal, and certify samples of materials taken from Project site, with Contractor present.
2. Testing agency will perform tests for product characteristics specified or cited in manufacturer's product data.

    a. Two core samples will be required for roof areas of up to 10,000 sq. ft., and one core sample will be required for each additional 10,000 sq. ft. or part thereof.
    b. Six slit-test samples will be required for each 10,000 sq. ft. of roof area to determine, as a minimum, the number of coats applied and dry film thickness of coating.

3. Testing agency will verify that surfaces slope to drain.

B. Coated foamed roofing will be considered defective if it does not pass tests and inspections.

C. Refill cores, repair slits, and re-coat test areas.

D. Prepare test and inspection reports.

3.7 REPAIR AND RE-COATING

A. Correct deficiencies in, or remove, foam or coatings that do not comply with requirements; fill and repair substrates and reapply materials.

B. Repair and re-coat coated foamed roofing according to ASTM D 6705/D 6705M and manufacturer's written instructions.

3.8 CURING, PROTECTING, AND CLEANING

A. Cure coatings according to manufacturer's written instructions, taking care to prevent contamination and damage during application stages and curing. Do not permit traffic on uncured coatings.

B. Protect coated foamed roofing from damage and wear during remainder of construction period.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 075700

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Formed roof-drainage sheet metal fabrications.
2. Formed wall sheet metal fabrications.
3. Formed perforated metal wall panels

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 079513.13 "Interior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for interior floors, walls, and ceilings.
3. Section 079513.16 "Exterior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for exterior building walls, soffits, and parapets.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

D. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

E. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are SPRI ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

D. FM Approvals Listing: Manufacture and install roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-105. Identify materials with name of fabricator and design approved by FM Approvals.

E. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on Drawings.

F. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than ten percent.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation, prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
2. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by Architect from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

C. Perforated Metal Wall Panel (Sheet): Manufacturer's standard factory-applied, flexible, protective back coating on both sides of panel.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Epic Metals Corporation.

2. Panel Type: "EST 4"

a. Panel Depth: 4"
b. Panel Thickness: 0.0474"
c. Material: Galvanized Steel in accordance with ASTM A924, Class 90.
d. Finish: Factory Standard (both sides).

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Carlisle Coatings & Waterproofing Inc.
b. Drexel Metals.
c. Henry Company.
d. Owens Corning.
e. Polyguard Products, Inc.

2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.

C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    b. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry,

metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

J. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

K. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of

size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Gutter Profile: Style A according to cited sheet metal standard.
2. Expansion Joints: Lap type or Butt type.
3. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen.
4. Gutters with Girth 16 to 20 Inches: Fabricate from the following materials:

    a. Galvanized Steel: 0.028 inch thick.

5. Gutters with Girth 21 to 25 Inches: Fabricate from the following materials:

    a. Galvanized Steel: 0.034 inch thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Hanger Style: Strap with concealed anchors.
2. Fabricate from the following materials:

    a. Galvanized Steel: 0.022 inch thick.

2.7 ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Joint Style: Overlapped, 4 inches wide.
2. Fabricate with profiles indicated
3. Fabricate from the Following Materials:

    a. Galvanized Steel: 0.028 inch thick.

B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch- wide, concealed backup plate.
2. Fabricate from the Following Materials:

    a. Galvanized Steel: 0.040 inch thick.

C. Roof and Roof-to-Wall Transition, Roof-to-Roof Edge-Flashing (Gravel-Stop) Transition. Expansion-Joint Cover: Fabricate from the following materials: Shop fabricate interior and exterior corners.

1. Galvanized Steel: 0.034 inch thick.

D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch thick.

E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12-foot- long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch- high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

B. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

D. Apply slip sheet, wrinkle free, over underlayment (or as indicated) before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. Substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Join sections with riveted and sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.

2. Anchor and loosely lock back edge of gutter to continuous cleat.
3. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
4. Anchor gutter with straps spaced not more than 24 inches apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
5. Install gutter with expansion joints at locations indicated, but not exceeding, 30 feet apart. Install expansion-joint caps.
6. Install continuous gutter screens on gutters with noncorrosive fasteners.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
2. Provide elbows at base of downspout to direct water away from building.
3. Connect downspouts to underground drainage system where provided.

D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

E. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

F. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

G. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of interlocking folded seam or blind rivets and sealant unless otherwise indicated.

H. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.9 PERFORATED METAL PANELS:

A. Installation of the perforated metal shall be installed per manufacturer's recommendations for the application indicated.

3.10 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On

completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls and assemblies.

B. Related Requirements:

1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."
2) Intertek Group in its "Directory of Listed Building Products."
3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Where indicated provide systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. 3M Fire Protection Products.
b. Hilti, Inc.
c. Tremco, Inc.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

1. Sealant shall have a VOC content of 250 g/L or less.

D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.3 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

D. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

E. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

F. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

G. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

C. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."

D. Penetration Firestopping Systems with No Penetrating Items:

1. UL-Classified Systems: C-AJ-0142 (or similar to achieve rating).
2. F-Rating: 1 hour.

3. T-Rating: 1 hour.
4. Type of Fill Materials: As required to achieve rating.

E. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing:

1. UL-Classified Systems: C-AJ-1421 (or similar to achieve rating)..
2. F-Rating: 1 hour.
3. Type of Fill Materials: As required to achieve rating.

F. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing:

1. UL-Classified Systems: C-AJ- 2167 (or similar to achieve rating)..
2. F-Rating: 1 hour.
3. Type of Fill Materials: As required to achieve rating.

G. Penetration Firestopping Systems for Insulated Pipes:

1. UL-Classified Systems: C-AJ-5091 (or similar to achieve rating).
2. F-Rating: 1 hour.
3. Type of Fill Materials: As required to achieve rating.

END OF SECTION 078413

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SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls and horizontal assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Joint firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."
2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Where indicated provide systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. 3M Fire Protection Products.
b. Hilti, Inc.
c. Tremco, Inc.

2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1. Sealant shall have a VOC content of 250 g/L or less.

D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.

C. Wall-to-Wall, Joint Firestopping Systems:

1. UL-Classified Systems: WW-D – 1080 (or similar to achieve rating)
2. Assembly Rating: 1 hour.
3. Nominal Joint Width: As indicated.

END OF SECTION 078443

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Latex joint sealants.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for Acoustical Joint Sealant for sealing joints in sound-rated construction.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

E. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with

requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Sealants and sealant primers shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. Pecora Corporation.
c. Sika Corporation; Joint Sealants.
d. Tremco Incorporated.

B. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. Pecora Corporation
c. Sika Corporation.
d. Tremco Incorporated.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Pecora Corporation.
b. Sika Corporation; Joint Sealants.
c. Tremco Incorporated.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Dow Corning Corporation.
    b. GE Construction Sealants; Momentive Performance Materials Inc.
    c. Tremco Incorporated.

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Pecora Corporation.
    b. Sherwin-Williams Company (The).
    c. Tremco Incorporated.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Alcot Plastics Ltd.
    b. BASF Corporation; Construction Systems.
    c. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, any of the type, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

    a. Perform 10 tests for the first 500 feet of joint length for each kind of sealant and joint substrate.
    b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
   a. Isolation and contraction joints in cast-in-place concrete slabs.
   b. Joints between different materials listed above.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 100/50, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
   a. Joints between plant-precast architectural concrete units.
   b. Control and expansion joints in unit masonry.
   c. Joints between different materials listed above.
   d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
   e. Control and expansion joints in overhead surfaces.
   f. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

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SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes interior expansion joint cover assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric-seal material.

E. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

F. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.

6. Product options.
7. Fire-resistance ratings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E 1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

C. Expansion Joint Design Criteria:

1. Type of Movement: Thermal.

a. Nominal Joint Width: As indicated on Drawings.

2. Type of Movement: Seismic.

a. Joint Movement: As indicated on Drawings.

2.3 WALL EXPANSION JOINT COVERS

A. Metal-Plate Wall Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Construction Specialties, Inc.
    b. InPro Corporation (IPC).
    c. Nystrom, Inc.

2. Application: Wall to wall.

3. Fire-Resistance Rating: Not less than that of adjacent construction.
4. Exposed Metal:

    a. Aluminum: Clear anodic, Class I.

B. Elastomeric-Seal Wall Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Construction Specialties, Inc.
    b. InPro Corporation (IPC).
    c. Nystrom, Inc.

2. Application: Wall to wall.

3. Fire-Resistance Rating: Not less than that of adjacent construction.
4. Exposed Metal:

    a. Aluminum: Clear anodic, Class I.

5. Seal: Preformed elastomeric membranes or extrusions.

    a. Color: As selected by Architect from manufacturer's full range.

2.4 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm. or thicker.

2.6 ACCESSORIES

A. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install frames in continuous contact with adjacent surfaces.

a. Shimming is not permitted.

2. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
3. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
4. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

G. Moisture Barrier Drainage: If indicated, provide drainage fittings and connect to drains.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION 079513.13

SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes exterior building expansion joint cover assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each exposed expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

E. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

F. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.
6. Product options.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Expansion Joint Design Criteria:

1. Type of Movement: Thermal.

a. Nominal Joint Width: As indicated on Drawings.

2. Type of Movement: Seismic.

a. Joint Movement: As indicated on Drawings.

2.3 EXTERIOR EXPANSION JOINT COVERS

A. Exterior Metal-Plate Joint Cover: Assembly consisting of sliding metal cover plate in continuous contact with gaskets mounted on metal frames fixed to sides of joint gap.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Construction Specialties, Inc.
b. InPro Corporation (IPC).
c. MM Systems Corporation.
d. Nystrom, Inc.

2. Application: Wall to wall and wall to roof.
3. Installation: Surface mounted.
4. Exposed Metal:

a. Aluminum: Clear anodic, Class I.

1) Color: As selected by Architect from full range of industry colors and color densities.

B. Exterior Elastomeric-Seal Joint Cover: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.

1. Application: Wall to wall and Soffit to soffit.
2. Installation: Recessed.
3. Exposed Metal:

a. Aluminum: Clear anodic, Class I.

1) Color: As selected by Architect from full range of industry colors and color densities.

4. Seal: Preformed elastomeric membrane or extrusion.

a. Color: Black.

2.4 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.5 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.6 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

1. Provide where indicated on Drawings.

B. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.

2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Moisture Barrier Drainage: If indicated, provide drainage fitting and connect to drains.

3.4 CONNECTIONS

A. Transition to Roof Expansion Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof expansion joint covers.

3.5 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections.

END OF SECTION 079513.16

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SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Interior standard steel frames.
2. Exterior standard steel doors and frames.

B. Related Requirements:

1. Section 087111 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation 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. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. Republic Doors and Frames.
4. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

A. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 Wind Zone 2.

1. Large-Missile Test: For glazed openings located within 30 feet of grade.

B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.38 deg Btu/F x h x sq. ft. when tested according to ASTM C 518.

2.3 INTERIOR STANDARD STEEL FRAMES

A. Construct hollow-metal frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches.
c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
b. Sidelite and Transom Frames (where indicated): Fabricated from same thickness material as adjacent door frame.
c. Construction: Knocked down frames shall be utilized for metal stud and gypsum board framing. Face welded frames are required for concrete masonry walls.

3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A. At all exterior locations unless otherwise noted.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.
c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Manufacturer's standard.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
b. Construction: Face welded.

3. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Fabricate of steel sheet to match door frame.

B. Construction: To match that of door frame.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.7 MATERIALS

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

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.8 FABRICATION

A. Door Astragals: Provide overlapping astragal 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 or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Where indicated, 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 welding.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

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

2.10 LOUVERS

A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.

1. Sight-proof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 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. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    b. Install frames with removable stops located on secure side of opening.

2. Floor Anchors: Secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, and trim for openings. Include factory-finishing specifications.

B. Sustainable Design Submittals:

1. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

D. Samples for Initial Selection: For factory-finished doors.

E. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
    a. Provide Samples for each species of veneer and solid lumber required.
    b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Algoma Hardwoods, Inc.
2. Graham Wood Doors; ASSA ABLOY Group Company.
3. Mohawk Flush Doors, Inc.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

B. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. WDMA I.S.1-A Performance Grade: Extra Heavy Duty (all doors).

D. WDMA I.S.1-A Performance Grade:

1. Extra Heavy Duty: Conference rooms, offices, public toilets, janitor's closets, assembly spaces, fitness areas, games rooms.

E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
4. Pairs: Provide formed-steel edges and astragals with intumescent seals.
    a. Finish steel edges and astragals with baked enamel same color as doors.
    b. Finish steel edges and astragals to match door hardware (locksets or exit devices).
5. Structural Composite Lumber: WDMA I.S.10.
    a. Screw Withdrawal, Face: 700 lbf.
    b. Screw Withdrawal, Edge: 400 lbf.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors <Insert drawing designation>:

1. Grade: Premium, with Grade AA faces.
2. Species: White oak.
3. Cut: Plain sliced (flat sliced).
4. Match between Veneer Leaves: Random match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening.
7. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet or more.
8. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
9. Exposed Vertical and Top Edges: Same species as faces or a compatible species - edge Type AA.
10. Core: Glued wood stave.
11. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
12. Construction: Seven plies, either bonded or nonbonded construction.
13. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.4 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard shape.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Metal Frames for Light Openings in Fire-Rated Doors: 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.

D. Metal Louvers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Air Louvers Inc.; a Division of the Activar Construction Products Group.
   b. Anemostat Products; a Mestek company.
   c. Louvers & Dampers, Inc.; a division of Mestek, Inc.

2. Blade Type: Vision-proof, inverted V.
3. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

E. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Air Louvers Inc.; a Division of the Activar Construction Products Group.
   b. Anemostat Products; a Mestek company.
   c. Louvers & Dampers, Inc.; a division of Mestek, Inc.

2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Factory finish doors that are indicated to receive transparent finish.

D. Factory finish doors where indicated in schedules or on Drawings as factory finished.

E. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" Modified Acrylic urethane.
3. Stain: Pigmented Modified Acrylic as selected by Architect from manufacturer's full range.
4. Effect: Filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.

a. Comply with NFPA 80 for fire-rated doors.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

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SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes access doors and frames for walls and ceilings.

B. Related Requirements:

1. Section 233300 "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

C. Product Schedule: For access doors and frames.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Acudor Products, Inc.
    b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    c. Larsens Manufacturing Company.

2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As indicated.
5. Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory applied finished.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Cam latch, screwdriver operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Concealed Flanges (where indicated):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Acudor Products, Inc.
    b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    c. Maxam Metal Products Limited.
    d. Nystrom, Inc.

2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As indicated.
5. Fire-Resistance Rating: Not less than 1 hour.
6. Steel Sheet for Door: Nominal 0.036 inch, 20 gage, factory applied finished.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Self-closing, self-latching door hardware, operated by key.

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

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

D. Frame Anchors: Same material as door face.

E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil for topcoat.

a. Color: As selected by Architect from full range of industry colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 083313 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Counter doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of coiling counter door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
3. Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
5. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Jambs, sill/counter.
3. Brackets.

4. Hood.
5. Locking device(s).

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Oversize Construction Certification: For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coiling counter doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.

1. Obtain operators and controls from coiling counter door manufacturer.

2.2 COUNTER DOOR ASSEMBLY

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Cornell Iron Works, Inc.
b. Overhead Door Corporation.
c. Raynor.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000 One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1. Include tamperproof cycle counter.

C. Door Curtain Material: Stainless steel.

D. Door Curtain Slats: Flat profile slats of 1 -1/2-inch center-to-center height.

1. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

E. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, fabricated stainless steel and finished to match door, jambs and counter.

F. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

G. Hood: Match curtain material and finish.

1. Shape: Round or Square.
2. Mounting: Face of wall.

H. Integral Frame, Hood, and Fascia: Stainless steel.

1. Mounting: Face of wall

I. Sill Configuration: Integral sill with counter indicated.

1. Size: As indicated on drawings.
2. Material: Stainless Steel.

J. Locking Devices: Equip door with locking device with key assembly.

1. Locking Device Assembly: Single-jamb side locking bars, operable from inside and outside with cylinders.

K. Manual Door Operator: Manufacturer's standard crank operator.

1. Provide operator with manufacturer's standard removable operating arm.

L. Curtain Accessories: Equip door with push/pull handles.

M. Door Finish:

1. Stainless-Steel Finish: No. 4 (polished directional satin).
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.3 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate coiling counter-door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness

and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Stainless-Steel Door Curtain Slats: ASTM A 666, Type 304; sheet thickness of 0.025 inch; and as required.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

1. Posts and Jamb Guides: Manufacturer's standard.

2.4 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Stainless Steel: 0.025-inch- thick stainless-steel sheet, Type 304, complying with ASTM A 666.

B. Integral Frame, Hood, and Fascia: Welded sheet metal assembly of the following sheet metal(s):

1. Stainless Steel: Type 304, complying with ASTM A 666.

2.5 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: Cylinders standard with manufacturer.
2. Keys: Four for each cylinder.

2.6 CURTAIN ACCESSORIES

A. Astragal: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.7 COUNTER DOOR ACCESSORIES

A. Integral Metal Sill-Counter: Fabricate sills as integral part of frame assembly of Type 304 stainless steel in manufacturer's standard thickness with No. 4 finish.

2.8 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Push-up Door Operation: Design counterbalance mechanism so that required lift or pull for door operation does not exceed 25 lbf.

C. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of type indicated. Size gears to require not more than 25-lbf force to turn crank. Fabricate gearbox to be oil tight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.

2.10 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install coiling counter doors, hoods, controls, and operators at the mounting locations indicated for each door.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Perform installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain coiling counter doors.

END OF SECTION 083313

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SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for windows.
3. Exterior and interior manual-swing entrance doors and door-frame units.

B. Related Requirements:

1. Section 087113: "Automatic Door Operators"
2. Section 087111: " Door Hardware"
3. Section 088800: "Glazing"

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.

2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

    a. Joinery, including concealed welds.
    b. Anchorage.
    c. Expansion provisions.
    d. Glazing.
    e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

G. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

H. Delegated-Design Submittal: For aluminum-framed entrances, storefronts and windows indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For Installer and laboratory mockup testing agency and field testing agency.

C. Energy Performance: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

D. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.

F. Source quality-control reports.

G. Field quality-control reports.

H. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances, storefronts and windows to include in maintenance manuals.

B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

1.8 PRECONSTRUCTION LABORATORY MOCKUPS

A. Preconstruction Laboratory Mockup Testing Program: Test preconstruction laboratory mockups according to requirements in "Performance Requirements" Article. Perform the following tests in the following order:

1. Structural: ASTM E 330 at 50 percent of positive test load.
2. Air Infiltration: ASTM E 283.
3. Water Penetration under Static Pressure: ASTM E 331.
4. Water Penetration under Dynamic Pressure: AAMA 501.1.
5. Structural: ASTM E 330 at 100 percent of positive and negative test loads. Repeat the following:

    a. Air Infiltration: ASTM E 283.
    b. Water Penetration under Static Pressure: ASTM E 331.

6. Interstory Drift: AAMA 501.4 at 100 percent of design displacement. Repeat the following:

    a. Air Infiltration: ASTM E 283.
    b. Water Penetration under Static Pressure: ASTM E 331.

7. Vertical Interstory Movement: AAMA 501.7. Repeat the following:

    a. Air Infiltration: ASTM E 283.
    b. Water Penetration under Static Pressure: ASTM E 331.

8. Thermal Cycling: According to AAMA 501.5. Repeat the following:

    a. Air Infiltration: ASTM E 283.
    b. Water Penetration under Static Pressure: ASTM E 331.

9. Structural: ASTM E 330 at 100 and 150 percent of positive and negative test loads. Repeat the following:

    a. Air Infiltration: ASTM E 283.
    b. Water Penetration under Static Pressure: ASTM E 331.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures including, but not limited to, excessive deflection.
    b. Noise or vibration created by wind and thermal and structural movements.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
d. Water penetration through fixed glazing and framing areas.
e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances, storefronts and windows.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances, storefronts and windows shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

   a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

2. Entrance Doors:

   a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
   b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
2. Maximum Water Leakage: According to AAMA 501.1 Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

I. Interstory Drift: Accommodate design displacement of adjacent stories indicated. Revise "Test Performance" Subparagraph below to suit Project.

1. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement.

J. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.

K. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing system shall have U-factor of not more than 0.50 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.5 as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.

L. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.

1. Outdoor-Indoor Transmission Class: Minimum 26.

M. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Zone 3.

1. Large-Missile Test: For glazed openings located within 30 feet of grade.

N. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

    a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
    b. Low Exterior Ambient-Air Temperature: 0 deg F.
    c. Interior Ambient-Air Temperature: 75 deg F.

O. Structural-Sealant Joints:

1. Designed to carry gravity loads of glazing.
2. Designed to produce tensile or shear stress of less than 20 psi.

P. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront system without failing adhesively or cohesively. When tested for

preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. EFCO Corporation.
2. Kawneer North America; an Alcoa company.
3. TRACO.

B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Front.
4. Finish: Baked-enamel or powder-coat finish or High-performance organic finish.
5. Fabrication Method: Field-fabricated stick system.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

    a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
    b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
    c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

    a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.

2. Door Design: Medium stile; 4-inch nominal width.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

    a. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087111 "Door Hardware (Descriptive Specification)."

B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
2. Opening-Force Requirements:

    a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion.

    b. Accessible Interior Doors" Subparagraph below is based on ADA-ABA Accessibility Guidelines.
    c. Accessible Interior Doors: Not more than 5 lbf to fully open door.

C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

F. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

G. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

H. Cylinders: BHMA A156.5, Grade 1.

1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".

I. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

J. Operating Trim: BHMA A156.6.

K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

L. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

N. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

1. Sealant shall have a VOC content of 250 g/L or less.

D. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.

1. Color: Black.

E. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.

1. Color: Match structural sealant.

2.7 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Storefront Framing: Fabricate components for assembly using shear-block system.

G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match existing frame color and gloss. The color selection is to be selected from the manufacturer's full range of color and gloss finishes.

2.10 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:

    a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
    b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
    c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

a. Perform a minimum of two tests in areas as directed by Architect.

C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.

1. Test a minimum of two areas on each building facade.
2. Repair installation areas damaged by testing.

D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

3.7 ENTRANCE DOOR HARDWARE SETS

A. Refer to Section 08 71 00 “Door Hardware” for additional hardware requirements for aluminum entrances and doors.

END OF SECTION 084113

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SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Mechanical door hardware for the following:

a. Swinging doors.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames"
2. Section 081416 "Flush Wood Doors"
3. Section 084113 "Aluminum-Framed Entrances and Storefronts"
4. Section 087113 "Automatic Door Operators" for low-energy power operators and low-energy power-assist operators.

1.3 COORDINATION

A. Floor-Recessed Door Hardware: where provided, coordinate layout and installation with floor construction.

1. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner and/or Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant**.**

B. Keying Conference: Conduct conference at Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant**.**
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:

a. Flow of traffic and degree of security required.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.
d. Requirements for access control.
e. Address for delivery of keys.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.
3. If alternate electrical products are submitted, it is the responsibility of the distributor to bear any and all costs of providing a complete and operational system including re-engineering of electrical diagrams and system layout, as well as power supplies, power transfers, and all other required electrical components.
4. Upon completion of the electrical hardware installation, the door hardware supplier shall verify that all electrical components are functioning properly and state in the required guarantee that this inspection has been performed.

C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.

1. Tag Samples with full product description to coordinate Samples with door hardware schedule.

D. Samples for Verification: For each type of exposed product, in each finish specified.

1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.

2. Tag Samples with full product description to coordinate Samples with door hardware schedule.

E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

a. Identification number, location, hand, fire rating, size, and material of each door and frame.
b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
e. Fastenings and other installation information.
f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
g. Mounting locations for door hardware.
h. List of related door devices specified in other Sections for each door and frame.

F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

G. Door Hardware: Hardware listed in the "Hardware Sets" at the end of this section are to serve as a basis of design and the standard of quality required. Alternates are acceptable provided any substitutions must be in compliance of the specific requirements and criteria listed in this section as the minimum standard of quality required. If alternates are provided, equivalent manufacturer model numbers and product data must be provided for evaluation; and the alternate manufacturer must provide in writing that these are equivalent to the hardware Basis of Design.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Architectural Hardware Consultant.

B. Product Certificates: For each type of electrified door hardware.

C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

B. Schedules: Final door hardware and keying schedule.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Door Hardware: Three key blanks for each lock.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

1.10 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:

a. Mortise Locks: Ten years from date of Substantial Completion.
b. Exit Devices: Ten years from date of Substantial Completion.
c. Closers: 10 years from date of Substantial Completion.
d. Continuous Geared Hinges: Lifetime.
e. Automatic Operators: Two years from date of Substantial Completion.
f. Thresholds, Door Sweeps, Self-Adhesive Gasketing, Perimeter Gasketing, Meeting Stile Gasketing, Mullion Seals, and Drip Strips: Three (3) Year Period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:

    a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
    b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 SCHEDULED DOOR HARDWARE

A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule. Hardware Sets listed in Part 3 represents the minimum standard of quality and basis of design.

1. Door hardware is scheduled in Part 3.

2.4 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allegion plc.
b. Bommer Industries, Inc.
c. Hager Companies.
d. McKinney Products Company; an ASSA ABLOY Group company.
e. Stanley Commercial Hardware; a division of Stanley Security Solutions.

B. Antifriction-Bearing Hinges:

1. Mounting: Full mortise (butts).
2. Bearing Material: Ball bearing.
3. Grade 1 (heavy weight).
4. Base and Pin Metal:

a. Exterior Hinges: Stainless steel with stainless-steel pin.
b. Interior Hinges: Stainless steel with stainless-steel pin unless indicated otherwise.
c. Hinges for Fire-Rated Assemblies: Stainless steel with stainless-steel pin.

5. Pins: Nonremovable.

a. Outswinging Exterior Doors: Nonremovable.
b. Outswinging Corridor Doors with Locks: Nonremovable.

6. Tips: Flat button.
7. Corners: Square unless indicated otherwise.

2.5 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Bommer Industries, Inc.

c. Hager Companies.
d. McKinney Products Company; an ASSA ABLOY Group company.
e. Stanley Commercial Hardware; a division of Stanley Security Solutions.

2. Grade: 1-600.
3. Hinges for Fire-Rated Assemblies: With steel fire pins to hold fire-rated doors in place if required by tested listing.
4. Mounting: Concealed leaf.
5. Electric Feature: Electric power transfer and switch.

2.6 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
2. Deadbolts: Minimum 1-inch bolt throw.

C. Lock Backset: 2-3/4 inches unless otherwise indicated.

D. Lock Trim:

1. Description: As indicated.
2. Levers: As indicated.
3. Escutcheons (Rose): As indicated.
4. Dummy Trim: Match lever lock trim and escutcheons.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Best Access Systems; Stanley Security Solutions, Inc.

c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
d. Stanley Commercial Hardware; a division of Stanley Security Solutions.
e. Yale Security Inc; an ASSA ABLOY Group company.

2.7 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company.
b. Burns Manufacturing Incorporated.
c. INOX by Unison Hardware, Inc.
d. Trimco.

B. Manual-Extension Flush Bolts: Grade 1, fabricated from extruded brass or aluminum, with 12-inch rod actuated by flat lever.

1. Strike: Matching.
2. Fire Rated: Listed and labeled for use in fire-rated assemblies.

C. Dustproof Strikes: Grade 1, polished wrought brass, with 3/4-inch- diameter, spring-tension plunger.

2.8 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
c. Precision Hardware, Inc.; a Stanley company.
d. SARGENT Manufacturing Company; ASSA ABLOY.
e. Yale Security Inc; an ASSA ABLOY Group company.

B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

C. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

D. Rim Exit Devices: Grade 1.

1. Type: 1, rim.
2. Actuating Bar: Narrow-stile push pad unless otherwise indicated.
3. Material: As indicated.
4. Electrified Features:

    a. Push pad monitor switch.
    b. Electric locking and unlocking.
    c. Fail-secure electric latch retraction (dogging) that engages latch when fire-alarm system is activated.
    d. Alarm.

E. Mortise Exit Devices: Grade 1.

1. Actuating Bar: Narrow-stile push pad.
2. Material: As indicated.
3. Electrified Features:

    a. Push pad monitor switch.
    b. Electric locking and unlocking.
    c. Fail-secure electric latch retraction (dogging) that engages latch when fire-alarm system is activated.
    d. Alarm.

F. Concealed Vertical-Rod Exit Devices: Grade 1.

1. Type: 6, narrow stile.
2. Actuating Bar: Narrow-stile push pad.
3. Material: As indicated.
4. Configuration: Top and bottom rods.
5. Electrified Features:

    a. Push pad monitor switch.
    b. Electric locking and unlocking.
    c. Fail-secure electric latch retraction (dogging) that engages latch when fire-alarm system is activated.
    d. Alarm.

G. Tube-Steel Removable Mullions: With malleable-iron top and bottom retainers, and prepared for strikes as follows:

1. Strikes: As indicated.

H. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Use mullions only with exit devices for which they have been tested.

I. Exit Device Outside Trim: As indicated in the schedule, material and finish to match locksets unless otherwise indicated.

1. Match design for lock trim unless otherwise indicated.

2.9 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver**.**

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Best Access Systems; Stanley Security Solutions, Inc.
c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
d. SARGENT Manufacturing Company; ASSA ABLOY.
e. Stanley Commercial Hardware; a division of Stanley Security Solutions.
f. Yale Security Inc; an ASSA ABLOY Group company.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

1. Core Type: Interchangeable.
2. Number of Pins: Six or Seven.
3. Lock Type: Mortise type.

C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.10 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.

a. Provide three cylinder change keys and five each of master and grand master keys.

2. Existing System:

a. Master key or grand master key locks to Owner's existing system.

3. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: Information to be furnished by Owner.

2.11 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Key Boxes and Cabinets.
b. GE Security, Inc.
c. Lund Equipment Co., Inc.
d. TelKee; Oasis International.

2. Wall-Mounted Cabinet: cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.12 OPERATING TRIM

A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Burns Manufacturing Incorporated.
c. Hager Companies.
d. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

B. Flat Push Plates: With square corners and beveled edges; secured with exposed screws.

1. Thickness: As indicated.
2. Size: As indicated.

C. Straight (Round) Door Pulls:

1. Type: round, constant-diameter pull.
2. Mounting: Surface applied with concealed fasteners.

3. Minimum Clearance: 1-1/2 inches from face of door.
4. Overall Length: As indicated.
5. Diameter: As indicated.

2.13 ACCESSORIES FOR PAIRS OF DOORS

A. Overlapping-with-Gasket Astragals: BHMA A156.22; T-shaped metal, surface mounted on edge of door with screws.

1. Gasket Material: Neoprene.

2.14 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
c. DORMA USA, Inc.
d. Hager Companies.
e. Norton Door Controls; an ASSA ABLOY Group company.
f. SARGENT Manufacturing Company; ASSA ABLOY.
g. Stanley Commercial Hardware; a division of Stanley Security Solutions.
h. Yale Security Inc; an ASSA ABLOY Group company.

B. Cast-Aluminum Surface Closers: Grade 1; Traditional type with mechanism enclosed in cast-aluminum alloy shell.

1. Mounting: As indicated
2. Type: As indicated

C. Surface Closer with Cover: Grade 1; Modern type with mechanism enclosed in cover.

1. Mounting: As indicated.
2. Type: As indicated.
3. Cover Material: Aluminum.
4. Closing Power Adjustment: At least 50 percent more than minimum tested value.

2.15 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Burns Manufacturing Incorporated.
c. Hager Companies.
d. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

B. Rigid-Type Floor Stop: Grade 1; with rubber bumper.

1. Installation: Surface-screw or Expansion-shield installation.

C. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch diameter, minimum 3/4-inch projection from wall; with backplate for concealed fastener installation.

1. Bumper Configuration: Concave.

2.16 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. DORMA USA, Inc.
c. Hager Companies.
d. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
e. SARGENT Manufacturing Company; ASSA ABLOY.

B. Overhead Concealed Slide Holders: Type 1; Grade 1; hold open and release by push and pull of door unless control is set in inactive position; with stop, shock absorber, and adjustable holding pressure; for doors opening 110 degrees.

1. Door Swing Type: Single acting.

C. Overhead Surface-Mounted Slide Holders: Type 2; Grade 1; hold open and release by push and pull of door unless control is set in inactive position; with stop, shock absorber, and adjustable holding pressure; for single-acting doors opening 110 degrees.

2.17 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Hager Companies.
b. National Guard Products, Inc.
c. Pemko Manufacturing Co.
d. Reese Enterprises, Inc.
e. Zero International, Inc.

B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
3. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

C. Rigid, Housed, Perimeter Gasketing: Neoprene bulb in place by housing; fastened to frame stop with screws.

1. Housing Material: Aluminum.

D. Overlapping Astragals for Meeting Stiles: Vinyl strip or Neoprene gasket material held in place by housing and overlapping when doors are closed; mounted to face of meeting stile with screws.

1. Housing Material: Aluminum.
2. Mounting: Surface mounted on face of each door.

E. Meeting Astragals for Meeting Stiles: Neoprene bulb gasket material held in place by housing; mounted with screws.

1. Housing Material: Aluminum.
2. Mounting: Surface mounted on face of each door.

F. Door Sweeps: Neoprene gasket material held in place by flat housing or flange; surface mounted to face of door with screws.

1. Housing or Flange Material: Aluminum.

2.18 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Hager Companies.
    b. National Guard Products, Inc.
    c. Pemko Manufacturing Co.
    d. Reese Enterprises, Inc.
    e. Zero International, Inc.

B. Saddle Thresholds:

1. Type: Fluted top, barrier free.
2. Base Metal: Aluminum.

2.19 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Allegion plc.
    b. Burns Manufacturing Incorporated.
    c. Hager Companies.
    d. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

B. Kick Plates: 10 inches high by door width with allowance for frame stops.

C. Mop Plates: 4 inches high by 1 inch less than door width.

2.20 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Allegion plc.
    b. Baldwin Hardware Corporation.
    c. Hager Companies.
    d. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

B. Silencers for Wood Door Frames: Grade 1; neoprene or rubber; minimum 5/8 by 3/4 inch; fabricated for drilled-in application to frame.

C. Silencers for Metal Door Frames: Grade 1; neoprene or rubber; minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

2.21 AUXILIARY ELECTRIFIED DOOR HARDWARE

A. Auxiliary Electrified Door Hardware:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Allegion plc.
b. Best Access Systems; Stanley Security Solutions, Inc.
c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
d. SARGENT Manufacturing Company; ASSA ABLOY.
e. Stanley Commercial Hardware; a division of Stanley Security Solutions.
f. Yale Security Inc; an ASSA ABLOY Group company.

B. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; listed and labeled for use with fire-alarm systems.

C. Monitor Strikes: Cast strike with toggle and Dustbox monitor for installation under standard strike.

D. Door Position Switches: Magnetically operated reed switch designed for concealed mounting.

E. Door and Frame Transfer Devices: Steel housing for mortise in hinge stile of door, with flexible tube for wiring bundle; accommodating doors that swing open to 120 degrees.

2.22 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not

permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

    a. Wood or Machine Screws: For the following:

        1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
        2) Strike plates to frames.
        3) Closers to doors and frames.

    b. Steel Through Bolts: For the following unless door blocking is provided:

        1) Surface hinges to doors.
        2) Closers to doors and frames.
        3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.23 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.
2. Furnish permanent cores to Owner for installation.

E. Key Control System:

1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule. Verify location with the owner.

F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening with electrified door hardware.

G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

HARDWARE GROUP NO. 001

FOR USE ON MARK/DOOR #(S):
116B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	EXIT DEVICE	CD - DL - 24 - R - NL-OP - 1439 STRIKE	US26D	FAL
1	EA	RIM CYLINDER	C953-7 CCA	626	FAL
1	EA	MORTISE CYLINDER	C987-7 CCA	626	FAL
2	EA	PERMANENT CORE	C607	626	FAL
1	EA	DOOR PULL	8190HD-2 X TYPE "O" MOUNTING	US32D	IVE
1	EA	OVERHEAD STOP	100S	US32D	GLY
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	MOUNTING PLATE	SC70-18	AL	FAL
1	EA	DRIP STRIP	142A	719	ZER
1	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	654A - E X 226 ANCHORS	719	ZER
1	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

GASKETING SHALL BE PROVIDED BY MANUFACTURER / SUPPLIER OF ALUMINUM DOOR AND FRAME.

DOOR CLOSER SHALL BE "TOP JAMB" MOUNTED.

DOOR OPENING IS REMOTELY MONITORED.

HARDWARE GROUP NO. 002

FOR USE ON MARK/DOOR #(S):
100A

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	EXIT DEVICE	CD - 24 - C - C (718C)	US26D	FAL
1	EA	EXIT DEVICE	CD - 24 - C - EO	US26D	FAL
1	EA	RIM CYLINDER	C953-7 CCA	626	FAL
2	EA	MORTISE CYLINDER	C987-7 CCA	626	FAL
3	EA	PERMANENT CORE	C607	626	FAL
2	EA	DOOR PULL	8190HD-2 X TYPE "O" MOUNTING	US32D	IVE
2	EA	OVERHEAD STOP	100S	US32D	GLY
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	AUTOMATIC OPERATOR	4642 CS REGULAR WMS	AL	LCN
1	EA	MOUNTING PLATE	SC70-18	AL	FAL
1	EA	WEATHER RING	8310-801	PLA	LCN
1	EA	WALL MOUNTED ACTUATOR	8310-853T	630	LCN
1	EA	DUAL WALL MOUNTED ACTUATOR	8310-855	630	LCN
2	EA	FLUSH MOUNTING BOX	8310-867F	689	LCN
2	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	654A - E X 226 ANCHORS	719	ZER
2	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

GASKETING SHALL BE PROVIDED BY MANUFACTURER / SUPPLIER OF ALUMINUM DOORS AND FRAME.

DOOR CLOSER SHALL BE "TOP JAMB" MOUNTED.

DESCRIPTION OF OPERATION:
"DAY MODE" - DOORS NORMALLY IN CLOSED AND UNSECURED POSITIONS.
FREE ENTRY AND EGRESS PERMITTED AT ALL TIMES.
MANUALLY DEPRESSING EXTERIOR ACTUATOR ACTIVATES DOOR 100A'S AUTOMATIC OPERATOR.
DOOR 100B'S AUTOMATIC OPERATOR REMAINS INACTIVE FOR A PREDETERMINED PERIOD OF TIME. UPON EXPIRATION OF TIME DELAY, DOOR 100B'S AUTOMATIC OPERATOR ACTIVATES AS DOOR 100A'S BEGINS TO CLOSE.
DOORS ALWAYS OPERABLE MANUALLY FROM EITHER SIDE. AUTOMATIC OPERATOR ACTS AS A STANDARD DOOR CLOSER.
"NIGHT MODE" - DOORS NORMALLY IN CLOSED AND SECURED POSITIONS.
FREE EGRESS IS PERMITTED AT ALL TIMES.
AUTHORIZED ENTRY ACHIEVED BY KEY IN CYLINDER.
DOOR OPENING IS REMOTELY MONITORED.

INSTALL DUAL WALL MOUNTED ACTUATOR IN VESTIBULE 100 AND WALL MOUNTED ACTUATOR IN AREAS DESIGNATED BY ARCHITECT / OWNER.

HARDWARE GROUP NO. 003

FOR USE ON MARK/DOOR #(S):
100B

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONTINUOUS GEARED HINGE	224HD EPT	US28	IVE
2	EA	POWER TRANSFER	EPT 10	SP28	VON
1	EA	EXIT DEVICE	RX - EL - 24 - C - C (718C)	US26D	FAL
1	EA	EXIT DEVICE	RX - EL - 24 - C - EO	US26D	FAL
1	EA	RIM CYLINDER	C953-7 CCA	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
2	EA	DOOR PULL	8190HD-2 X TYPE "O" MOUNTING	US32D	IVE
2	EA	OVERHEAD STOP	100S	US32D	GLY
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	AUTOMATIC OPERATOR	4642 CS REGULAR WMS	AL	LCN
1	EA	MOUNTING PLATE	SC70-18	AL	FAL
1	EA	KEYSWITCH	8310-806K	BLACK	LCN
1	EA	LOGIC MODULE	8310-845	689	LCN
1	EA	WALL MOUNTED ACTUATOR	8310-853T	630	LCN
1	EA	FLUSH MOUNTING BOX	8310-867F	689	LCN
1	EA	POWER SUPPLY	PS914 900-4RL 900-BBK 900-KL	LGR	VON

GASKETING (IF REQUIRED) SHALL BE PROVIDED BY MANUFACTURER / SUPPLIER OF ALUMINUM DOORS AND FRAME.

DOOR CLOSER SHALL BE "TOP JAMB" MOUNTED.

REFER TO HARDWARE GROUP NO. 002 (DOOR 100A) FOR DESCRIPTION OF OPERATION. KEYSWITCH PROVIDED FOR REMOTE OPERATION (ON/OFF/HOLD-OPEN) OF SPECIFIED AUTOMATIC DOOR OPERATORS FOR DOORS 100A AND 100B.

INSTALL WALL MOUNTED ACTUATOR AND KEYSWITCH IN AREAS DESIGNATED BY ARCHITECT / OWNER.

ALL HEAD END EQUIPMENT, INCLUDING BUT NOT LIMITED TO, ACCESS CONTROL READER, READER CONTROLLER, READER INTERFACE, WIRE, AND ALL OTHER COMPONENTS NECESSARY FOR A COMPLETE AND FUNCTIONING ACCESS CONTROL SYSTEM SHALL BE PROVIDED BY OWNER.

SUPPLIER SHALL COORDINATE ELECTRICAL REQUIREMENTS WITH ELECTRICAL ENGINEERS, ALARM SYSTEM'S ENGINEERS, AND ACCESS CONTROL SYSTEM'S INTEGRATORS.

HARDWARE GROUP NO. 004

FOR USE ON MARK/DOOR #(S):
117B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	APARTMENT LOCKSET	MA531HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	LOCK GUARD	LG12	US32D	IVE
1	EA	DOOR CLOSER	SC71 SS/HO TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	DRIP STRIP	142A	719	ZER
1	SET	PERIMETER GASKETING	429A	719	ZER
1	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	655A - E X 226 ANCHORS	719	ZER
1	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

DO NOT CUT GASKETING. DOOR CLOSER'S PARALLEL ARM BRACKET SHALL BE ATTACHED TO FRAME THROUGH GASKETING SECTION.

DOOR OPENING IS REMOTELY MONITORED.

HARDWARE GROUP NO. 005

FOR USE ON MARK/DOOR #(S):
120A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	LOCK GUARD	LG12	US32D	IVE
1	EA	DOOR CLOSER	SC71 SS/HO TBWMS	AL	FAL
1	EA	DRIP STRIP	142A	719	ZER
1	SET	PERIMETER GASKETING	429A	719	ZER
1	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	655A - E X 226 ANCHORS	719	ZER
1	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

DO NOT CUT GASKETING. DOOR CLOSER'S PARALLEL ARM BRACKET SHALL BE ATTACHED TO FRAME THROUGH GASKETING SECTION.
DOOR OPENING IS REMOTELY MONITORED.

HARDWARE GROUP NO. 006

FOR USE ON MARK/DOOR #(S):
102B 116C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	EXIT DEVICE	CD - 25 - R - NL-OP - SNB	US26D	FAL
1	EA	RIM CYLINDER	C953-7 CCA	626	FAL
1	EA	MORTISE CYLINDER	C987-7 CCA	626	FAL
2	EA	PERMANENT CORE	C607	626	FAL
1	EA	DOOR PULL	8190HD-2 X TYPE "O" MOUNTING	US32D	IVE
1	EA	DOOR CLOSER	SC71 SS TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	DRIP STRIP	142A	719	ZER
1	SET	PERIMETER GASKETING	429A	719	ZER
1	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	655A - E X 226 ANCHORS	719	ZER
1	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

DO NOT CUT GASKETING. RIM EXIT DEVICES' STRIKES AND DOOR CLOSERS' PARALLEL ARM BRACKETS SHALL BE ATTACHED TO FRAMES THROUGH GASKETING SECTIONS.

DOOR OPENINGS ARE REMOTELY MONITORED.

HARDWARE GROUP NO. 007

FOR USE ON MARK/DOOR #(S):
121A

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
2	EA	MANUAL FLUSH BOLT	FB458	US26D	IVE
1	EA	DUST PROOF STRIKE	DP2	US26D	IVE
1	EA	EXIT DEVICE	LD - 25 - M - NL (512NL) - SNB	US26D	FAL
1	EA	MORTISE CYLINDER	C987-7 CCA	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	OVERHEAD STOP & HOLDER	90H	US32D	GLY
1	EA	DOOR CLOSER	SC71 SS/HO TBWMS	AL	FAL
1	EA	DRIP STRIP	142A	719	ZER
1	SET	PERIMETER GASKETING	429A	719	ZER
2	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	655A - E X 226 ANCHORS	719	ZER
2	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

DO NOT CUT GASKETING. DOOR CLOSER'S PARALLEL ARM BRACKET AND OVERHEAD STOP'S JAMB BRACKET SHALL BE ATTACHED TO FRAME THROUGH GASKETING SECTIONS.

DOOR OPENING IS REMOTELY MONITORED.

HARDWARE GROUP NO. 008

FOR USE ON MARK/DOOR #(S):
115A 134A

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONTINUOUS GEARED HINGE	224HD	US28	IVE
1	EA	KEYED REMOVABLE MULLION	KR4023	USP	FAL
1	EA	EXIT DEVICE	CD - 25 - R - EO - SNB	US26D	FAL
1	EA	EXIT DEVICE	CD - 25 - R - NL-OP - SNB	US26D	FAL
1	EA	RIM CYLINDER	C953-7 CCA	626	FAL
3	EA	MORTISE CYLINDER	C987-7 CCA	626	FAL
4	EA	PERMANENT CORE	C607	626	FAL
2	EA	DOOR PULL	8190HD-2 X TYPE "O" MOUNTING	US32D	IVE
2	EA	DOOR CLOSER	SC71 SS/HO TBWMS	AL	FAL
2	EA	KICK PLATE	8400 10" X 2" LDW B4E CS	US32D	IVE
1	EA	DRIP STRIP	142A	719	ZER
1	SET	PERIMETER GASKETING	429A	719	ZER
1	EA	MULLION SEAL	8780N	BLACK	ZER
2	EA	MEETING STILE GASKETING	8195AA	628	ZER
2	EA	DOOR SWEEP	8197AA	628	ZER
1	EA	THRESHOLD	655A - E X 226 ANCHORS	719	ZER
2	EA	DOOR POSITION SWITCH	679-05	BLACK	SCE

DO NOT CUT GASKETING. DOOR CLOSERS' PARALLEL ARM BRACKETS SHALL BE ATTACHED TO FRAMES THROUGH GASKETING SECTIONS.

DOOR OPENINGS ARE REMOTELY MONITORED.

HARDWARE GROUP NO. 009

FOR USE ON MARK/DOOR #(S):
130A 132A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 8" X 16"	US32D	IVE
1	EA	DOOR CLOSER	SC71 HD/PA TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 010

FOR USE ON MARK/DOOR #(S):
125A 131B 133A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	630	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 8" X 16"	US32D	IVE
1	EA	DOOR CLOSER	SC71 HD/PA TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 011

FOR USE ON MARK/DOOR #(S):
128A 133B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 8" X 16"	US32D	IVE
1	EA	DOOR CLOSER	SC71 DS TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 012

FOR USE ON MARK/DOOR #(S):
131A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	630	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 8" X 16"	US32D	IVE
1	EA	DOOR CLOSER	SC71 DS TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 013

FOR USE ON MARK/DOOR #(S):
135A 135B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 4" X 16"	US32D	IVE
1	EA	OVERHEAD STOP	90S	652	GLY
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 014

FOR USE ON MARK/DOOR #(S):
127A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	630	IVE
1	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
1	EA	PUSH PLATE	8200 8" X 16"	US32D	IVE
1	EA	OVERHEAD STOP	90S	652	GLY
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 015

FOR USE ON MARK/DOOR #(S):
113A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE LATCHSET	MA101 SG	626	FAL
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 016

FOR USE ON MARK/DOOR #(S):
107A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCKSET	MA321 SG	626	FAL
1	EA	DOOR CLOSER	SC71 DS TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 017

FOR USE ON MARK/DOOR #(S):
108A 126A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	PRIVACY LOCKSET	MA321 SG	626	FAL
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 018

FOR USE ON MARK/DOOR #(S):
106B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCKSET	MA561HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 019

FOR USE ON MARK/DOOR #(S):
106A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCKSET	MA561HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	FLOOR STOP	FS439	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 020

FOR USE ON MARK/DOOR #(S):
110A 111A 114A 123A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	DORMITORY LOCKSET	MA571HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 021

FOR USE ON MARK/DOOR #(S):
103A 136A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	DORMITORY LOCKSET	MA571HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	OVERHEAD STOP	450S - J	652	GLY
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

INSTALL OVERHEAD STOPS ON "PULL SIDE" OF DOORS.

HARDWARE GROUP NO. 022

FOR USE ON MARK/DOOR #(S):
117A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	DORMITORY LOCKSET	MA571HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 023

FOR USE ON MARK/DOOR #(S):
112A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	DORMITORY LOCKSET	MA571HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	DOOR CLOSER	SC71 RW/PA TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	FLOOR STOP	FS439	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 024

FOR USE ON MARK/DOOR #(S):
105A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 025

FOR USE ON MARK/DOOR #(S):
118A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	OVERHEAD STOP	450S - J	652	GLY
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
3	EA	SILENCER	SR64	GREY	IVE

INSTALL OVERHEAD STOP ON "PULL SIDE" OF DOOR.

HARDWARE GROUP NO. 026

FOR USE ON MARK/DOOR #(S):
137A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	OVERHEAD STOP	450S	652	GLY
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 027

FOR USE ON MARK/DOOR #(S):
122A 124A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
1	EA	DOOR CLOSER	SC71 REGULAR TBWMS	AL	FAL
1	EA	KICK PLATE	8400 10" X 1-1/2" LDW B4E CS	US32D	IVE
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 028

FOR USE ON MARK/DOOR #(S):
102A 116A 129A

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	BUTT HINGE	5BB1HW 4.5 X 4.5	652	IVE
2	EA	DOOR PULL	8103HD-2 X TYPE (1/2) "STANDARD" AND (1/2) "O" MOUNTING	US32D	IVE
2	EA	PUSH PLATE	8200 4" X 16"	US32D	IVE
2	EA	DOOR CLOSER	SC71 DS TBWMS	AL	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B4E CS	US32D	IVE
2	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 029

FOR USE ON MARK/DOOR #(S):
119A 135C

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	BUTT HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2	EA	MANUAL FLUSH BOLT	FB458	US26D	IVE
1	EA	DUST PROOF STRIKE	DP2	US26D	IVE
1	EA	SINGLE DUMMY TRIM	MA12 SG	626	FAL
1	EA	STOREROOM LOCKSET	MA581HD7 SG	626	FAL
1	EA	PERMANENT CORE	C607	626	FAL
2	EA	OVERHEAD STOP	450S	652	GLY
2	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 030

FOR USE ON MARK/DOOR #(S):
117C

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

ALL REQUIRED DOOR HARDWARE ITEMS SHALL BE PROVIDED BY MANUFACTURER / SUPPLIER OF STEEL OVERHEAD COILING DOOR.

END OF SECTION 087111

SECTION 087113 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Power door operators for swinging doors.

1.3 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.

C. Double-Swing (Doors): A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.

D. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

E. For automatic door terminology, see BHMA A156.10 and BHMA A156.19 for definitions of terms.

1.4 COORDINATION

A. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control automatic door operators. Concrete, reinforcement, and formwork requirements are specified elsewhere.

B. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing automatic door operators.

C. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.

D. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For automatic door operators.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Indicate locations of activation and safety devices.
4. Include diagrams for power, signal, and control wiring.
5. Include plans, elevations, sections, and attachment details for guide rails.

C. Samples: For each exposed product and for each color and texture specified, manufacturer's standard size.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of automatic door operator.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For automatic door operators, safety devices, and control systems, to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Faulty or sporadic operation of automatic door operator, including controls.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Besam Entrance Solutions; ASSA ABLOY.
2. DORMA USA, Inc.
3. LCN; an Allegion brand.
4. SARGENT Manufacturing Company; ASSA ABLOY.
5. Norton Door Controls, ASSA ABLOY.

B. Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.

2.2 AUTOMATIC DOOR OPERATORS, GENERAL

A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.

1. Emergency Breakaway: Where indicated for center-pivoted doors, provide emergency breakaway feature for reverse swing of doors. Equip system to discontinue power to automatic door operator when door is in emergency breakaway position, to return door to closed position after breakaway, and to automatically reset.
2. Wind Load: Provide door operators on exterior doors that will open and close doors and maintain them in fully closed position when subjected to wind load of as indicated on the drawings.

B. Electrohydraulic Operating System: Self-contained, low-pressure unit; with separate cylinders for power and checking, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.

C. Hinges: See Section 087111 "Door Hardware" for hinge type for each door that door operator shall accommodate.

D. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch- thick, extruded or formed aluminum; manufacturer's standard width; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.

E. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Refer to Section 087111 "Door Hardware" for basis of design. Other manufacturer's operators are acceptable where these operators are in accordance with standards and quality herein.

2.3 LOW-ENERGY DOOR OPERATORS

A. Standard: BHMA A156.19.

B. Performance Requirements:

1. Opening Force if Power Fails: Not more than 15 lbf required to release latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
2. Entrapment-Prevention Force: Not more than 15 lbf required to prevent stopped door from closing or opening.

C. Configuration: Operator to control pair of swinging doors.

1. Traffic Pattern: Two way
2. Mounting: Surface

D. Operation: Power opening and spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.

E. Operating System: Electrohydraulic

F. Microprocessor Control Unit: Solid-state controller.

G. Features:

1. Adjustable opening and closing speed.
2. Adjustable opening and closing force.
3. Adjustable backcheck.
4. Adjustable hold-open time from zero to 30 seconds.
5. Adjustable time delay.
6. Adjustable acceleration.

7. Obstruction recycle.
8. On-off/hold-open switch to control electric power to operator.

H. Activation Device: Push-plate switch on each side of door to activate door operator.

I. Exposed Finish: Baked-enamel or powder-coat finish.

1. Color: To match the aluminum storefront frame color and gloss.

J. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221.
2. Sheet: ASTM B 209.

K. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.4 CONTROLS

A. General: Provide controls, including activation and safety devices, according to BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.

B. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.

C. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

D. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator**.**

1. Configuration: Square push plate with 4-by-4-inch junction box.

a. Mounting: Recess mounted, semiflush in wall.

2. Configuration: Rectangular push plate with 2-by-4-inch junction box.

a. Mounting: Recess mounted, semiflush in wall.

3. Push-Plate Material: Stainless steel as selected by Architect from manufacturer's full range.
4. Message: International symbol of accessibility.

E. Push-Button Switch: Momentary-contact door control switch with one red-button actuator; enclosed in nominal 2-by-4-inch or 4-by-4-inch junction box.

F. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.5 FABRICATION

A. Factory fabricate automatic door operators to comply with indicated standards.

B. Form aluminum shapes before finishing.

C. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.

D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.6 ACCESSORIES

A. Signage: As required by cited BHMA standard for type of door and its operation.

1. Application Process: Operator manufacturer's standard process.
2. Provide sign materials with instructions for field application when operators are installed.

B. Guide Rails: Baked-enamel or powder-coated aluminum fabricated from bars or tubing, minimum 30 inches high, and finished to match doors unless otherwise indicated; positioned and projecting from face of door jamb for distance as indicated, but not less than that required by BHMA A156.10 for type of door and direction of travel with filler panel.

1. Filler Panel: Aluminum.
2. Provide intermediate guide rail suitable for supporting photoelectric beams.
3. Aluminum Finish: Baked-enamel or powder-coat finish.

a. Color: As selected by Architect from full range of industry colors and color densities.

2.7 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.

B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

C. Examine roughing-in for compressed-air piping systems to verify actual locations of piping connections before automatic door operator installation.

D. Verify that full-height finger guards are installed at each door with pivot hinges where door has a clearance at hinge side greater than 1/4 inch and less than 3/4 inch with door in any position.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install automatic door operators according to manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.

1. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
2. Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.

B. Controls: Install activation and safety devices according to manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. Connect control wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

D. Guide Rails: Install according to BHMA A156.10, including Appendix A and manufacturer's written instructions unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Certified Inspector: Owner will engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Perform the following tests and inspections**.**

1. Test and inspect each automatic door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

C. Automatic door operators will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

1. Adjust operators on exterior doors for weathertight closure.

B. After completing installation of automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.

C. Readjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic door operator Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION 087113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites and storefront framing.
2. Glazing sealants and accessories.

B. Related Requirements:

1. Section 084113 "Aluminum Framed Entrances and Storefronts" for storefronts.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Glass Samples: For each type of the following products; 12 inches square.

1. Tinted glass.
2. Insulating glass.

D. Glazing Accessory Samples: For sealants in 12-inch lengths.

E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

F. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, glass testing agency and sealant testing agency.

B. Product Certificates: For glass.

C. Product Test Reports: For tinted glass, coated glass, insulating glass and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than four Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or

to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. AGC Glass Company North America, Inc.
2. Guardian Industries Corp.; SunGuard.
3. Pilkington North America.
4. PPG Flat Glass; PPG Industries, Inc.
5. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

    a. Wind Design Data: As indicated on Drawings.
    b. Basic Wind Speed: As indicated on drawings.
    c. Importance Factor: As indicated on drawings.
    d. Exposure Category: As indicated on drawings.

3. Design Snow Loads: As indicated on Drawings.
4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.

1. Large-Missile Test: For glazing located within 30 feet of grade.
2. Small-Missile Test: For glazing located more than 30 feet above grade.

E. Safety Glazing: Where safety glazing is indicated or required, provide glazing that complies with 16 CFR 1201, Category II.

F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.

4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: ¼ inch.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealant shall have a VOC content of 250 g/L or less.
4. Colors of Exposed Glazing Sealants: Match Architect's samples or as selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. Pecora Corporation.
c. Sika Corporation.
d. Tremco Incorporated.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dow Corning Corporation.
b. Pecora Corporation.
c. Sika Corporation.
d. Tremco Incorporated.

D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. Pecora Corporation.
c. Sika Corporation.
d. Tremco Incorporated.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type: Clear fully tempered float glass.

1. Minimum Thickness: ¼ inch
2. Safety glazing required.

3.9 INSULATING GLASS SCHEDULE

A. Glass Type: Clear, Low-E-coated, insulating glass.

1. Basis-of-Design Product: Viracon.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: ¼ inch.

4. Outdoor Lite: Clear heat-strengthened float glass.
5. Color: Clear.
6. Interspace Content: Argon.
7. Indoor Lite: Clear heat-strengthened float glass.
8. Low-E Coating: On second surface.
9. Winter Nighttime U-Factor: 0.35 or less.
10. Summer Daytime U-Factor: 0.35 or less.
11. Solar Heat Gain Coefficient: 0.50 or less.
12. Shading Coefficient: 0.60
13. Tempered safety glazing where required by code.

END OF SECTION 088000

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SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following types of silvered flat glass mirrors:

1. Tempered glass mirrors qualifying as safety glazing.

B. Related Requirements:

1. Section 088000 "Glazing" for glass with reflective coatings used for vision lites.
2. Section 102800 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

D. Samples: For each type of the following:

1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
2. Mirror Clips: Full size.
3. Mirror Trim: 12 inches long.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of mirror.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.

1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Avalon Glass and Mirror Company.
2. Guardian Industries Corp.; SunGuard.
3. National Glass Industries.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

A. Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.

B. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.

1. Nominal Thickness: 6.0 mm (1/4" nominal).

C. Safety Glazing Products: For tempered mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 MIRROR HARDWARE

A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.

1. Bottom and Side Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.
3. Finish: Clear bright anodized.

B. Mirror Clips: Manufacturer standard.

C. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

D. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

A. Fabricate mirrors in the shop to greatest extent possible.

B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Beveled polished edge.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

1. GANA Publications: Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.
2. Aluminum J-Channels and Cleat: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.

3. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed, formed-metal louvers.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

D. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Windborne-debris-impact-resistance test reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
2. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft. or as indicated, acting inward or outward.

C. Windborne-Debris-Impact Resistance: Louvers located within 30 feet of grade shall pass basic-protection, large-missile testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.

D. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

G. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, FORMED-METAL LOUVERS

A. Horizontal, Drainable-Blade Louver: Where indicated, provide louvers in accordance with the following:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Air Flow Company, Inc.
    b. Construction Specialties, Inc.
    c. Industrial Louvers Inc.
    d. Ruskin Company.
    e. Vent Products Co., Inc.

2. Louver Depth: 4 inches or depth for application indicated.
3. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch minimum.
4. Mullion Type: Exposed.
5. Louver Performance Ratings:

    a. Free Area: Not less than the free area indicated.
    b. Point of Beginning Water Penetration: Not less than 800 fpm.
    c. Air Performance: Not more than 0.10-inch wg static pressure drop at 800-fpm free-area exhaust or intake velocity.

d. Air Performance: Not more than 0.15-inch wg static pressure drop at 900-fpm free-area velocity.

6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with machine screws with heads finished to match louver, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Non-rewirable, U-shaped frames.

D. Louver Screening for Galvanized-Steel Louvers:

1. Insect Screening: Galvanized steel, 18-by-14 mesh, 0.011-inch wire.

2.5 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 zinc coating, mill phosphatized.

D. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
2. Exterior Corners: Prefabricated corner units with mitered and welded blades and with semirecessed mullions at corners.

G. Provide subsills made of same material as louvers for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.7 STEEL SHEET FINISHES

A. Finish louvers after assembly.

B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating compatible with the organic

coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780.

C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 2 mils.

1. Color and Gloss: Match existing and as selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

B. Sustainable Design Submittals:

1. Recycle Content.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For embossed steel studs and runners and firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use steel studs and runners or embossed steel studs and runners.

1. Steel Studs and Runners:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) MBA Building Supplies.
2) MRI Steel Framing, LLC.
3) Steel Network, Inc. (The).

b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
c. Depth: As indicated on Drawings.

2. Embossed Steel Studs and Runners:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1) ClarkDietrich Building Systems.
2) MarinoWARE.
3) MBA Building Supplies.

b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.

c. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

        1) ClarkDietrich Building Systems.
        2) Metal-Lite.
        3) Steel Network, Inc. (The).

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. ClarkDietrich Building Systems.
    b. Fire Trak Corp.
    c. Metal-Lite.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length, width and thickness required for application.

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As required for application.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. ClarkDietrich Building Systems.
    b. MRI Steel Framing, LLC.

2. Minimum Base-Metal Thickness: As indicated on Drawings.

3. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. ClarkDietrich Building Systems.
b. MRI Steel Framing, LLC.

2. Configuration: Asymmetrical or hat shaped.

I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.

1. Depth: 2 inches.

E. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.

3. Embossed Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.

4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base-Metal Thickness: As indicated on Drawings

5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Armstrong World Industries, Inc.
b. Chicago Metallic Corporation.
c. United States Gypsum Company.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
2. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Attach to masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 16 inches o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
2. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Recycle content.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: Where indicated, provide fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

B. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch.
2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch unless indicated otherwise.
2. Long Edges: Tapered.
3. Moisture resistant.

D. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.

Basis of Design Product: Subject to compliance with the requirements, provide USG Fiberock Interior Panel or an approved equal.

1. Core: 5/8 inch, Type X.
2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
4. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
5. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements
6. Long Edges: Tapered.
7. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

E. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

1. Thickness: 5/8 inch.
2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. U-Bead: J-shaped; exposed short flange does not receive joint compound.
d. Expansion (control) joint.
e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate only where attachment by screws is impractical or not feasible.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings
2. Type X: Vertical surfaces unless otherwise indicated.
3. Flexible Type: Apply in double layer at curved assemblies.
4. Ceiling Type: As indicated on Drawings.
5. Abuse-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum

board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at showers, and where indicated unless the wall type in the drawings depict otherwise.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead or U-Bead: Use at exposed panel edges.
3. Curved-Edge Cornerbead: Use at curved openings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Porcelain tile.
3. Glazed wall tile.
4. Stone thresholds.
5. Waterproof membrane for thinset applications.
6. Crack isolation membrane.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

E. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch lengths.
4. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Stone thresholds.
2. Waterproof membrane.
3. Crack isolation membrane.
4. Cementitious backer units.
5. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.3 TILE PRODUCTS

A. Ceramic Tile Type: Unglazed ceramic mosaic tile.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Olean; a division of Dal-Tile Corporation.
b. Daltile.
c. Crossville.

2. Composition: Impervious natural clay or porcelain.
3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
4. Module Size: As selected.
5. Thickness: 1/4 inch.

6. Face: Plain with cushion edges.
7. Surface: Slip resistant, with abrasive admixture.
8. Dynamic Coefficient of Friction: Not less than 0.42.
9. Finish: Mat, opaque glaze.
10. Tile Color and Pattern: Match Architect's sample.
11. Grout Color: Match Architect's sample.
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base Cove: Cove, module size 1 by 1 inch.
    b. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile
    c. Internal Corners: Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
    d. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

B. Ceramic Tile Type: Porcelain tile.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Olean; a division of Dal-Tile Corporation.
    b. Daltile.
    c. Crossville.

2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: As selected.
4. Face Size Variation: Rectified.
5. Thickness: 1/4 inch.
6. Face: Plain with square or cushion edges.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: Match Architect's sample.
9. Grout Color: Match Architect's sample.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base Cap: Surface bullnose, module size same as adjoining flat tile.
    b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
    c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
    d. External Corners: Surface bullnose, module size same as adjoining flat tile.
    e. Internal Corners: Field-butted square corners.
    f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

C. Ceramic Tile Type: Glazed wall tile.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Olean; a division of Dal-Tile Corporation.
   b. Daltile.
   c. Seneca Tiles, Inc.

2. Module Size: 4-1/4 by 4-1/4 inches or as selected.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch.
5. Face: Plain with modified square edges or cushion edges.
6. Finish: Mat, opaque glaze.
7. Tile Color and Pattern: Match Architect's sample.
8. Grout Color: Match Architect's sample.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

   a. Base for Thinset Mortar Installations: Straight, module size 4-1/4 by 4-1/4 inches.
   b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 4-1/4 by 4-1/4 inches.
   c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
   d. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
   e. Internal Corners: Field-butted square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

2.4 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 12 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.5 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester.

1. Nominal Thickness: 0.040 inch.

C. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

D. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

E. Latex-Portland Cement Waterproof Mortar: Flexible, waterproof mortar consisting of cement-based mix and latex additive.

2.6 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester; 0.040-inch nominal thickness.

C. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

D. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

E. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.

2.7 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226/D 226M, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.
3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.

a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
c. Configuration over Studs and Furring: Flat.
d. Configuration over Solid Surfaces: Self-furring.
e. Weight: 2.5 lb/sq. yd.

4. Latex Additive: Manufacturer's standard acrylic resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

B. Standard Dry-Set Mortar (Thinset): ANSI A118.1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Bostik, Inc.
b. LATICRETE SUPERCAP, LLC.
c. MAPEI Corporation.
d. Southern Grouts & Mortars, Inc.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

C. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Bonsal American, an Oldcastle company.
b. LATICRETE SUPERCAP, LLC.
c. MAPEI Corporation.
d. Southern Grouts & Mortars, Inc.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

D. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bonsal American, an Oldcastle company.
    b. Bostik, Inc.
    c. LATICRETE SUPERCAP, LLC.
    d. MAPEI Corporation.
    e. Southern Grouts & Mortars, Inc.

2. Adhesives shall have a VOC content of 65 g/L or less.
3. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.8 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.

B. Standard Cement Grout: ANSI A118.6.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bonsal American, an Oldcastle company.
    b. Bostik, Inc.
    c. LATICRETE SUPERCAP, LLC.
    d. MAPEI Corporation.
    e. Southern Grouts & Mortars, Inc.

C. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bonsal American, an Oldcastle company.
    b. Bostik, Inc.
    c. LATICRETE SUPERCAP, LLC.
    d. MAPEI Corporation.
    e. Southern Grouts & Mortars, Inc.

2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
3. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

D. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Bonsal American, an Oldcastle company.
b. Bostik, Inc.
c. LATICRETE SUPERCAP, LLC.
d. MAPEI Corporation.
e. Southern Grouts & Mortars, Inc.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

E. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D 4397, 4.0 mils thick.

C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA

installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors.
    b. Tile floors in wet areas.
    c. Tile floors consisting of tiles 8 by 8 inches or larger.
    d. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch.
2. Glazed Wall Tile: 1/16 inch.
3. Porcelain Tile: 1/4 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in modified dry-set improved modified dry-set mortar (thinset).

K. Metal Edge Strips: Install at locations indicated.

L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.7 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and

plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.8 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.9 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F112 and ANSI A108.1A cement mortar bed (thickset) bonded to concrete.

    a. Ceramic Tile Type: As selected.
    b. Bond Coat for Cured-Bed Method: Standard dry-set or Modified dry-set mortar.
    c. Grout: Sand-portland cement or High-performance unsanded grout.

2. Ceramic Tile Installation: TCNA F113; thinset mortar.

    a. Ceramic Tile Type: As selected.
    b. Thinset Mortar: Standard dry-set or modified dry-set mortar.
    c. Grout: Water-cleanable epoxy grout.

3. Ceramic Tile Installation: TCNA F115; thinset mortar; epoxy grout.

    a. Ceramic Tile Type: As selected.
    b. Thinset Mortar: Standard dry-set or modified dry-set mortar.
    c. Grout: Water-cleanable epoxy grout.

4. Ceramic Tile Installation: TCNA F116; organic adhesive or water-cleanable, tile-setting epoxy.

    a. Ceramic Tile Type: As selected.
    b. Grout: Water-cleanable epoxy grout.

5. Ceramic Tile Installation: TCNA F131; water-cleanable, tile-setting epoxy; epoxy grout.

    a. Ceramic Tile Type: As selected.
    b. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Masonry or Concrete:

1. Ceramic Tile Installation: TCNA W202; thinset mortar.

   a. Ceramic Tile Type: As selected.
   b. Thinset Mortar: Standard dry-set Modified dry-set mortar.
   c. Grout: Sand-portland, Standard sanded cement, Water-cleanable epoxy grout.

C. Interior Wall Installations, Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W223; organic adhesive on solid backing.

   a. Ceramic Tile Type: As selected.
   b. Grout: Sand-portland cement or Standard sanded cement grout.

2. Ceramic Tile Installation: TCNA W243; thinset mortar on gypsum board.

   a. Ceramic Tile Type: As selected.
   b. Thinset Mortar: Standard dry-set or modified dry-set mortar.
   c. Grout: Water-cleanable epoxy grout.

3. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.

   a. Ceramic Tile Type: As selected.
   b. Thinset Mortar: Modified dry set mortar.
   c. Grout: Sand-portland cement, High-performance unsanded or Water-cleanable epoxy grout.

4. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

   a. Ceramic Tile Type: As selected.
   b. Thinset Mortar: Standard dry-set or modified dry-set mortar.
   c. Grout: Water-cleanable epoxy grout.

END OF SECTION 093013

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SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Initial Selection: For components with factory-applied finishes.

E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.

    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:

    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.

7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: 1/8 inch = 1 foot.

B. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E 1264.
2. Smoke-Developed Index: 50or less.

2.3 ACOUSTICAL PANELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. USG Corporation.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

D. Classification: Provide panels as follows:

1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with factory applied standard finish.
2. Pattern: E (lightly textured).

E. Color: As selected from manufacturer's full range unless indicated otherwise.

F. Light Reflectance (LR): Not less than 0.90

G. Ceiling Attenuation Class (CAC): Not less than 35

H. Noise Reduction Coefficient (NRC): Not less than 0.75.

I. Edge/Joint Detail: Beveled tegular edge.

J. Thickness: 3/4 inch.

K. Modular Size: 24 by 24 inches.

L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. USG Corporation.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.

C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges. Suspension system to be compatible with acoustical panel.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel.
5. Cap Finish: Painted white unless indicated otherwise.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

    a. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
    b. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316.
    c. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch-diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.

10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.

2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096229 - CORK FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cork floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data for sealants indicating VOC content.

C. Shop Drawings: For each type of cork flooring.

1. Include cork flooring layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

D. Samples: Full-size units of each type, color, pattern, and finish of cork flooring required.

E. Samples for Initial Selection: For each type of cork flooring indicated.

F. Samples for Verification: Full-size units of each type, color, pattern, and finish of cork flooring required.

G. Product Schedule: For cork flooring. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of cork flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Cork Flooring: Furnish 2 percent but no less than one box, of each type, color, pattern, and finish of cork flooring installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store cork flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store cork flooring on flat surfaces.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 75 deg F where relative humidity is between 45 and 65 percent, in spaces to receive cork flooring during the following periods:

1. 72 hours before installation.
2. During installation.
3. 72 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 75 deg F.

C. Close spaces to traffic during cork flooring installation.

D. Close spaces to traffic for 72 hours after cork flooring installation.

E. Install cork flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For cork flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Sustainability:

1. Recycle content: Submit recycle content for post-consumer and post-industrial recycle content.

2.2 CORK FLOOR TILE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Capri Cork.
2. Globus Cork.
3. Nova Distinctive Floors.
4. USFloors Inc.

B. Composition: 100 percent natural cork bark and recycled cork granules and set in a natural or synthetic, flexible resin matrix; homogeneous and uniform in composition throughout the tile thickness.

C. Nominal Density: Manufacturer's standard.

D. Nominal Thickness: 0.1875 inch.

E. Nominal Size: 12 by 12 inches.

F. Color: Match Architect's sample.

G. Factory Finish: Match Architect's sample.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by cork flooring manufacturer for applications indicated.

B. Vapor Retarder: ASTM D 4397, polyethylene sheet not less than 8.0 mils thick or fluid applied as recommended by manufacturer.

C. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit cork flooring and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of cork flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to cork flooring manufacturer's written instructions to ensure adhesion of cork flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by cork flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by cork flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 100 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install cork flooring until materials are the same temperature as space where they are to be installed.

1. At least 72 hours in advance of installation, move cork flooring products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by cork flooring.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing cork flooring.

B. Mix together floor tiles from each carton to ensure uniform distribution of shade.

C. Discard broken, cracked, chipped, or deformed floor tiles.

D. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

E. Lay floor tiles in pattern indicated.

F. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

G. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

I. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of appearance between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

J. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting cork flooring.

B. Perform the following operations immediately after completing cork flooring installation:

1. Remove blemishes from surfaces.

    a. Remove installation adhesive from surfaces.

2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect cork flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover cork flooring until Substantial Completion.

END OF SECTION 096229

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Thermoset-rubber base.
2. Rubber molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Product Data: For sealants, indicating VOC content.
4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For resilient base and accessories, indicating compliance with requirements for low-emitting materials.
6. Environmental Product Declaration: For each product.

C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

D. Samples for Initial Selection: For each type of product indicated.

E. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

F. Product Schedule: For resilient base and accessory products.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 THERMOSET-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
2. Flexco.
3. Johnsonite; a Tarkett company.
4. Roppe Corporation, USA.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

1. Style and Location:

    a. Style A, Straight: Provide in areas with carpet.
    b. Style B, Cove: Provide in areas with resilient floor coverings.

C. Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Colors: Match Architect's sample.

2.3 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
2. Flexco.
3. Johnsonite; a Tarkett company.
4. Roppe Corporation, USA.

B. Description: Rubber cap for cove carpet, cap for cove resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet, and transition strips.

C. Profile and Dimensions: Manufacturer's standard.

D. Locations: Provide rubber molding accessories in areas indicated.

E. Colors and Patterns: Match Architect's sample.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.

    a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.

    a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

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SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Vinyl composition floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Product Data: For chemical-bonding compounds, indicating VOC content.
4. Laboratory Test Reports: For chemical-bonding compounds, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
6. Environmental Product Declaration: For each product.

C. Shop Drawings: For each type of resilient floor tile.

1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

D. Samples: Min 2 inch by 2 inch of each color, texture, and pattern of floor tile required.

E. Product Schedule: For floor tile.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive floor tile during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Armstrong World Industries, Inc.
2. Congoleum Corporation.
3. Johnsonite; a Tarkett company.
4. Mannington Mills, Inc.
5. Tarkett North America

B. Tile Standard: ASTM F 1700, Class 1, Type A.

C. Thickness: 0.080 inch.

D. Size: As indicated.

E. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

1. Sealant shall have a VOC content of 250 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis and in the pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in the pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply three coat(s).

E. Joint Sealant: Apply sealant to resilient terrazzo floor tile perimeter and around columns, at door frames, and at other joints and penetrations.

F. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interlocking, rubber floor tile.

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for wall base and accessories installed with resilient athletic flooring.

1.3 COORDINATION

A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details and locations of the following:

1. Border tiles.
2. Floor patterns.
3. Layout, colors, widths, and dimensions of game lines and markers.
4. Locations of floor inserts for athletic equipment installed through flooring.
5. Seam locations for sheet flooring.

C. Samples: For each exposed product and for each type, color, and pattern specified, 6-inch-square in size and of the same thickness indicated for the Work.

1. Game-Line- and Marker-Paint Samples: Include Sample sets showing game-line- and marker-paint colors applied to flooring.

D. Samples for Initial Selection: For each type of resilient athletic flooring.

1. Game-Line and Marker Paint: Include charts showing available colors and glosses.

E. Samples for Verification: For each type, color, and pattern of flooring specified, 6-inch square in size and of same thickness and material indicated for the Work.

1. Game-Line- and Marker-Paint Samples: Include Sample sets showing game-line- and marker-paint colors applied to flooring.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resilient athletic flooring to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of floor tile installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.

B. Store materials to prevent deterioration.

1. Store tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Adhesively Applied Products:

1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
3. Close spaces to traffic during flooring installation.
4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.

B. Install flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 INTERLOCKING, RUBBER FLOOR TILE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Johnsonite; a Tarkett company.
2. Mondo America Inc.
3. Roppe Corporation, USA.
4. Tarkett Sports; a division of the Tarkett Group.

B. Description: Athletic flooring consisting of modular rubber tiles with precision cut, interlocking edges, for free-lay installation.

C. Material: Recycled-rubber compound with EPDM color chips.

D. Tile Interlock: Visible or Hidden.

E. Traffic-Surface Texture: Smooth

F. Size: 34 inches square.

G. Thickness: 2 inch unless otherwise indicated.

H. Color and Pattern: As selected by Architect from manufacturer's full range.

I. Border: Interlocking, beveled-edge tiles, of same material as floor tile; with bevels that transition from thickness of floor tile to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.

1. Border Color and Pattern: As selected by Architect from manufacturer's full range to contrast with floor tile.

2.2 ACCESSORIES

A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.

B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

1. Low VOC

C. Game-Line and Marker Paint: Complete system including primer, if any, compatible with flooring and recommended in writing by flooring and paint manufacturers for use indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.

1. Do not install flooring until it is the same temperature as space where it is to be installed.

F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOORING INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions.

B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.

C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.

D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

E. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

F. Discard broken, cracked, chipped, or deformed tiles.

G. Tile Matching: Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged if so numbered.

H. Adhered Floor Tile: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Free-Lay Tile: Place flooring at locations indicated with units securely interconnected and fully seated on substrate to form a smooth, level surface.

3.4 GAME LINES AND MARKERS

A. Mask flooring at game lines and markers, and apply paint to produce sharp edges. Where crossing, break minor game line at intersection; do not overlap lines.

B. Apply game lines and markers in widths and colors according to requirements indicated on Drawings

3.5 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing flooring installation:

1. Remove adhesive and other blemishes from flooring surfaces.
2. Sweep and vacuum flooring thoroughly.
3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.

B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 096566

SECTION 098433 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, sound-absorbing acoustical panel units tested for acoustical performance.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Data: For adhesives, indicating VOC content.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
4. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.

C. Shop Drawings: For unit assembly and installation.

D. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel: Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Acoustical Panel Systems (APS, Inc.).
2. Armstrong World Industries.
3. MBI Products Company, Inc.
4. Sound Management Group LLC.
5. Tectum Inc.

a. Core Layer: Manufacturer's standard impact-resistant, wood fiber board.

6. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
7. Edge Profile: Chamfered (beveled).
8. Corner Detail in Elevation: Square.
9. Reveals between Panels: Flush.
10. Facing Material: As indicated on Drawings or specified.
11. Acoustical Performance: Sound absorption NRC 0.70 to 0.90 according to ASTM C 423 for Type A mounting according to ASTM E 795.
12. Nominal Overall Panel Thickness: 1-1/2 inches.

2.3 MATERIALS

A. Composite Wood Products: Products shall be made without urea formaldehyde.

B. Composite Wood Products: Products shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

D. Core Materials: Manufacturer's standard.

1. Glass-Fiber Board: ASTM C 612; of type standard with manufacturer, unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
2. Mineral-Fiber Board: Maximum flame-spread and smoke-developed indexes of 25 and 10, respectively, and with perforated surface.
3. Wood and Wood Fiber: Manufacturer's standard plywood or clear, vertical grain, straight, kiln-dried hardwood.

a. Fire-retardant treated by pressure process with a flame-spread index of 25 or less when tested according to ASTM E 84 or UL 723, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1) Treated material shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity.
2) Kiln-dry material after treatment to 19 percent or less for lumber and 15 percent or less for plywood.

E. Facing Material: Fabric from same dye lot; color and pattern as selected by Architect from manufacturer's full range.

1. Applied Treatments: Stain resistance.

2. Seamless plain woven 2-ply 100 percent polyester, minimum 15 ounces/linear yard. Tear strength a minimum 29 pounds. Tensile strength 150 pounds minimum in accordance with ASTM D 5034. Stretch fabric covering free of wrinkles and then bond to the edges and back, or bond directly to the wood fiber panel, face, edges and back of panel a minimum distance standard with the manufacturer. Light fastness (fadeometer) approximately 40 hours in accordance with AATCC 16.

F. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Adhesives shall have a VOC content of 70 g/L or less.

2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.4 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

1. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.

D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain with adjacent units.

3.2 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 098433

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Steel and iron.
2. Galvanized metal.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Benjamin Moore & Co.

2. Duron, Inc.
3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: Match Architect's samples

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1B or MPI EXT 5.1M:

a. Prime Coat: Primer, rust inhibitive, water based MPI #107.

b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

B. Galvanized-Metal Substrates:

1. Latex System MPI EXT 5.3H:

a. Prime Coat: Primer, galvanized, water based, MPI #134.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete masonry units (CMUs).
2. Steel and iron.
3. Galvanized metal.
4. Gypsum board.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Sustainable Design Submittals:

1. Product Data: For paints and coatings, indicating VOC content.
2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Benjamin Moore & Co.
2. Coronado Paint; Benjamin Moore Company.
3. Duron, Inc.
4. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, provide products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

D. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Colors: Match Architect's samples or as indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7/NACE No. 4.
4. SSPC-SP 11.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment and mechanical rooms:

a. Fire Suppression Piping.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 4.2E:

a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 4), MPI #146.

d. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

B. Steel Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 5.1S:

a. Prime Coat: Primer, rust inhibitive, water based MPI #107.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

2. Water-Based Light Industrial Coating System MPI INT 5.1B:

a. Prime Coat: Primer, rust-inhibitive, water based MPI #107.
b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.

C. Galvanized-Metal Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 5.3N:

a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

2. Water-Based Light Industrial Coating System MPI INT 5.3K:

a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.

D. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
d. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 4), MPI #146.
e. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

2. Water-Based Light Industrial Coating System MPI INT 9.2L:

    a. Prime Coat: Primer sealer, latex, interior, MPI #50.
    b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
    c. Topcoat: Light industrial coating, interior, water based (MPI Gloss Level 3), MPI #151.
    d. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.

END OF SECTION 099123

SECTION 101423.13 - ROOM-IDENTIFICATION SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

B. Related Requirements:

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Recycle content.

C. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille and layout for each sign at least half size.

D. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

E. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.
2. Full-size Samples, if approved, will be returned to Contractor for use in Project.

F. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Variable Component Materials: 12 replaceable text inserts and interchangeable characters (letters, numbers, and graphic elements) of each type.
2. Tools: One set(s) of specialty tools for assembling signs and replacing variable sign components.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products.

1.10 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Modular sign system with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. APCO Graphics, Inc.
b. ASI Sign Systems, Inc.
c. InPro Corporation (IPC).

2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.

a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
b. Surface-Applied Graphics: Applied vinyl film.
c. Subsurface Graphics: Front loading changeable insert.
d. Color(s): Match Architect's sample.

3. Sign-Panel Perimeter: Finish edges smooth.

a. Edge Condition at Vertical Edges and/or Horizontal Edges: Square cut.
b. Corner Condition in Elevation: Square or as indicated.

4. Frame: Vertical retainers to hold changeable sign panel.

    a. Material: Aluminum.
    b. Material Thickness: 0.125" or as indicated.
    c. Frame Depth: As indicated on Drawings.
    d. Frame Size: 5/8"
    e. Profile: Square or as indicated.
    f. Corner Condition in Elevation: Square or as indicated.
    g. Finish and Color: Match Architect's sample.

5. Mounting: Surface mounted to wall with concealed anchors.
6. Text and Typeface: Accessible raised characters and Braille with typeface matching Architect's sample or typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 SIGN MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

D. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.

E. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. Sign Mounting Fasteners:

    a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
    b. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.

B. Adhesive: As recommended by sign manufacturer.

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

D. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.

E. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

C. Subsurface-Etched Graphics: Reverse etch back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

D. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For front-loading, slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Subsequent changeable inserts are by Owner. Furnish two blank inserts for each sign for Owner's use.
2. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, Class I, 0.018 mm. or thicker.

B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

    a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
2. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
3. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support

weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

4. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch away from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.
5. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423.13

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SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for blocking for floor anchored-overhead braced compartments and urinal screens.
2. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: For toilet compartments.

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.
5. Show bracing locations.

D. Samples for Initial Selection: For each type of toilet compartment material indicated.

1. Include Samples of hardware and accessories involving material and color selection.

E. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

F. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.

1. Fasteners: Ten fasteners of each size and type.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 50 or less.
2. Smoke-Developed Index: 450 or less.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. American Sanitary Partition Corporation.
2. Bradley Corporation.
3. Global Partitions; ASI Group.
4. Scranton Products.

B. Toilet-Enclosure Style: Floor anchored-Overhead Braced.

C. Urinal-Screen Style: Wall hung-floor anchored post.

D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Heat-Sink Strip: Manufacturer's standard continuous, strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.

F. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters with shoe and sleeve (cap) matching that on the pilaster.

G. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel.

2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.

1. Material: Chrome-plated zamac.
2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
3. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ASTM B 221.

C. Brass Castings: ASTM B 584.

D. Brass Extrusions: ASTM B 455.

E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

F. Stainless-Steel Castings: ASTM A 743/A 743M.

G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.5 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

D. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.

E. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch.
b. Panels and Walls: 1 inch.

2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached near top and bottom of panel.

a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

D. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.19

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Corner guards.

B. Related Requirements:

1. Section 087111 "Door Hardware (Descriptive Specification)" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For each type of wall and door protection showing locations and extent.

1. Include plans, elevations, sections, and attachment details.

D. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

1. Include Samples of accent strips and accessories to verify color selection.

E. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

1. Corner Guards: 12 inches long. Include example top caps.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of handrail.

B. Material Certificates: For each type of exposed plastic material.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Corner-Guard Covers: Provide two full-size plastic covers of each type, color, and texture of cover installed, including accessories and fasteners.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
2. Keep plastic materials out of direct sunlight.
3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.

a. Store corner-guard covers in a vertical position.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
    b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS

A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Floor Products Company, Inc.
    b. InPro Corporation (IPC).
    c. Musson Rubber Co.
    d. wallProtex.

2. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; as follows:

    a. Profile: Nominal 3-inch-long leg and 1/4-inch corner radius.
    b. Height: 4 feet.
    c. Color and Texture: As indicated or match Architect's sample.

3. Continuous Retainer: Minimum 0.060-inch-thick, one-piece, extruded aluminum.
4. Retainer Clips: Manufacturer's standard impact-absorbing clips.

5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.4 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. of notch when tested according to ASTM D 256, Test Method A.

C. Adhesive: As recommended by protection product manufacturer.

1. Adhesives shall have a VOC content of 50 g/L or less.

2.5 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Quality: Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, and smooth.

2.6 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install corner guard protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

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SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Private-use bathroom accessories.
4. Underlavatory guards.
5. Custodial accessories.

B. Related Requirements:

1. Section 088300 "Mirrors" for frameless mirrors.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials:

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer unless otherwise noted.

B. Toilet Tissue (Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.
d. Kimberly Clark.

2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Controlled delivery.
5. Capacity: Designed for 4-1/2- or 5-inch diameter tissue rolls.
6. Material and Finish: ABS plastic, gray.

C. Paper Towel (Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Kimberly Clark.

2. Description: Lever-actuated mechanism permitting controlled delivery of paper rolls in preset lengths per stroke.

3. Mounting: Surface mounted.
4. Minimum Capacity: 8-inch- wide, 800-foot- long roll.
5. Material and Finish: ABS plastic, gray.
6. Lockset: Tumbler type.

D. Waste Receptacle:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.

2. Mounting: Open top, recessed.
3. Minimum Capacity: 12.8 gal.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Liner: Vinyl liner.
6. Lockset: Tumbler type for waste receptacle.

E. Liquid-Soap Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Kimberly Clark.

2. Description: Designed for dispensing antibacterial soap in liquid or lotion form.
3. Mounting: Vertically oriented, surface mounted.
4. Capacity: 40 oz..
5. Materials: ABS plastic, gray.
6. Lockset: Tumbler type.
7. Refill Indicator: Window type.

F. Grab Bar:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2. Mounting: Flanges with concealed fasteners.

3. Material: Stainless steel, 0.05 inch thick.

    a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/2 inches.
5. Configuration: Straight grab bar and shower grab bar.
6. Lengths for straight grab bars: 18", 36" and 42"

G. Sanitary-Napkin Disposal Unit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2. Mounting: Surface mounted.

3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

H. Seat-Cover Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Specialties, Inc.

b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Mounting: Surface mounted.
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.

I. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Frame: Stainless-steel channel.

a. Corners: Manufacturer's standard.

3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: As indicated.

J. Coat Hook:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Description: Single-prong unit.

3. Material and Finish: Polished chrome-plated brass or Polished chrome-plated zinc alloy (zamac).

2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Source Limitations: Obtain public-use shower room accessories from single source from single manufacturer.

B. Shower Curtain Rod:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Description: 1-inch OD; fabricated from nominal 0.0375-inch- thick stainless steel
3. Mounting Flanges: Stainless-steel flanges designed for concealed fasteners.
4. Finish: Stainless steel, No. 4 finish (satin).

C. Shower Curtain:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Size: Minimum 6 inches wider than opening by 72 inches high.
3. Material: Vinyl, minimum 0.006 inch thick, opaque, matte.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Folding Shower Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

2. Configuration: L-shaped seat, designed for wheelchair access.

3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
5. Dimensions: 33" wide X 22" deep.

E. Soap Dish:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.

2. Description: Without washcloth bar.
3. Mounting: Surface mounted.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Towel Hook:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.

2. Description: Double prong unit.

3. Material and Finish: Stainless steel, No. 4 finish (satin).

2.5 PRIVATE-USE BATHROOM ACCESSORIES

A. Source Limitations: Obtain private-use bathroom accessories from single source from single manufacturer.

B. Toilet Tissue Dispenser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Kimberly Clark.

2. Description: Double-roll dispenser.

3. Mounting: Surface mounted.
4. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
5. Material and Finish: ABS plastic, gray.

2.6 CHILDCARE ACCESSORIES

A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.

B. Diaper-Changing Station:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Specialties, Inc.
    b. Foundations Children's Products.
    c. Koala Kare Products.

2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.

    a. Engineered to support minimum of 200-lb static load when opened.

3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: Polypropylene with steel chassis in manufacturer's standard color.
6. Liner Dispenser: Built in.

2.7 UNDERLAVATORY GUARDS

A. Underlavatory Guard:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Plumberex Specialty Products, Inc.
    b. Truebro by IPS Corporation.

2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.

3. Material and Finish: Antimicrobial, molded plastic, white.

2.8 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Mop and Broom Holder with shelf:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches (nominal)
4. Hooks: Four.
5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

    a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
    b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.9 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.10 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers."

1.3 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire-protection cabinets including, but not limited to, the following:

a. Schedules and coordination requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed or semirecessed method and relationships of box and trim to surrounding construction.

B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Product Schedule: For fire-protection cabinets. Indicate whether recessed or semirecessed. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.6 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.7 SEQUENCING

A. Apply decals or vinyl lettering on fire-protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Where indicated, provide listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Basis of Design Product: Subject to compliance with requirements, provide Larsen's Manufacturing Company or an approved equal.

B. Cabinet Construction: Nonrated unless indicated otherwise.

C. Cabinet Material: Cold-rolled steel sheet with baked enamel box.

1. Shelf: Same metal and finish as cabinet.

D. Recessed Cabinet:

1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.

F. Cabinet Trim Material: Stainless-steel sheet

G. Door Material: Stainless-steel sheet

H. Door Style: Vertical duo panel with frame.

I. Door Glazing: Acrylic sheet

1. Acrylic Sheet Color: Clear transparent acrylic sheet.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard door hardware.
2. Provide manufacturer's standard hinge permitting door to open 180 degrees.

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
3. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
4. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
5. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.

    a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER"

        1) Location: Applied to cabinet glazing.
        2) Application Process: Decals.
        3) Lettering Color: White.
        4) Orientation: Vertical.

6. Alarm: Manufacturer's standard alarm that actuates when fire-protection cabinet door is opened and that is powered by batteries.

L. Materials:

1. Cold-Rolled Steel for Cabinet Box: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

    a. Finish: Baked enamel or powder coat.
    b. Color: As selected by Architect from full range of industry colors and color densities.

2. Stainless Steel for Trims and Doors: ASTM A 666, Type 304.

    a. Finish: No. 4 finish, 304 stainless steel.

3. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or at heights acceptable to authorities having jurisdiction.

1. Fire-Protection Cabinets: 54 inches above finished floor to top of cabinet.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets. Surface mounted cabinets are not permitted.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification: Apply decals at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

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SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:

a. Schedules and coordination requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.7 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Basis of Design Product: Subject to compliance with requirements, provide Larsen's Manufacturing Company or an approved equal.
2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type: 4A-80B: C UL-rated 10 lb. nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

    a. Orientation: Vertical

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

    1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

    1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

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SECTION 105113 - LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid Plastic lockers.
2. Locker benches.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of locker.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker and bench.

B. Shop Drawings: For lockers.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Show locker trim and accessories.
3. Include locker identification system and numbering sequence.

C. Samples: For each color specified, in manufacturer's standard size.

D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

E. Samples for Verification: For the following products, in manufacturer's standard size:

1. Lockers and equipment.
2. Locker benches.

F. Product Schedule: For lockers.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:

a. Locks.
b. Identification plates.
c. Hooks.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for their installation.

1.9 FIELD CONDITIONS

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

1.10 COORDINATION

A. Coordinate sizes and locations of bases for lockers.

B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that lockers can be supported and installed as indicated.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of lockers that fail in materials or workmanship, excluding finish, within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures.
    b. Faulty operation of latches and other door hardware.

2. Damage from deliberate destruction and vandalism is excluded.
3. Warranty Period for Welded Lockers: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain lockers**,** locker benches, and accessories from single source from single locker manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.3 PLASTIC LOCKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. General Storage Systems Ltd.
2. Lyon Workspace Products, LLC.
3. Penco Products, Inc.
4. Republic Storage Systems, LLC.
5. Bradley Corporation.

B. Doors: One piece; fabricated from ½" High Density Polyethylene (HDPE) with homogeneous color. Lockers are to be single tier.

1. Doors: Matte finish
2. Door Style: Vented panel as follows:

    a. Louvered Vents: No fewer than four louver openings at top and bottom for single-tier lockers.

C. Body: Fabricated from 3/8" High Density Polyethylene (HDPE) with homogeneous color.

1. Shelves: Fabricated from 3/8" High Density Polyethylene (HDPE) with homogeneous color.

D. Hinges: Continuous Hinge: Manufacturer's standard, stainless steel, full height.

E. Handle and Latch: Constructed of molded plastic.

F. Locks: Constructed for standard padlocks.

G. Identification Plates: Manufacturer's standard.

H. Hooks: Manufacturer's standard ball-pointed type hooks, polycarbonate, aluminum or steel; zinc plated.

I. Continuous Base: Fabricated from 1" High Density Polyethylene (HDPE) with homogeneous color.

1. Height: 3 inches.

J. Continuous Sloping Tops: Manufacturer standard thickness.

1. Sloping-top corner fillers, mitered.

K. Filler Panels: Manufacturer standard.

L. Finish and color: As selected by Architect from manufacturer's full range.

M. Locker: ADA compliant (see drawings).

N. Sustainability:

1. Lockers: 30% pre-consumer content.
2. Lockers: 100% post-consumer content.
3. Lockers: Greene-guard certified as a low VOC material.

2.4 LOCKER BENCHES

A. Provide bench units with overall assembly height of 18-1/2 inches.

B. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.

1. Size: Minimum approximately 9-1/2 inches wide by 1-1/4 inches thick.
2. Top: Fabricated from 1-1/2" High Density Polyethylene (HDPE) with homogeneous color.

a. Color: As selected by Architect from manufacturer's full range.

3. Bench: ADA compliant.

C. Freestanding Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top, complete with fasteners, and as follows:

1. Aluminum: 1/8-inch-thick by 3-inch-wide channel or 1/4-inch-thick by 3-inch-wide bar stock, shaped into trapezoidal or inverted-T form; with nonskid pads at bottom.

a. Finish: Clear anodic finish.

D. Materials:

1. Stainless Steel: ASTM A 666, Type 304.
2. Extruded Aluminum: ASTM B 221, alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated.
3. Steel Tube: ASTM A 500/A 500 M, cold rolled.

2.5 FABRICATION

A. Fabricate lockers square, rigid, without warp, and with faces flat and free of scratches or distortion. Make exposed edges safe to touch and free of sharp edges.

1. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.

C. Equipment: Provide each locker with an identification plate and the following equipment:

1. Single-Tier Units: Shelf, one double-prong ceiling hook.

D. Accessible Lockers: Fabricate as follows:

1. Locate bottom shelf no lower than 15 inches above the floor.
2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.

E. Continuous Base: Lengths as long as practical to enclose base and base ends of lockers; finished to match lockers.

F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

1. Sloping-top corner fillers, mitered.

G. Individual Sloping Tops: Fabricated in width to fit one locker frame in lieu of flat locker tops; with integral back; finished to match lockers. Provide wedge-shaped divider panels between lockers.

H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

I. Boxed End Panels: Fabricated with 1-inch- wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed lockers; finished to match lockers.

1. Provide one-piece panels for double-row (back-to-back) locker ends.

J. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed lockers; finished to match lockers.

1. Provide one-piece panels for double-row (back-to-back) locker ends.

K. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

2.6 ACCESSORIES

A. Fasteners: Manufactures standard.

B. Anchors: Material, type, and size required for secure anchorage to each substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install lockers level, plumb, and true; shim as required, using concealed shims.

1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent distortion.
2. Anchor single rows of lockers to walls near top and bottom of lockers.
3. Anchor back-to-back lockers to floor.

B. Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames. Install per the manufacture's installation instructions.

C. Equipment:

1. Attach hooks with at least two fasteners.
2. Identification Plates: Identify lockers with identification indicated on Drawings.

a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.

b. Attach plates to upper shelf of each open-front locker, centered, with a least two aluminum rivets.

D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach recess trim to recessed lockers with concealed clips.
2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
3. Attach sloping-top units to lockers, with closures at exposed ends.
4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed lockers.
5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed lockers.

E. Freestanding Locker Benches: Place benches in locations indicated on Drawings.

3.3 ADJUSTING

A. Clean, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

A. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

B. Replace lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

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SECTION 114000 - FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Tables and Counters.
2. Sinks with Drain Boards.
3. Cooking equipment.
4. Self-contained refrigeration equipment.
5. Warewashing equipment.
6. Shelving equipment.

B. Related Requirements:

1. See mechanical for exhaust hoods

1.3 COORDINATION

A. Coordinate foodservice equipment layout and installation with other work, including layout and installation of lighting fixtures, HVAC equipment, and fire-suppression system components.

B. Coordinate locations and requirements of utility service connections.

C. Coordinate sizes, locations, and requirements of the following:

1. Overhead equipment supports.
2. Equipment bases.
3. Floor depressions.
4. Insulated floors.
5. Floor areas with positive slopes to drains.
6. Floor sinks and drains serving foodservice equipment.
7. Roof curbs, equipment supports, and penetrations.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include the following:

1. Manufacturer's model number.
2. Accessories and components that will be included for Project.
3. Clearance requirements for access and maintenance.
4. Utility service connections for water, drainage, power, and fuel; include roughing-in dimensions.

B. Shop Drawings: For fabricated equipment. Include plans, elevations, sections, roughing-in dimensions, fabrication details, utility service requirements, and attachments to other work.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each factory-applied color finish required, in manufacturer's standard sizes.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For foodservice facilities.

1. Indicate locations of foodservice equipment and connections to utilities.
2. Key equipment using same designations as indicated on Drawings.
3. Include plans and elevations; clearance requirements for equipment access and maintenance; details of equipment supports; and utility service characteristics.
4. Include details of seismic bracing for equipment.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For foodservice equipment to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Product Schedule: For each foodservice equipment item, include the following:

1) Designation indicated on Drawings.
2) Manufacturer's name and model number.
3) List of factory-authorized service agencies including addresses and telephone numbers.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with foodservice equipment by field measurements before fabrication. Indicate measurements on Coordination Drawings.

1.9 WARRANTY

A. Refrigeration Compressor Warranty: Manufacturer agrees to repair or replace compressors that fail in materials or workmanship within specified warranty period.

1. Failure includes, but is not limited to, inability to maintain set temperature.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NSF Standards: Provide equipment that bears NSF Certification Mark or UL Classification Mark certifying compliance with applicable NSF standards.

B. BISSC Standards: Provide bakery equipment that complies with BISSC/Z50.2.

1. Provide BISSC-certified equipment**.**

C. UL Certification: Provide electric and fuel-burning equipment and components that are evaluated by UL for fire, electric shock, and casualty hazards according to applicable safety standards, and that are UL certified for compliance and labeled for intended use.

D. Steam Equipment: Provide steam-generating and direct-steam heating equipment that is fabricated and labeled to comply with 2013 ASME Boiler and Pressure Vessel Code.

E. Regulatory Requirements: Install equipment to comply with the following:

1. ASHRAE 15, "Safety Code for Mechanical Refrigeration."
2. NFPA 54, "National Fuel Gas Code."
3. NFPA 70, "National Electrical Code."
4. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations."

F. Seismic Restraints: Comply with SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines," Appendix A, "Seismic Restraint Details," unless otherwise indicated.

2.2 FABRICATED EQUIPMENT

A. Stainless Steel Sinks:

1. Sinks with Drain Boards (See Schedule at the end of this section).
2. Description: Two and Three-compartment sink(s). Fabricate units of welded stainless steel, sound deadened.

    a. Bowls: Stainless steel, Type 304, 0.062 inch thick.
    b. Integral Drainboards: Stainless steel, Type 304, 0.062 inch thick.
    c. Number of Drain Boards per unit: Two
    d. Body: Stainless steel, 304 Stainless Steel, 0.062 inch thick.

        1) Back Splash: Formed, 10 inches.
        2) Counter edges: Rolled edges

    e. Legs and Feet: Stainless steel tubing legs with adjustable bullet feet.
    f. Accessories:

        1) Faucets and Spouts for each sink.
        2) Basket strainer for each sink.

3. Stainless Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, type as indicated.
4. Fabrication: Prepare sink for installation of the following equipment items:

    a. Food waste disposer; weld disposer cone or collar into sink.
    b. Under-counter Shelving.

B. Stainless Steel Prep Table and L-shaped Counters:

1. Prep Table and L-shaped Counters (See Schedule at the end of this section).
2. Description: Flat-countertop Prep table.

    a. Tops: Stainless steel, Type 304, 0.078 inch thick, reinforced and sound deadened.

        1) Edge: Bullnose on four sides (Prep Table).
        2) Edge: Bullnose on front and sides sides (Counter).
        3) Backsplashes (Counter): Formed, 10 inches.

    b. Crossbracing: Stainless steel tubing, welded to legs.
    c. Feet: Stainless steel adjustable bullets.

3. Materials:

    a. Stainless Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, type as indicated.

C. Stainless Steel Shelf Units (for general storage and pots):

1. Shelving (See Schedule at the end of this section).
2. Description; Stand alone, six tier adjustable open-wire shelfs. Fabricate units of stainless steel, Type 304, 0.062 inch thick.
3. Stainless Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, type as indicated.

4. Legs: Provisions for anchoring to floor.

D. Stainless Steel Hand Sinks:

1. Stainless Steel Hand Sink: (Refer to Plumbing Drawings)

2.3 COOKING EQUIPMENT

A. Ranges: Free Standing Natural Gas, Restaurant Type

1. Range (See Schedule at the end of this section)
2. Description:

a. Stainless Steel with raised Back-Splash.

b. Top Configuration:

1) Open-Burner Unit:

a) Standard Burners: Six.

b) Lift off tops

2) Griddle: Flat – thermostatic controlled.
3) Radiant Broiler: Manufacturer's Standard.

c. Base Configuration:

1) Convection Oven(s): Two.
2) Storage Base: One.

d. Accessories:

1) High back with shelf.
2) Stainless steel sides.
3) Stainless steel back.
4) Toe Base: 4 inches high.
5) Casters: Six.
6) Oven Rack(s): One for each oven.

e. Electrical Service: Equip unit for connection to electrical service as needed.
f. Gas Service: Natural gas.

B. Deep Fat Fryers: Free Standing, Open Pot Design

1. Gas Fryer (See Schedule at the end of this section)
2. Description: Gas fryer.

a. Oil Capacity: 50 lb.
b. Types and Accessories:

1) Stainless steel fry pot, door and cabinet.
2) Controls: Millivolt control system.
3) Stainless steel fry tank cover.
4) Casters.
5) Basket lifts: Manual
6) Two Fry Baskets.
7) Quick gas-service disconnect and flexible hose.
8) Frying Area: 14" x 15" x 5" (minimum).

c. Electrical Service: Not required (self-contained controls)
d. Gas Service: Natural gas.

2.4 SELF-CONTAINED REFRIGERATION EQUIPMENT

A. Refrigeration Equipment: Free Standing Refrigerator.

1. Refrigerator (See Schedule at the end of this section)
2. Description: Reach-in type.

a. Exterior Finish: Stainless Steel.
b. Interior Finish: Manufacturer's standard anodized aluminum.
c. Doors: Double Full Height Swinging Type.
d. Dimensions: 52" wide x 84" high x 35 deep.
e. Capacity: 46 Cu. Ft.
f. Accessories:

1) Casters: Manufacturer's Standard
2) Stainless Steel Louvers.
3) Doors: Two Solid Face Doors
4) Interior Lights: Manufacturer's Standard.
5) Tray Slides: For sheet pans.
6) Stainless Steel Shelves: Six.
7) Loading Rack: Manufacturer's Standard.
8) Transfer Carriage: Manufacturer's Standard.

g. Electrical Service: Equip unit with plug and cord for service indicated on Drawings.

B. Refrigeration Equipment: Free Standing Freezer.

1. Freezer: (See Schedule at the end of this section)
2. Description: Reach-in Type.

a. Exterior Finish: Stainless Steel
b. Interior Finish: Manufacturer's standard anodized aluminum.
c. Doors: Two Solid Face Doors
d. Dimensions: 52" wide x 84" high x 35 deep.
e. Capacity: 46 Cu. Ft.

f. Accessories:

1) Casters: Manufacturer's Standard.
2) Stainless Steel Louvers.
3) Doors: Two Solid Face Doors
4) Interior Lights: Manufacturer's Standard.
5) Stainless Steel Shelves: Six
6) Stacking kit.

g. Electrical Service: Equip unit with plug and cord for service indicated on Drawings.

C. Stainless Steel Ice-Making Machine: Undercounter

1. Ice Maker (See Schedule at the end of this section)
2. Description: Undercounter unit.

a. Production: Ice cubes.
b. Capacity: 122 lb. per 24-hour period.
c. Dimensions: 26" Wide x 28" deep x 38" High (with 6" legs).
d. Accessories:

1) Storage Bin:

a) Storage Capacity: 90 lb.

2) Stainless steel stand and legs.
3) Water filter.

e. Electrical Service: Equip unit for connection to service indicated on Drawings.

2.5 WAREWASHING EQUIPMENT

A. Warewashing Machines:

1. Dishwasher (Under Counter) (See Schedule at the end of this section).

2. Description: Dish, utensils, pot and pan washing, two racks, stainless steel tank, top, door and sides.

a. Dimensions: 34" H. x 24" W. x 27" D.
b. Capacity: 30 racks per hour.
c. Tank Capacity: 3 Gallons (minimum).
d. Water Usage: 0.74 Gallons per rack.
e. Pump Capacity: 54 gpm (minimum).
f. Controls: Micro-computer, top mounter, with display for temperature and cycle.
g. Accessories: Power Cord kit, Stainless Steel Base and Stainless Steel Top Cover.
h. Electrical Service: Equip unit for connection to service indicated on Drawings.

2.6 MISCELLANEOUS MATERIALS

A. Installation Accessories, General: NSF certified for end-use application indicated.

B. Elastomeric Joint Sealant: ASTM C 920; silicone. Type S (single component), Grade NS (nonsag), Class 25, Use NT (nontraffic) related to exposure, and Use M, G, A, or O as applicable to joint substrates indicated.

1. Public Health and Safety Requirements:

    a. Sealant is certified for compliance with NSF standards for end-use application indicated.
    b. Washed and cured sealant complies with the FDA's regulations for use in areas that come in contact with food.

2. Cylindrical Sealant Backing: ASTM C 1330, Type C, closed-cell polyethylene, in diameter greater than joint width.

2.7 FINISHES

A. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

    a. Run grain of directional finishes with long dimension of each piece.
    b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install foodservice equipment level and plumb, according to manufacturer's written instructions.

1. Connect equipment to utilities.
2. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections.

B. Complete equipment assembly where field assembly is required.

1. Provide closed butt and contact joints that do not require a filler.
2. Grind field welds on stainless steel equipment until smooth and polish to match adjacent finish.

C. Install equipment with access and maintenance clearances that comply with manufacturer's written installation instructions and with requirements of authorities having jurisdiction.

D. Install cabinets and similar equipment on bases in a bed of sealant.

E. Install closure-trim strips and similar items requiring fasteners in a bed of sealant.

F. Install joint sealant in joints between equipment and abutting surfaces with continuous joint backing unless otherwise indicated. Produce airtight, watertight, vermin-proof, sanitary joints.

3.2 CLEANING AND PROTECTING

A. After completing installation of equipment, repair damaged finishes.

B. Clean and adjust equipment as required to produce ready-for-use condition.

C. Protect equipment from damage during remainder of the construction period.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain foodservice equipment.

3.4 SCHEDULE:

Equipment (Refer to Drawing Sheet A-401):

1. Reach-in Freezer: Traulsen G-Series G22010 (2 door)
2. Reach-in Refrigerator: Traulsen G-Series G20010 (2 door)
3. Stainless Steel Sink – 30" D. x 96" L. x 34" H. triple Sink with sloping drainage surface.
4. Under-counter Dishwasher: Hobart "Dishmachine" LXiH3
5. Stainless Steel Prep Table – 30" W. x 96" L. x 34" H.
6. Gas Fryer: "Frymaster"GF40
7. Gas Range (Restaurant Type): Vulcan 60" Endurance Restaurant Range with 6 open Burners, 24" Griddle and 60" Broiler
8. Stainless Steel Prep Table with double Sink – 21" D. x 70" L. x 34" H.
9. Stainless Steel "L-Shape" Counter – (L1: 30" D. 138" L. x 34" H.) and (L2: 30" D. x 38" L. x 34" H.)
10. Pass Through Coiling Door
11. (NOT USED)
12. (NOT USED)
13. Ice Machine: Manitowoc NEO U-140
14. Exhaust Fan (See Mechanical Drawings)
15. Hand Sink (See Plumbing Drawings)
16. 20" D. x 48" L. x 72" H. Stainless Steel Open- wire Shelving/Pot Rack

END OF SECTION 114000

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SECTION 115213 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Electrically operated, front-projection screens and controls.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for metal support framing for front-projection screens.
   Section 061053 "Miscellaneous Rough Carpentry" for wood backing for screen installation.

1.3 DEFINITIONS

A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:

1. Drop lengths.
2. Location of seams in viewing surfaces.
3. Location of screen centerline relative to ends of screen case.
4. Anchorage details, including connection to supporting structure for suspended units.
5. Details of juncture of exposed surfaces with adjacent finishes.
6. Location of wiring connections for electrically operated units.
7. Wiring diagrams for electrically operated units.
8. Accessories.

C. Samples for Initial Selection: For finishes of surface-mounted screen cases.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For front-projection screens to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Environmental Limitations: Do not deliver or install front-projection screens until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

A. Coordinate layout and installation of front-projection screens with adjacent construction, including ceiling suspension systems, light fixtures, HVAC equipment, and partitions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.

2.2 ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Controls: Remote, key-operated, three-position control switch installed in recessed device box with flush cover plate matching other electrical device cover plates in room where switch is installed.

    a. Provide two control switches for each screen.
    b. Provide power supply for low-voltage systems if required.
    c. Provide key-operated, power-supply switch.
    d. Provide video interface control for connecting to projector. Projector provides signal to raise or lower screen.

3. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
4. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- diameter metal rod with ends of rod protected by plastic caps.

    a. Roller for end-mounted motor is supported by self-aligning bearings in brackets.
    b. Roller for motor in roller is supported by vibration- and noise-absorbing supports.

5. Tab Tensioning: Provide units that have a durable low-stretch cord, such as braided polyester, on each side of screen that is connected to edge of screen by tabs to pull screen flat horizontally.

B. Suspended, Electrically Operated Screens without Ceiling Closure, with Motor-in-Roller, and with Tab Tensioning: Units designed and fabricated for suspended mounting, with bottom of case entirely or partially open under screen compartment.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Da-Lite Screen Company.
    b. Draper Inc.
    c. Stewart Filmscreen Corporation.

2. Provide metal or metal-lined wiring compartment.
3. Screen Case: Made from metal.
4. Finish on Exposed Surfaces: Baked enamel.

2.3 FRONT-PROJECTION SCREEN MATERIAL

A. Matte-White Viewing Surface: Peak gain of not less than 0.9, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Da-Lite Screen Company.
    b. Draper Inc.
    c. Stewart Filmscreen Corporation.

B. Material: Vinyl-coated, glass-fiber fabric.

C. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.

D. Flame Resistance: Passes NFPA 701.

E. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.

F. Seams: Where length of screen indicated exceeds maximum length produced without seams in material specified, provide screen with horizontal seam placed as follows:

1. At top of screen at juncture between extra drop length and viewing surface.
2. In location indicated.

G. Seamless Construction: Provide screens, in sizes indicated, without seams.

H. Edge Treatment: Without black masking borders.

I. Size of Viewing Surface: As indicated.

J. Provide extra drop length of dimensions and at locations indicated.

1. Color: Same as viewing surface.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.

B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.

1. Install low-voltage controls according to NFPA 70 and complying with manufacturer's written instructions.

a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

2. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.
3. Test manually operated units to verify that screen-operating components are in optimum functioning condition.

3.2 FRONT-PROJECTION SCREEN SCHEDULE

A. Electrically Operated, Front-Projection Screen Type: Surface mounted, metal encased.

1. Motor Configuration: Motor in roller.
2. Screen Surface: Matte white.
3. Size of Viewing Surface: As indicated.
4. Extra Drop Length: As needed at top of screen for bottom of screen to be 36 inches above floor and 36 inches at bottom of screen.
5. Location: Multi-purpose Room (116)

END OF SECTION 115213

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SECTION 122113 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Horizontal louver blinds with aluminum slats.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long.

D. Samples for Initial Selection: For each type and color of horizontal louver blind.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type and color of horizontal louver blind indicated.

1. Slat: Not less than 12 inches long.
2. Horizontal Louver Blind: Full-size unit, not less than 16 inches wide by 24 inches long.

F. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For horizontal louver blinds with polymer slats that have been tested for compliance with NFPA 701, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. CACO, Inc., Window Fashions.
2. Hunter Douglas Contract.
3. Springs Window Fashions; SWFcontract.

B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.

1. Width: 1 inch.
2. Thickness: Not less than 0.008 inch.
3. Spacing: Manufacturer's standard.
4. Finish: Ionized antistatic, dust-repellent, baked polyester finish or as indicated.

5. Features:

    a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.

1. Capacity: One blind(s) per headrail unless otherwise indicated.
2. Ends: Manufacturer's standard.
3. Manual Lift Mechanism:

    a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
    b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.

4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

    a. Tilt: Full.
    b. Tilt: Two-direction, positive stop or lockout limited at an angle of 60 degrees from horizontal, both directions.
    c. Operator: Clear-plastic wand.
    d. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.

5. Manual Lift-Operator and Tilt-Operator Lengths: Manufacturer's standard.
6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.
7. Integrated Headrail/Valance: Curved face.

D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.

1. Type: Manufacturer's standard.

E. Lift Cords: Manufacturer's standard braided cord.

F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.

1. Type: Braided cord.

G. Valance: Manufacturer's standard.

H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.

1. Type: Between frames.

2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.

J. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.

K. Colors, Textures, Patterns, and Gloss:

1. Slats: As selected by Architect from manufacturer's full range or as indicated on Drawings.
2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 BLIND FABRICATION

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.

C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so slat edges are not closer than 1/2 inch from interior faces of glass, through full operating ranges of blinds.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems.

END OF SECTION 122113

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SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roll-up rail mats.
2. Recessed frames.

1.3 COORDINATION

A. Coordinate size and location of recesses in concrete to receive floor mats and frames.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.

B. Shop Drawings:

1. Items penetrating floor mats and frames, including door control devices.
2. Divisions between mat sections.
3. Perimeter floor frames.
4. Custom Graphics: Scale drawing indicating colors.

C. Samples: For the following products, in manufacturer's standard sizes:

1. Floor Mat: Assembled sections of floor mat.
2. Tread Rail: Sample of each type and color.
3. Frame Members: Sample of each type and color.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For floor mats and frames to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

A. Structural Performance: Provide roll-up rail mats and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:

1. Uniform floor load of 300 lbf/sq. ft.
2. Wheel load of 350 lb.

B. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 ROLL-UP RAIL MATS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Forbo Industries, Inc.
2. Mats Incorporated.
3. Musson Rubber Co.

B. Roll-up, Vinyl-Rail Hinged Mats: Vinyl-acrylic tread rails 3 inches or as indicated wide by 3/8 inch thick, with slotted or perforated hinges.

1. Tread Inserts: 1/4-inch-high, 28-oz./sq. yd. weight, level-cut, nylon-pile, fusion-bonded carpet.
2. Colors, Textures, and Patterns of Inserts: Match Architect's sample or selection.
3. Rail Color: Match Architect's sample or selection.
4. Hinges: Vinyl.
5. Mat width: As indicated.
6. Mat length: Ten (10) feet.
7. Sustainability: 25% minimum recycle content.

2.3 FRAMES

A. Recessed Frames: Manufacturer's standard extrusion.

1. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.

a. Color: As selected by Architect from full range of industry colors and color densities or as indicated.

2.4 CONCRETE FILL AND GROUT MATERIALS

A. Provide concrete fill and grout equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.5 FABRICATION

A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.

1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

C. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install recessed mat frames and mats to comply with manufacturer's written instructions so that tops of mats will be flush with adjoining finished flooring. Set mats with tops at height recommended by manufacturer for most effective cleaning action; coordinate tops of mat surfaces with bottoms of doors that swing across mats to provide clearance between door and mat.

1. Install necessary shims, spacers, and anchorages for proper location, and secure attachment of frames.
2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.
3. Delay setting mats until construction traffic has ended.

B. Install surface-type units to comply with manufacturer's written instructions; coordinate with entrance locations and traffic patterns.

1. Anchor fixed surface-type frame members to floor with devices spaced as recommended by manufacturer.

3.3 PROTECTION

A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124813

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